CABI Plantwise



Plantwise in Burundi

Annual Report 2023

KNOWLEDGE FOR LIFE



Plantwise is a global programme, led by CABI, that aims to increase food security and improve rural livelihoods by reducing crop losses. Working in close partnership with relevant actors, Plantwise strengthens national plant health systems from within, enabling countries to provide farmers with the knowledge they need to lose less and feed more.

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Acronyms

COPE	Centre of Phytosanitary Excellence
ISABU	Institut des Sciences Agronomiques du Burundi
ITAB	Institut Technique Agricole du Burundi
MEC	Mass Extension Campaign
MEL	Monitoring, Evaluation and Learning
POMS	Plantwise Online Management System
WEAI	Women's Empowerment in Agriculture Index



Executive summary

Project description

Plantwise, a global programme led by CABI, aims to reduce crop losses due to plant health problems. Collaborating closely with national agricultural advisory services and partners, the programme establishes networks of plant clinics staffed by trained experts, offering practical advice to farmers on plant health. These networks are supported by the Plantwise Knowledge Bank, which provides access to a wealth of online and offline resources, including diagnostic tools, pest management advice, and data analysis for targeted crop protection. Together, these resources enhance national plant health systems by fostering linkages among stakeholders and facilitating information exchange. Strengthening these systems equips countries to support farmers in ensuring a safe and sustainable food supply and improving livelihoods. Since its launch in 2011, Plantwise has been implemented in 35 countries, collaborating with over 200 partners, including governments, NGOs, and farmers' associations. Since late 2020, Burundi has joined the list of countries benefiting from Plantwise interventions. In Burundi, the Institut des Sciences Agronomiques du Burundi (ISABU) serves as the National Responsible Organization for Plantwise, with funding provided by Nuffic (July 2020-March 2022) and the Embassy of the Kingdom of the Netherlands in Bujumbura, Burundi (November 2020-February 2024).

Project highlights

The Plantwise project in Burundi made significant strides in 2023, with achievements detailed in this report. Based on impact study results, the project has had a positive impact on the development of resilient farming enterprises. Assessing the project's impact on farm productivity and income requires additional time. However, preliminary findings gathered as part of results monitoring provide positive indications that the farmers reached have likely experienced improved productivity and income.

Upon examining broader project results (Annex 1), it is evident that two out of three outcome indicators surpassed targets, while one showed a moderate gap. Similarly, five out of seven output indicators surpassed targets, with two demonstrating a moderate gap. The project also refined its approach to measuring women's empowerment, transitioning from specific results indicators to a more comprehensive measure—the Women's Empowerment in Agriculture Index (WEIA). This shift reflects the project's commitment to promoting gender equity and ensuring inclusivity in its impact assessment.

Key project highlights for 2023 include:

- Establishment of 71 new plant clinics, bringing the cumulative total to 121 clinics. These clinics serve as vital hubs for providing practical plant health advice to farmers.
- At least 289,242 farmers reached in 2023 (533,895 cumulative since project start) through direct outreach

(plant clinics, plant health rallies, and community conversations) and indirect outreach (mass extension campaigns).

- Handling of 6,191 plant clinic queries reported in 2023 (7,967 cumulatively) through the Plantwise Online Management System (POMS), facilitating timely and effective responses to farmers' plant health inquiries.
- Execution of 19 community conversation sessions across 9 communes, fostering dialogue and behaviour change towards more inclusive agricultural practices. Community conversations serve as a platform for shifting social norms that limit women's participation in agricultural activities and decision-making roles.
- A horizon scanning workshop was held using CABI's Horizon Scanning Tool. This workshop identified 7,991 potential pests that could threaten Burundi's agricultural ecosystems in the future.
- Training of 29 participants on mealybugs of economic importance in East Africa and their biological control, enhancing expertise in pest management strategies.
- Integration of plant doctor modules into the training guides for 2nd and 3rd year crop protection students of ITABs (Institut Technique Agricole du Burundi), ensuring the incorporation of practical plant health knowledge into agricultural education.
- Completion of an external evaluation assessing programme performance against evaluation criteria of relevance, coherence, effectiveness, efficiency, and sustainability.
- Conduct of an endline Women's Empowerment in Agriculture Index (WEAI) survey, assessing the impact of Plantwise interventions on shifting social norms and behaviours related to women's participation in agriculture.
- Organization of a study visit to Kenya for 10 personnel from Burundi, facilitating training on pest and disease diagnostics, laboratory management, and pest surveillance and diagnosis in phytosanitary systems at the Centre of Phytosanitary Excellence (COPE).
- Scientific identification of the mango mealybug and citrus orthezia as invasive pests, highlighting the importance of proactive measures in managing these threats to agricultural ecosystems.
- Refurbishment of an ISABU screenhouse to support the mass production of a mango mealybug parasitoid (a natural enemy), bolstering biological control efforts and mitigating the threat posed by the mealybug invasion on mango trees.
- Renovation of ISABU's plant pathology laboratory to enhance diagnostic capabilities.
- Establishment and equipping of four permanent plant clinics in four communes, providing accessible plant health services.
- Procurement of a project vehicle stationed at ISABU, facilitating efficient mobility for personnel and resources.
- Conduct of comprehensive refresher courses for plant doctors, ensuring continuous professional development, equipping them with updated knowledge and skills for effective plant health management.

Project challenges and measures taken

In 2023, the Plantwise project in Burundi experienced challenges in the execution of some tasks which in certain instances resulted in delays. These challenges include:

i. Plant clinics encounter challenges in delivering top-quality diagnosis and advice to farmers, mainly due to limited practical experience among some plant doctors, especially those operating new clinics. However, this challenge is typical in Plantwise projects globally, and plant doctors' skills are anticipated to enhance with practice. To tackle this issue, the project initiated continuous training and mentorship programmes for plant doctors, aiming to enhance diagnostic proficiency and ensure accurate and effective plant health guidance.

ii. Challenges persisted in transmitting data from plant clinics to central systems due to internet connectivity issues, app usage difficulties, and reliance on paper forms, complicating data digitization. To overcome these hurdles, the project enhanced app training for plant doctors, and prioritized digitizing paper records. Consequently, these efforts yielded positive results, with a 300% increase in clinic data records submitted in 2023.

iii. Ensuring sufficient outreach to farmers with appropriate advice faced challenges due to inadequate collaboration among diverse agricultural extension services. To tackle this issue, the project began

exploring partnerships with several organizations, such as One Acre Fund. Although this potential collaboration is in its initial phases, it presents evident advantages for mutual cooperation into the future.

iv. Although the project promoted the adoption of best practices, certain farmers perceived the recommended methods as prohibitively expensive. The project could not address this issue but remains crucial for addressing in future initiatives or supplementary programmes within the country.

v. Limited diagnostic capabilities in Burundi pose challenges in effectively managing pests. For instance, the project faced difficulties identifying potential invasive pests due to the lack of necessary analysis tools. To mitigate this issue, samples suspected to be mango mealybug and citrus orthezia were sent abroad for identification. Moreover, the project implemented two measures to enhance Burundi's diagnostic capacity:

   - Ten Burundian personnel underwent a study visit to Kenya to acquire advanced diagnostic skills.
   - The project facilitated the renovation of ISABU's plant pathology laboratory, aiming to enhance the facility for future diagnoses.

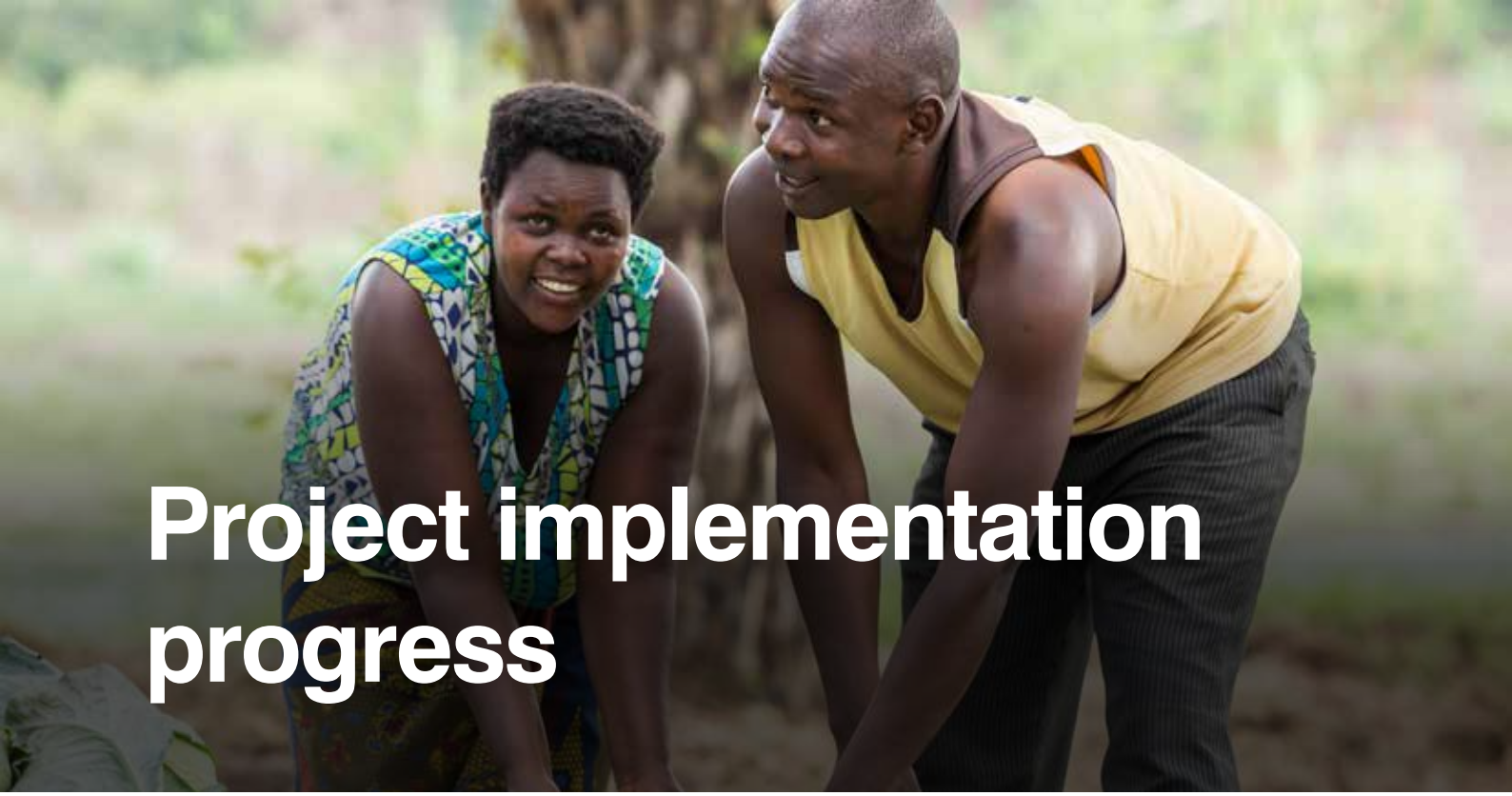
vi. Addressing the critical threat posed by mango mealybug, proactive measures were implemented, including the refurbishment of an ISABU screenhouse for rearing a mango mealybug parasitoid. This initiative played a vital role in mitigating the devastating impact of the mealybug infestation.

Lessons learned

- Positive impact on farming resilience was demonstrated. While early trends show promise, a longer-term analysis is needed to fully assess the project's impact on farm productivity and income.
- Solutions should not only be effective but also affordable and adaptable to farmers' specific contexts to ensure sustainability.
- Factors contributing to increased adoption rates include improved communication strategies, growing trust in plant doctors' expertise, and targeted approaches addressing farmer challenges. Ensuring consistent quality of diagnosis across all plant clinics, especially with varying experience levels, is crucial.
- Application of evidence-based multiplication factor from CABI research suggests that the overall project reach target has been (over)achieved in Burundi by end of 2023.
- Sustaining training and support for plant doctors in a changing agricultural landscape requires continuing efforts.
- Accessibility, local context, user engagement through capacity building, and continuous improvement based on feedback are key for the Plantwise Knowledge Bank's effectiveness. Comprehensive training on digital literacy and ICT tools is still needed for stakeholders.
- Digital platforms need continuous improvement for data management, usability, and efficiency. Centralised data repositories like POMS are valuable for informed decision-making.

Next steps

- Conduct a more detailed analysis to comprehensively assess the project's impact on farmer productivity and income.
- Continue to support plant doctors and tailor communication to diverse farmer needs. Additionally, continue to implement robust feedback mechanisms.
- Utilise new diagnostic skills and facilities to further build capacity so that national pest distribution will be confirmed and targeted control measures can be identified for widespread implementation.
- Invest in ongoing training for plant doctors, foster farmer-to-farmer learning, and maintain rigorous monitoring and evaluation.
- Enhance beginner plant doctor expertise through training and mentorship programmes. Strengthen collaboration with partners (like One Acre Fund) for wider outreach.
- Focus outreach on underserved areas, improve digital tools usability based on user feedback, develop more locally-tailored extension content, and empower digital tool users through capacity building.



Project implementation progress

Impact: Improved crops productivity and income for smallholder farmers in Burundi contributing to agricultural growth

Overall project target: Increase productivity and income for 60,000 farmers (10% of project participants), while also enhancing the resilience of their family farms.

Progress in 2023

Monitoring, evaluation, and learning (MEL) activities, including result monitoring surveys, play a vital role in assessing the project's effectiveness. In 2023, the project conducted the second result monitoring survey to evaluate the impact to date of its interventions. The survey assessed farmers' adoption of improved practices, pest management enhancements, and changes in productivity and income for targeted crops.

Encouragingly, the 2023 survey results demonstrated that the project is surpassing expectations in one key area: the development of resilient farming enterprises. This indicator specifically assesses farmers' ability to cope with unexpected challenges and disruptions. The survey data revealed that 12% (against a target of 10%) of the sampled farmers reported significant improvements in dealing with shocks. This positive trend was observed across genders, with 15% of female farmers and 12% of male farmers indicating enhanced resilience. These findings suggest that Plantwise interventions are effectively equipping farmers with the knowledge, resources, and strategies necessary to navigate difficulties and ensure the long-term sustainability of their farms.

While analysing the full impact of Plantwise Burundi interventions on local farm productivity and income is crucial, it is important to acknowledge the limitations posed by the timeframe. The 2022-2023 period was not sufficient to capture the complete picture. Agricultural interventions often require multiple seasons or even years to yield measurable results. Factors such as crop cycles, weather patterns, and the rate of adoption of new practices all play a significant role in determining long-term impacts.

Despite this limitation, valuable preliminary insights were gleaned from the data collected in the second result monitoring survey (Annex 2). For instance, the productivity and income from tomato and Irish potato farming between 2022 and 2023 for project participants depict notable changes, reflecting shifts in agricultural dynamics and household earnings (Table 1).

Table 1: Comparison of Irish potato and tomato productivity and Income: 2022 vs. 2023

Crop harvested in 12 months	Year	Number of farmers (N)	Area under crop (ha)	Yield harvested (t/ha)	Quantity consumed (t/ha)	Quantity sold (t/ha)	Household produce income (USD/ ha)
Tomato	2022	53	0.13	6.4	1.1	5.6	5,780
Tomato	2023	44	0.19	7.8	*	7.0	1,622
Irish Potato	2022	72	0.12	3.8	1.5	2.4	753
Irish Potato	2023	113	0.36	11.3	*	9.8	4,779

*Missing data due to limitations in farmer recall and reporting consistency

Area under cultivation for tomatoes expanded by 46% from 2022 to 2023, alongside a notable increase in the quantity harvested per hectare, which rose from 6.4 to 7.8 tons. However, data on the quantity of tomatoes consumed by farmers in 2023 is missing. This lack of information makes it difficult to definitively assess changes in sales compared to 2022. Despite the potential production increase, tomato income for farmers significantly decreased from USD 5,780/ha in 2022 to USD 1,622/ha in 2023. This decline warrants further investigation to understand the underlying reasons.

In contrast to tomatoes, Irish potato cultivation experienced a remarkable turnaround. The area under cultivation tripled, and productivity mirrored this growth. The quantity harvested per hectare jumped from 3.8 tons in 2022 to an impressive 11.3 tons in 2023. While, similar to tomatoes, data on the quantity of potatoes consumed in 2023 is missing, the significant production increase suggests a potential rise in sales as well. This positive trend is further supported by a significant increase in Irish potato income for farmers, rising from USD 753/ha in 2022 to USD 4,779/ha in 2023.

While the project appears to have had a positive impact on Irish potato productivity and income, a definitive conclusion for tomatoes requires data on the quantity sold in 2023. The decline in tomato income despite potentially increased production necessitates further investigation. Furthermore, the absence of data on the quantity of both crops consumed by farmers in 2023 hinders a complete understanding of the project's impact on household consumption patterns. Future data collection efforts should include this information to provide a more comprehensive picture of the project's overall impact.

Lessons learned

The Plantwise project in Burundi shows promise in strengthening farm resilience, but a longer timeframe is needed to definitively measure its impact on income and productivity. While initial surveys offer positive signs for farm output, a more comprehensive and long-term analysis is necessary. The project also highlighted the importance of complete data collection. Missing information on household crop consumption in 2023, the result of limitations in farmer recalls and reporting consistency, limited the ability to assess sales and consumption patterns. Future data collection efforts should include this crucial information to provide a clearer picture of the project's overall impact on farm income, food security, and long-term farm productivity.

Next steps

While a more detailed analysis requiring a longer timeframe and even more comprehensive data collection methods would allow for a more robust assessment of impact, these preliminary findings provide encouraging indications that Plantwise interventions are positively affecting farmer productivity and income. Future evaluations will be designed to capture a more complete picture, allowing for a refinement of the project's approach, and ensuring long-term success in fostering resilient family farms in Burundi.

Outcome 1: Plant doctors reach more farmers with better quality advice

Overall project target: Increase the satisfaction rate of farmers with plant doctor services to 80% by the end of the project.

Progress in 2023

The Plantwise project in Burundi employed a multi-pronged approach in 2023 to reach in excess of 295,838 farmers. This included direct methods like plant clinics, plant health rallies, and community conversations, along with indirect methods like mass extension campaigns (Table 2).

Table 2: Plantwise farmer reach in 2023 segregated by the extension method

Extension method	Farmers reached
Plant clinics (based on POMS entries only)	6,191
Community conversation	405
Plant health rallies	23,131
Mass extension campaigns (in collaboration with AUXFIN)	266,111
Total	**295,838**

To assess the project's effectiveness, a key focus of results monitoring was farmer satisfaction. A survey targeted households that had visited plant clinics for crop health advice. The results were very positive, showing a substantial increase in overall satisfaction with the advice and recommendations provided by plant doctors (from 89% in 2022 to 95% in 2023) (Figure 1). This increase in satisfaction was consistent across genders, with both women and men expressing greater confidence in the services. This rise in satisfaction implies several positive outcomes for the project.

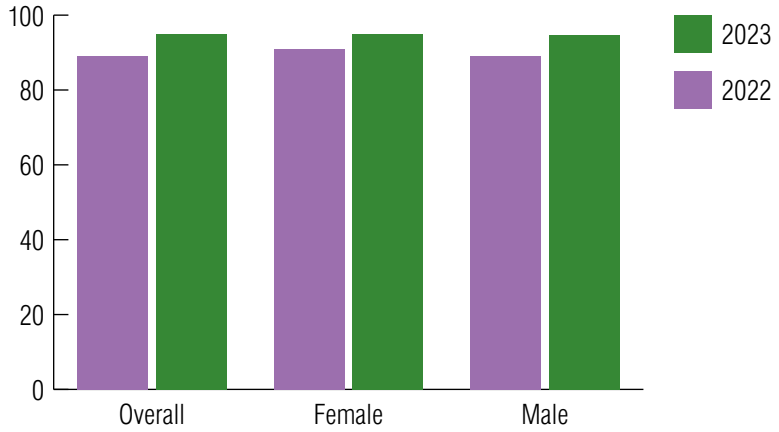




Figure 1: Comparison of farmer satisfaction rates by gender in 2022 and 2023

The increased farmer satisfaction signifies enhanced trust and confidence in plant doctors' expertise, promoting greater adoption of recommended practices by farmers. This is expected to result in improved crop health, higher yields, and increased productivity and income. Additionally, a satisfied farmer base contributes to the project's long-term sustainability, anticipating continued engagement and broader benefits for future participants.

Lessons learned

The Plantwise project's pursuit of high farmer satisfaction provides insights for future agricultural development efforts. Key lessons include the significance of ongoing monitoring to track progress and address areas needing improvement. Moreover, sustainability considerations are vital, emphasizing the importance of solutions that are not only effective but also affordable and adaptable to farmers' unique contexts.

Next steps

The 2023 survey results reveal considerable progress. To maintain this positive outcome, future initiatives (PlantwisePlus) should focus on maintaining service quality through ongoing backstopping and other support for plant doctors. Tailoring communication strategies to address specific needs and challenges of diverse farmer groups should be another priority. Additionally, incorporating more robust feedback mechanisms will enable continuous improvement in service provision.

Outcome 2: Plantwise contributing to prompt identification and action on plant health problems

Overall project target: Identify or solve a total of 2 new and emerging plant health problems throughout the project duration.

Progress in 2023

The Plantwise project in Burundi has played a pivotal role in the identification and management of emerging threats to agricultural productivity. In 2023, the project achieved a significant milestone by identifying two previously unknown pests in the country: the mango mealybug and citrus orthezia scale. These discoveries mark a crucial moment in the project's efforts to safeguard the agricultural sector against potential threats. Accurate identification of pests is important for implementing effective control measures, developing targeted interventions, and informing policy decisions. By identifying these new and emerging plant health problems, Plantwise Burundi has demonstrated its capacity to stay vigilant and proactive in addressing evolving challenges in agriculture.

The identification of the mango mealybug and citrus orthezia scale adds to a cumulative total of five new and emerging plant health problems identified by the project against a target of identifying only two such problems throughout its entire lifespan. The surpassing of this target underscores the project's effectiveness in surveillance and early detection of pests, which is crucial for mitigating their impact on agricultural production.

While the identification of these pests represents a success, it also highlights a key challenge: the lack of essential infrastructure and expertise within Burundi. Due to limitations in molecular and morphological analysis tools, the identification process required sending samples overseas.

To bolster the country's diagnostic capabilities and ensure long-term resilience, the Plantwise project initiated some vital actions. Firstly, ten Burundian personnel underwent training in Kenya, gaining introductory skills in pest identification. This investment in human resources supports the establishment of a proficient workforce capable of addressing future challenges. Moreover, the project trained 29 participants on mealybugs of economic importance in East Africa and their biological control, further enhancing expertise in pest management strategies. Secondly, the project facilitated the refurbishment of ISABU's plant pathology laboratory, anticipated to be equipped with enhanced tools and resources, thereby enabling domestic diagnostic capabilities for future plant health assessments. Alongside these efforts, a horizon scanning workshop was held using the CABI's Horizon Scanning Tool, which identified 7,991 potential pests that could threaten Burundi's agricultural ecosystems in the future. This proactive approach to identifying emerging threats underscores the project's commitment to safeguarding the country's agricultural sector against future challenges. Finally, to combat the serious threat posed by the recent mango mealybug invasion of farms, the project took proactive measures. This included refurbishing an ISABU screenhouse specifically for rearing a natural enemy of the mealybug – a parasitoid wasp. This initiative played a crucial role in mitigating the devastating impact of the pest outbreak.

Lessons learned

Early detection of new pests is critical for minimizing their negative impact on agriculture, emphasizing the importance of swift identification. Strengthening local diagnostic capabilities through investment is vital for improving pest management strategies. Equipping local personnel with advanced skills ensures the sustainability of diagnostic capacity in the long term, facilitating effective pest control measures and bolstering agricultural resilience.

Next steps

By building on these successes and lessons learned, it will be possible to significantly contribute to a more secure agricultural future for Burundi. Next steps that are needed involve utilizing the newly acquired skills and improved facilities to confirm the spatial distribution of these pests within the country and explore and implement targeted control measures to mitigate their potential damage. This will not only address the immediate threats posed by the mango mealybug and citrus orthezia scale but also establish a foundation for effectively managing future pest challenges.

Outcome 3: Farmers adopt practices according to advice given by plant doctors

Overall project target: Increase the adoption of Plantwise advice by farmers by 30% during the entire project duration.

Progress in 2023

The 2023 results monitoring survey revealed significant improvements in farmers' adoption of advice and recommendations from project interventions: the percentage of clients fully implementing plant doctors' advice rose from 63% to 84%, while the perception of advice effectiveness increased from 49% to 76% (Figure 2). These findings indicate a growing level of trust and satisfaction among farmers with the services provided by plant clinics.

The rise in adoption rates within the project could signify substantial benefits: improved crop health and yields have been observed in other countries when farmers heed the guidance of plant doctors, leading to heightened income and enhanced food security among farming households. Additionally, increased adoption could foster a more sustainable agricultural framework, as farmers might reduce reliance on harmful chemicals by implementing integrated pest management practices and embracing new technologies, promoting long-term plant health and ecological balance. Moreover, widespread adoption of recommended practices might indicate successful knowledge transfer from plant doctors to farmers, equipping them with the knowledge needed to make better informed decisions about their crops and fostering greater self-sufficiency in farm management.

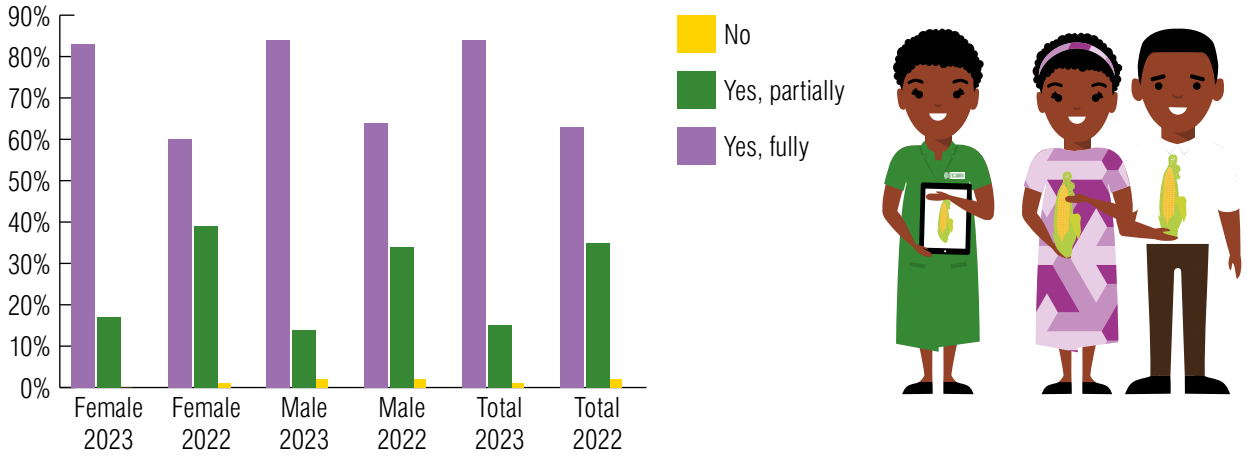


Figure 2: Application and effectiveness of plant health advice by gender of household head

Lessons learned

The encouraging data suggest various underlying factors contributing to the rise in adoption rates: Firstly, improved communication strategies have facilitated clearer understanding of the advice dispensed by plant doctors, thereby enhancing receptivity to their recommendations. Secondly, the substantial increase in positive feedback indicates a growing trust in the expertise of plant doctors, which likely motivates farmers to implement their suggestions more diligently. Lastly, the project's targeted approach in addressing farmer challenges and customizing recommendations to fit specific contexts likely fosters a conducive environment for increased adoption of recommended practices.

Next steps

To further capitalize on the project's successes, several strategic considerations should be made: Firstly, sustaining the quality of service is paramount, necessitating ongoing investment in training and support for plant doctors to keep them abreast of the latest knowledge and best practices. Secondly, fostering farmer-to-farmer learning initiatives can facilitate the exchange of insights and experiences, fostering a supportive network and promoting widespread adoption of recommended practices. Lastly, maintaining rigorous monitoring and evaluation mechanisms through regular surveys enables timely adjustments to strategies, ensuring the continued relevance and effectiveness of the project's recommendations.

Output 1: Plant clinic networks established and complemented by other extension methods to enhance access to information on sustainable management of crop health

Overall project target: establish a network of 100 operational plant clinics across Burundi, ensuring that 600,000 farmers, including both men and women, gain access to plant health advice through these clinics or complementary Plantwise-led extension approaches.

Progress in 2023

The project achieved a major milestone in 2023 by establishing an additional 71 plant clinics, bringing the nationwide total to 121. These clinics serve as crucial hubs, providing farmers with practical and localized advice to address their plant health concerns. This widespread coverage underscores the project's commitment to democratizing access to agricultural resources and empowering farmers with the knowledge and tools necessary to safeguard their crops and livelihoods. By decentralizing plant health services and making them more accessible, the project not only addresses immediate agricultural concerns but also contributes to the long-term resilience and sustainability of farming communities across the country.

Reaching a target of 600,000 farmers necessitates a comprehensive strategy, which the project has pursued vigorously. In 2023 alone, the initiative effectively reached 295,838 farmers (Table 2), contributing to a cumulative total exceeding 540,491 since its inception. This remarkable outreach was facilitated through a dual approach comprising direct and indirect methods. Direct outreach efforts encompassed services provided at established plant clinics, engaging plant health rallies, and fostering community conversations aimed at informal knowledge exchange. Indirect outreach, on the other hand, utilized mass extension campaigns (MECs), such as those jointly conducted with AUXFIN, targeting Banana Xanthomonas Wilt and safe chemical use. These MECs involved the production of educative videos for farmers and disseminating them through AUXFIN's AgriCoach platform to the G50 groups. This concerted approach ensures widespread access to critical plant health knowledge, accommodating diverse learning preferences and geographical locations, ultimately bolstering agricultural resilience and productivity.

Lesson learned

Based on recent CABI research elsewhere (across multiple low-medium income countries), we could apply an evidence-based multiplication factor for estimating further reach through farmer-to-farmer sharing (Table 3).

Table 3:Multiplication factor of farmer-to-farmer sharing information, by source media

Multiplication factor by media	Face to face	SMS	Radio	TV	Print media
Average % who share (all ages, gender, countries)	94%	93%	90%	94%	97%
Number shared with (all ages, gender, countries, media)	14	13	13	11	10
Proportional reduction based on percentage of information shared	56%	48%	50%	49%	52%
Total farmer-to-farmer sharing after proportional reduction	7	6	6	5	5

Study results showed that 91% of farmer recipients share information, and they share with, on average, just under 12 other people. Once it is recognised that on average 51% of information is shared, a multiplication factor of just over 5 can be derived to calculate farmer to farmer sharing of information. There is a small amount of variation in this multiplication factor when considering the channel through which the information was first shared, which can add further accuracy to the farmer to farmer sharing calculation. Nevertheless, the study shows that we can be confident that the project reach target will have been achieved in Burundi by end 2023.

Next steps

While significant progress has been achieved, challenges remain to be addressed. One such challenge pertains to building expertise, particularly among newer plant clinics where limitations in providing top-quality diagnosis and advice may arise due to the practical experience of some plant doctors. To tackle this issue, the project has implemented continuous training and mentorship programmes aimed at enhancing the diagnostic proficiency of plant doctors over time. As these professionals gain more experience, the effectiveness of plant clinics is expected to improve substantially. Additionally, collaboration emerges as a key factor in ensuring sufficient outreach with appropriate advice. Strong partnerships among diverse agricultural extension services are essential for reaching a broader audience with tailored guidance. The project's exploration of collaborations with organizations like One Acre Fund holds promise for fostering enhanced cooperation and facilitating the wider dissemination of agricultural knowledge and practices.

Output 2: Plant doctors deliver advice at plant clinics

Overall project target: 200 plant doctors offering advice to farmers at plant clinics

Progress in 2023

In pursuit of establishing a network of 100 operational plant clinics across Burundi, the Plantwise project made significant strides forward in 2023. With the establishment of 71 new plant clinics, the nationwide total now stands at an impressive 121, marking a substantial leap towards achieving widespread accessibility to plant health advice. To support the operation of these new clinics, 138 new plant doctors were deployed (having been trained in late 2022), bringing the cumulative total of active plant doctors to 238. Recognizing the importance of ensuring that all plant doctors are equipped with the necessary skills and knowledge, both new and existing plant doctors underwent refresher training through regional cluster meetings. These sessions not only provided opportunities for skill reinforcement but also facilitated knowledge exchange and networking among plant doctors. Efforts were also made to institutionalize plant doctor training by incorporating relevant course content into existing secondary school level curriculum, particularly in the second and third years of ITABs.

Lessons learned

Ensuring consistent quality of diagnosis and advice across all plant clinics remains a priority, especially considering the varying levels of experience among plant doctors. Furthermore, sustaining the momentum of training and support for plant doctors amidst evolving agricultural landscapes presents ongoing challenges. The realization of the importance of continuous capacity building stems from the recognition that the effectiveness of plant clinics relies heavily on the skills and knowledge of the plant doctors operating them. Through ongoing training and mentorship programmes, plant doctors can stay abreast of emerging agricultural trends, advancements in plant health management, and evolving pest and disease threats. This continuous capacity building not only ensures that plant doctors remain proficient in their roles but also enables them to adapt to changing circumstances and effectively address the diverse needs of farmers.

Furthermore, the integration of plant doctor modules into formal education systems underscores the long-term sustainability and reach of plant doctor training. By incorporating relevant course content into secondary school curricula, such as those offered by ITABs, the project lays the foundation for a future generation of farmers who are equipped with essential plant health knowledge and skills. This proactive approach not only helps to instil a culture of plant health awareness from an early age but also ensures that agricultural education remains relevant and responsive to the needs of the farming community. Ultimately, by embedding plant doctor modules within formal education systems, the project contributes to building a more resilient and knowledgeable agricultural workforce, capable of tackling plant health challenges and driving sustainable agricultural development in Burundi for years to come.

Next steps

Looking ahead into the future, the importance of consolidating the project achievements needs to be built upon to ensure sustained impact and scalability. Strengthening collaboration with key stakeholders, including government agencies, non-profit organizations, and community groups, is paramount to maximizing the reach and effectiveness of plant health interventions. By fostering partnerships and alliances, existing networks and resources can be leveraged to amplify efforts and reach a broader audience of farmers. Additionally, enhancing monitoring and evaluation mechanisms will enable the project to systematically assess its progress, identify areas for improvement, and make data-driven decisions to optimize outcomes. This includes refining data collection processes, analysing results more effectively, and integrating feedback loops to ensure continuous learning and adaptation. Furthermore, fostering innovation in plant health delivery approaches is essential for staying responsive to evolving challenges and opportunities. By embracing new technologies, methodologies, and best practices, the project can enhance the efficiency, accessibility, and sustainability of its interventions, ultimately empowering both men and women farmers across Burundi with the knowledge and resources they need to protect their crops and secure their livelihoods.

Output 3: Plantwise Information resources used by plant doctors and other plant health stakeholders

Overall project target: 350 stakeholders using Plantwise knowledge bank (data and other information resources), and 30 extension materials developed/adapted by local experts and stored in the knowledge bank for use in Burundi

Progress in 2023

In 2023, the Plantwise project in Burundi made significant strides in leveraging digital platforms to disseminate plant health knowledge and resources to stakeholders across the country. The emergence of the Plantwise Knowledge Bank as a vital resource, with 127 active users (cumulative 437) accessing valuable data and information, signifies a significant milestone in the Plantwise project's mission to disseminate plant health knowledge in Burundi. This platform serves as a centralized repository for stakeholders, offering essential resources crucial for supporting agricultural practices across the country. Among the resources available are the 19 extension materials developed by Burundi partners, with an additional 12 awaiting review and validation within the country before publication, highlighting the collaborative efforts to enrich the Plantwise Knowledge Bank with locally-relevant content. The Plantwise Knowledge Bank provides access to a wide range of resources, including diagnostic tools, pest management techniques, and crop-specific recommendations, tailored to address the diverse needs and challenges of stakeholders. By facilitating easy access to timely and relevant information, the Plantwise Knowledge Bank empowers users to make informed decisions, adopt best practices, and enhance agricultural productivity, resilience, and sustainability.

Lessons learned

The utilization of the Plantwise Knowledge Bank in Burundi has provided valuable lessons for digital knowledge dissemination initiatives in agricultural development. Ensuring accessibility to diverse stakeholders, including those in remote areas, and tailoring content to local contexts are vital for the platform's effectiveness. Sustained user engagement, facilitated through capacity-building efforts, enhances the platform's impact. Continuous improvement based on user feedback and technological advancements is crucial for maintaining relevance and usability. These insights underscore the importance of user-centric scalability and sustainability in digital knowledge dissemination initiatives, contributing to the empowerment of stakeholders and the promotion of sustainable agriculture in Burundi.

Next steps

Further expansion of the user base of the Plantwise Knowledge Bank, focusing on outreach efforts to remote and underserved areas to ensure equitable access. Additionally, enhancing the functionality and usability of the platform based on user feedback and technological advancements can improve user engagement and satisfaction. Collaborating with local partners to develop and publish additional extension materials tailored to the needs of Burundian farmers will enrich the knowledge bank and enhance its relevance. Moreover, ongoing

capacity-building initiatives can empower users to leverage the platform effectively for informed decision-making in plant health management. By prioritizing these actions, the project can continue to strengthen its digital footprint and support sustainable agricultural practices in Burundi.

Output 4: Data-driven ICT-based processes adopted in systems for Plant health management at the smallholder farmer level

Overall project target: 250 male and female plant doctors and other stakeholders using the Plantwise ICT toolkit (Data Collection App, Factsheet App, etc) and 10,000 plant clinic records stored in the Burundi site of the Plantwise Online Management System (POMS)

Progress in 2023

The Plantwise project in Burundi is harnessing digital tools to revolutionize plant health management.

In 2023, the Plantwise project in Burundi demonstrated significant progress. A total of 250 male and female plant doctors and other stakeholders actively utilized the Plantwise ICT toolkit, including the Plantwise Factsheet Library App and the Plantwise Data Collection App. The Factsheet Library App witnessed substantial engagement, with 178 new devices onboarded during the year, resulting in an average of 11 active devices per day and 28 sessions per day. Furthermore, the Data Collection App recorded a total of 341 users in 2023, including 173 new users, highlighting the increasing adoption of digital platforms for data collection and management.

Additionally, the POMS played a pivotal role in handling plant clinic queries, with 6,191 queries reported in 2023 and a cumulative total of 7,967 queries addressed through the system. However, challenges persisted in transmitting data from plant clinics to central systems due to internet connectivity issues, app usage difficulties, and reliance on paper forms, hindering effective data digitization. To address these challenges, the project intensified app training for plant doctors and prioritized the digitization of paper records. These efforts resulted in a remarkable 300% increase in clinic data records submitted in 2023, indicating improved data management practices. Moving forward, the project aims to further enhance digital literacy among stakeholders, streamline data transmission processes, and optimize the functionality of digital tools to ensure more efficient and effective plant health management in Burundi.

Lessons learned

The project's experience underscores the significance of providing comprehensive training and support to stakeholders to enhance their digital literacy and proficiency in utilizing ICT tools. Additionally, the project highlights the need for continuous improvement and adaptation of digital platforms to streamline data management processes and optimize functionality for better usability and efficiency. Furthermore, the project emphasizes the value of centralized data repositories, like the POMS, in facilitating data analysis and informed decision-making. Overall, the lessons learned emphasize the importance of a holistic approach to digital transformation, encompassing capacity building, technological infrastructure development, and ongoing monitoring and evaluation to ensure the successful integration of digital tools into plant health management practices.

Next steps

Moving forward (under PlantwisePlus), the Plantwise project in Burundi plans to focus on several key next steps to further strengthen plant health management. These include providing ongoing training and support to plant doctors and stakeholders to enhance their digital literacy and maximize the use of ICT tools for data collection and management. Additionally, strategies will be implemented to address connectivity issues and streamline the process of transmitting clinic data to central systems. Efforts to digitize paper records and integrate them into the POMS will be scaled up, alongside continuous refinement of the functionality and usability of digital tools to meet the evolving needs of users. Furthermore, robust monitoring and evaluation mechanisms will be implemented to track progress, identify areas for improvement, and measure the impact of digital interventions on plant health outcomes. Through these initiatives, the Plantwise project aims to advance plant health management practices in Burundi and contribute to the resilience and sustainability of the agricultural sector.



Monitoring, evaluation, and learning

Monitoring, evaluation, and learning (MEL) play a critical role in the Plantwise Burundi project, ensuring accountability and informing continuous improvement. The year 2023 saw significant accomplishments, highlighted by two key MEL activities:

Independent end-of-project evaluation

The comprehensive end-of-project external evaluation conducted by the KIT Royal Tropical Institute stands as a pivotal milestone in assessing the effectiveness of the Plantwise Burundi project. This evaluation not only shed light on the notable progress achieved but also underscores the significance of such assessments in ensuring accountability and informing future improvements. Key findings from the evaluation reveal significant strides in establishing a comprehensive plant health system, with the rapid deployment of plant clinics and the empowerment of plant doctors emerging as particularly successful endeavours. These initiatives have effectively prioritized the needs of farmers, as evidenced by the enthusiastic feedback from those who have utilized the services, highlighting the quality of advice received. The positive outcomes underscore the transformative potential of the Plantwise project in bolstering agricultural sustainability and livelihoods across Burundi.

Looking ahead, the evaluation's recommendations emphasize the critical importance of consolidating these gains and addressing key areas for improvement. Prioritizing the consistent delivery of high-quality plant health advice, ensuring access to recommended seeds and essential chemicals, and strengthening data management processes are identified as crucial steps. Furthermore, institutional integration of the Plantwise initiative within Burundi's existing plant health framework and the promotion of collaboration with diverse stakeholders are highlighted as essential for sustainability and long-term impact. By heeding these recommendations, the project should continue into a new phase to enhance its effectiveness and contribute to the resilience and prosperity of Burundi's agricultural sector, underscoring the necessity and significance of rigorous evaluations in driving positive change and ensuring the success of development initiatives.

Result monitoring survey

Monitoring and evaluation serve as crucial pillars in the Plantwise Burundi project, providing insights into progress towards project objectives and the effectiveness of interventions for project participants. Over the course of the project, two result monitoring surveys have been conducted, with the most recent one in 2023 following the initial assessment in 2022. These surveys aimed to assess the effectiveness of the project's interventions and track progress towards achieving its objectives. By systematically collecting and analysing data on various indicators, result monitoring helps project personnel and stakeholders understand how well the project is performing and whether it is making a positive impact on project participants.

Data collection for these monitoring surveys involved gathering information from a random sample of farmers who sought services at plant clinics. This approach allowed for a comprehensive assessment of the adoption of recommended practices and their effects on pest management, productivity, and income levels over a 12-month period. To ensure the reliability and comparability of data between the two survey waves, rigorous measures were implemented to maintain sample homogeneity, particularly in terms of geographic location. Random sampling techniques and stratification based on geographic regions, aligned with the 2022 study design, were employed to minimize potential biases or confounding factors. The survey sample comprised 527 farmers selected across different provinces (Table 4).

Table 4: Farmers' sampled in communes by province

Province	Achieved sample	Commune (Sample)
Cibitoke	106	Murwi (22) Buganda (22) Rugombo (31) and Mabayi (31)
Gitega	94	Bugendana (61) Gitega (13) and Makebuko (20)
Bujumbura Rural	78	Mugongomanga (20) and Isare (58)
Ngozi	67	Gashikanwa (19) Ngozi (23) and Mwumba (25)
Mwaro	66	Bisoro (22) Ndava (22) and Kayokwe (22)
Kayanza	65	Kayanza (15) Muhanga (25) and Muruta (25)
Muramvya	51	Mbuye (21) and Bukeye (30)
Total	**527**	

Numbers in parentheses indicate number of farmers

In addition to the previously highlighted findings, further insights from the survey reveal various aspects of the engagement with plant clinics among smallholder farmers in Burundi. It was observed that the average land cultivated by plant clinic clients stood at 0.84 hectares, showing a slight decrease from 1.24 hectares recorded in 2022. Expectedly, there was a disparity in land cultivation between male-headed and female-headed households, with the former averaging 0.81 hectares compared to 1.1 hectares for the latter.

Moreover, the majority of surveyed households, comprising 67%, relied solely on crop farming, while 25% practiced mixed farming. Most households, approximately 75%, made multiple visits for consultations with plant doctors, indicating a strong demand for advisory services. Despite this, challenges in implementing advice were more prevalent among male-headed households in 2023, with 54% experiencing difficulties compared to 42% among female-headed households. This was attributed mainly to financial constraints in purchasing recommended pesticides and difficulties in accessing inputs.

Notably, certain crops such as cabbage and banana emerged as top income generators, yielding approximately USD 30,000 and USD 21,000 per hectare, respectively (Annex 2). Conversely, plant clinic clients from female-headed households derived their highest average incomes from tomato and rice, earning USD 3,300 and USD 2,600 per hectare (Annex 2). Additionally, the survey revealed improvements in food security, with 76% of plant clinic clients experiencing little to no hunger, marking a positive shift from previous years (Figure 3). Overall, the findings underscore the effectiveness of plant health rallies and mass extension campaigns in complementing plant clinic services, leading to enhanced awareness and adoption of advisory recommendations among farmers. This work has been reported separately, providing a comprehensive overview (Project progress monitoring survey report 2023).

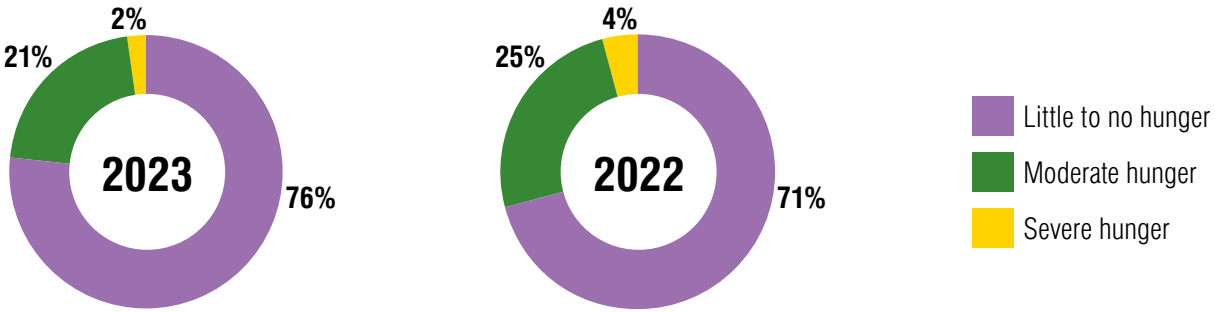


Figure 3: Proportion of households in Household Food Insecurity Access Scale (HFIAS) categories



Gender-focused activities

2023 marked a significant year for Plantwise Burundi's dedication to gender equality in agriculture. Recognizing the crucial role women play in food security and agricultural production, the programme implemented a series of impactful initiatives:

Understanding the gender landscape in Burundi

In 2023, Plantwise Burundi conducted a comprehensive endline assessment focused on social norms, attitudes, and practices related to the distribution of unpaid care work and women's participation in decision-making within agriculture. This assessment aimed to evaluate the impact of Plantwise community conversations on reshaping these norms and behaviours, providing valuable insights into the project's gender empowerment efforts. The findings from this assessment highlight several key insights into gender dynamics and empowerment within agricultural communities in Burundi. Traditional gender roles continue to influence the division of labour and decision-making processes, with women predominantly engaged in unpaid agricultural activities and household chores, while men primarily make decisions regarding inputs, crops, and income.

Community conversations emerged as pivotal catalysts in shifting social norms and increasing women's empowerment levels, particularly in instrumental agency, although intrinsic agency remains comparatively lower. Women participants of the Plantwise project demonstrated higher empowerment scores and achieved greater household gender parity compared to non-participants, reflecting the positive impact of project interventions. Despite an increase in the percentage of empowered women from 41% in 2022 to 46% in 2023, which fell short of the initial target of 20%, this progress is commendable within the context of a one-year intervention. Empowering women in agriculture is a complex process that requires not just access to knowledge and resources but also a transformation in social norms and decision-making power within households. Therefore, a single year may be insufficient to achieve substantial and lasting behavioural change, but this initial progress lays a solid foundation for further growth as women gain confidence, skills, and influence within the agricultural sector. This work is reported separately, providing a comprehensive overview (Plantwise Burundi Project: Gender & Women Empowerment Report). Furthermore, a manuscript describing this work has been submitted to a journal for publication.

Educational qualifications and household headship emerged as significant factors influencing women's empowerment, with higher educational attainment associated with higher empowerment scores, particularly among those with no or low educational qualifications. However, the effects of education on empowerment were mixed, suggesting the need for nuanced approaches to address gender disparities effectively. Additionally, gender parity increased among women spouses, particularly among project participants, indicating the positive impact of community conversations on shifting gender dynamics within households. Overall, these findings underscore the importance of targeted interventions and intersectional approaches in promoting gender equality and empowering women in agriculture.

Shifting norms through dialogue

Plantwise organized 19 community conversation sessions across nine communes, serving as platforms for dialogue and behaviour change towards more inclusive agricultural practices. These sessions facilitated discussions on gender dynamics in farming households, aiming to challenge norms that restrict women's participation in agricultural activities and decision-making roles. By fostering open communication and promoting awareness, these conversations played a crucial role in shifting social norms and promoting gender equality within farming communities.

The community conversation sessions played a pivotal role in promoting gender equality by providing a safe and inclusive environment for participants to express their views and concerns. Through facilitated discussions and interactive activities, community members were encouraged to critically examine traditional gender roles and norms, exploring ways to challenge and transform them to create more equitable opportunities for women in agriculture. By fostering a sense of ownership and collective responsibility, these sessions empowered participants to actively participate in the process of social change, ultimately contributing to the creation of more inclusive and gender-responsive agricultural practices.

Equipping changemakers

Plantwise conducted a special training programme, involving 153 individuals including plant doctors, supervisors, and provincial phytosanitary experts, on gender-sensitive extension advisory service provision. This two-day training equipped participants with the knowledge and skills needed to effectively address gender disparities in agricultural extension services, ensuring that advisory support provided to farmers is sensitive to gender-specific needs and challenges.

Throughout the training programme, participants were exposed to practical strategies and approaches for integrating gender-sensitive perspectives into their advisory practices. This encompassed techniques for fostering inclusivity, promoting women's participation and leadership, and tailoring extension interventions to address gender-specific needs and priorities. By enhancing the capacity of plant doctors, supervisors, and phytosanitary experts in gender-sensitive service delivery, Plantwise aimed to ensure that advisory support provided to farmers is responsive to the diverse needs and circumstances of both men and women farmers.



Visibility

The project was featured in several online publications including journal articles, blogs, and news articles. A comprehensive news report was produced separately (Plantwise Burundi: 2023 PR & Communications report). Scientific publications on work done in 2023 were prepared for publication and further blogs are also included in below:

Publications:

Ayuya, O. I., Ochilo, W. N., Mutuku, B., Mugambi, I., Ntirampeba, L., Niyongere, C., Habindavyi, E., Hakizimana, M. B., Otieno, A., Lutomia, C., Ndishimiyimana, E., Ndayihanzamaso, P., Mbugua, F., Bundi, M., Vos, J., & Terefe, B. (2024). **Bridging the gap: community conversations and plant clinics as catalysts for women's empowerment**. AgriRxiv. https://doi.org/10.31220/agriRxiv.2024.00246

Musyoka, P. M., Ochilo, W. N., Ntirampeba, L., Mutuku, B., Mugambi, I., Matata, J., Niyongere, C., Habindavyi, E., Ndayihanzamaso, P., Ndishimiyimana, E., Bundi, M., Vos, J., & Terefe, B. (2024). **Can men unburden women from unpaid care work? Evidence from Burundi**. AgriRxiv. https://doi.org/10.31220/agriRxiv.2024.00247

Toepfer, S., Niyongere, C., Ndayihanzamaso, P., Ndikumana, D., Irakoze, W., Cimpaye, E., Minani, D., Bindariye, P., & Ochilo, W. (2023). **Sustainable Improvements in Diagnostic Capabilities of Plant Health Practitioners through Short In-Service Training**. Sustainability, 15(17), 12956. https://doi.org/10.3390/su151712956

Blogs

Strengthening Sanitary and Phytosanitary Systems in Burundi: A transformative training experience

Plantwise programme made considerable progress to help strengthen plant health systems in Burundi



Annex 1: Status of Plantwise Burundi performance against agreed indicators and targets

Impact	Indicator	Disaggregation	Unit	Baseline	Achieved in 2021	Achieved in 2022	Achieved in 2023			Project target (project end)
							New	Cumulative total	Narrative	
Impact: Improved crops productivity and income for smallholder farmers in Burundi contributing to agricultural growth	I**M1.1.** Number of family farms [farming households] (sub-sector, male/female, age: % < 35) with increased productivity directly as a result of Plantwise interventions	F	Number	0				-	The 2022-2023 timeframe isn't enough to fully assess Plantwise interventions' impact on productivity and income due to factors like crop cycles and weather. Despite this, preliminary findings provide encouraging indications that Plantwise interventions are positively affecting farmer productivity and income	60,000
		M	Number					-		
		Y	Number					-		
	I**M1.2.** Number of family farms [farming households] (sub-sector, male/female, age: % < 35) with increased income directly as a result of Plantwise interventions	F	Number	0				-		60,000
		M	Number					-		
		Y	Number					-		
	IM1.3. Number of family farms (sub-sector, male/female, age: % < 35) whose farming enterprise became more resilient to shocks directly as a result of Plantwise intervention	F	Number	0				35,855	Target surpassed	60,000
		M	Number					29,004		
		Y	Number					-		

Impact	Indicator	Disaggregation	Unit	Baseline	Achieved in 2021	Achieved in 2022	Achieved in 2023			Project target (project end)
							New	Cumulative total	Narrative	
Outcome 1: Plant doctors reach more farmers with better quality advice	**OC1.1.** Number of farmers reporting satisfaction with plant doctor services (disaggregated by male/female)	F	Number	0	90	604	1,767	2,461	Moderate gap	8,000
		M	Number		118	784	4,114	5,016		
Outcome 2: Plantwise contributing to prompt identification and action on plant health problems	**OC2.1.** Number of new and emerging plant health problems identified or solved through Plantwise interventions		Number	0	-	3	2	5	Target surpassed	2
Outcome 3: Farmers adopt practices according to advice given by plant doctors	**OC3.1.** Number of farmers adopting Plantwise advice (disaggregated by male/female)	F	Number	0		63,016	104,092	167,108	Target surpassed	180,000
		M	Number			89,101	143,682	232,783		
Output 1: Plant clinic networks established and complemented by other extension methods to enhance access to information on sustainable management of crop health	**OT1.1.** Number of plant clinics operating in Burundi	NA	Number	0	16	34	71	121	Target surpassed	100
	OT1.2. Number of male and female farmers accessing advice from plant clinics and Plantwise led complementary extension approaches	F	Number	0	188	102,378	125,336	227,902	Moderate gap	600,000
		M	Number		387	141,700	170,502	312,589		

Impact	Indicator	Disaggregation	Unit	Baseline	Achieved in 2021	Achieved in 2022	Achieved in 2023			Project target (project end)
							New	Cumulative total	Narrative	
Output 2: Plant doctors deliver advice at plant clinics	**OT2.1.** Number of plant doctors offering advice to farmers at plant clinics (disaggregated by sex)	F	Number	0	3	8	15	26	Target surpassed	200
		M	Number		29	60	123	212		
Output 3: Plantwise Information resources used by plant doctors and other plant health stakeholders	**OT3.1.**Number of stakeholders using Plantwise knowledge bank (data and other information resources)	NA	Number	0	115	195	127	437	Target surpassed	350
	OT3.2. Number of extension materials developed/adapted by local experts and stored in the knowledge bank for use in Burundi	NA	Number	0	19	12		31	Target surpassed	30
Output 4: Data driven ICT based processes adopted in systems for Plant health management at smallholder farmer level	**OT4.1.** Number of male and female plant doctors and other stakeholders using the Plantwise ICT toolkit (DCA, Factsheet App etc)	F	Number	0	10	-		10	Target surpassed	250
		M	Number		90	199	178	467		
	OT4.2. Number of plant clinic records stored in Burundi site of the Plantwise Online Management System (POMS)	NA	Number	0	231	1,545	6,191	7,967	Moderate gap	10,000

Impact	Indicator	Disaggregation	Unit	Baseline	Achieved in 2021	Achieved in 2022	Achieved in 2023			Project target (project end)
							New	Cumulative total	Narrative	
Result 1: Stakeholder linkages established/ strengthened with key actors to ensure complementarity of activities in service delivery to farmers	**R1.1.** Number of collaborating institutions in Plantwise interventions	Pblc	Number	0	12	-		12	Target surpassed	12
		Pvt	Number		3	-		3		
	R1.2. Number of organisations represented in the National forum and steering committee	Pblc	Number	0	10	-		10	Target surpassed	7
		Pvt	Number		2	-		2		
Result 2: Plantwise steering committee involved in planning and overseeing implementation of project activities	**R2.1.** Number of Plantwise steering committee meetings	NA	Number	0	2	2	2	6	Target reached	6
Result 3: Plant clinics piloted in selected districts/ collines	**R3.1.** Number of pilot plant clinics established	NA	Number	0	16	-		16	Target reached	16
Result 4: Webpage specific to Burundi established on the Plantwise Knowledge Bank and used in the country	**R4.1.** Number of organizations using Knowledge Bank resources	Pblc	Number	0	4	3		7	Target surpassed	10
		Pvt	Number		-	6		6		

Impact	Indicator	Disaggregation	Unit	Baseline	Achieved in 2021	Achieved in 2022	Achieved in 2023			Project target (project end)
							New	Cumulative total	Narrative	
Result 5: Additional plant doctors trained to run expanded networks of plant clinics in Burundi	**R5.1.** Number of additional male and female plant doctors trained and operating plant clinics	F	Number	0	7	15		22	Target surpassed	168
		M	Number		61	123		184		
	R5.2. Number of new plant clinics successfully established and operational	NA	Number	0	-	34	71	105	Target surpassed	84
Result 6: Content of Plantwise training modules included into curricula of agricultural colleges and universities	**R6.1.** Number of college and university curricula with Plantwise training materials/content	NA	Number	0	-	1	1	2	Target surpassed	≥ 1
Result 7: Monitoring plant clinic performance and assessment of Plantwise outcomes conducted	**R7.1:** Number of plant clinic performance monitoring reports, including lessons learnt		Number	0	-	5	7	12	Moderate gap	16
	R7.2. Baseline and end line surveys completed	Bsl	Number	0	1	-		1	Target reached	2
		El	Number		-	-	1	1		

Impact	Indicator	Disaggregation	Unit	Baseline	Achieved in 2021	Achieved in 2022	Achieved in 2023			Project target (project end)
							New	Cumulative total	Narrative	
Result 8: Rapid Care Analysis (RCA) conducted; Community conversation dialogue process carried out; plant doctors trained on gender sensitive advisory service provision; learning on good practices for gender sensitive agriculture extension conducted	**R8.1.** Percent (%) of men doing unpaid care work activities in the household	M	%					-	[Dropped in favour of Pro-WEIA (R8.2) as a measure of women empowerment]	10%
	R8.2. Percent (%) of women having control or joint control over household income and farm products (Proportion of empowered women - Pro-WEIA)	F	%	41			46	5%	Significant gap	20%
	R8.3. Number of plant doctors trained on gender	F	Number	0	10	15		25	Target reached	300
		M	Number		90	184		274		



Annex 2: Comprehensive comparison of crop productivity and income: 2022 vs. 2023

Crop harvested in 12 months	Year	No. of farmers (N)	Area under crop (ha)	Quantity harvested (t4/ha)	Quantity consumed (t/ha)	Quantity sold (t/ha)	Household produce income (USD/ha) Female	Household produce income (USD/ha) Male	Household produce income (USD/ha) Overall
Maize	2022	151	0.14	4.8	1.6	2.9	431	1,031	887
Maize	2023	319	0.50	2.5	*	1.7	1,611	1,342	1,372
Bean	2022	134	0.12	1.9	1.1	2.2	1,146	1,375	1,311
Bean	2023	255	0.45	1.3	*	0.7	1,134	2,092	1,923
Irish Potato	2022	72	0.12	3.8	1.5	2.4	652	770	753
Irish Potato	2023	113	0.36	11.3	*	9.8	2,143	5,192	4,779
Banana	2022	65	0.13	7.1	2.9	17.7	517	1,032	925
Banana	2023	86	0.43	8.8	*	6.2	211	22,566	20,969
Tomato	2022	53	0.13	6.4	1.1	5.6	1,493	6,302	5,780
Tomato	2023	44	0.19	7.8	*	7.0	3,321	1,230	1,622
Cassava	2022	52	0.12	2.0	1.2	*	2,940	658	792
Cassava	2023	121	0.37	4.2	*	1.9	744	2,074	1,793
African eggplant	2022	25	0.11	11.8	2.1	*	90	4,088	3,567
African eggplant	2023	24	0.24	15.5	*	11.1	-	2,175	2,175
Cabbage	2022	15	0.08	21.0	1.9	*	825	887	872
Cabbage	2023	15	0.18	64.6	*	58.9	-	29,990	29,990
Rice	2022	12	0.20	4.5	1.3	3.1	1,127	2,931	2,630
Rice	2023	30	0.26	4.8	*	3.5	2,633	2,265	2,282

Coffee	2022	6	0.16	2.7	0	2.7	86	1,095	927
Coffee	2023	4	0.18	12.8	0	12.8	-	4,408	4,408
Avocado					*				
Avocado	2023	5	0.57	13.5	1.0	12.5	-	6.795	6,795
Mangoes									
Mangoes	2023	6	0.24	8.1		7.5	-	1,779	1,779
Citrus fruits									
Citrus fruits	2023	6	0.22	8.6		7.8	-	1,521	1,521
Onion									
Onion	2023	4	0.28	9.2		8.5	-	2,246	2,246
Amaranth									
Amaranth	2023	3	0.07	4.8		3.9	-	2,106	2,106
Tree tomato									
Tree tomato	2023	2	0.11	-	-	-	-	-	-
Leek									
Leek	2023	1	0.01	4.0		3.6	-	1,404	1,404
Carrots									
Carrots	2023	1	0.08	6.7		6.5		3,744	3,744

*Missing data due to limitations in farmer recall and reporting consistency

Plantwise is a global programme, led by **CABI**, to increase food security and improve rural livelihoods by reducing crop losses

National Responsible Organization:



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To find out more and discuss how you can get involved in this exciting new initiative, contact either of the following:

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