

# HARMONISING REGULATIONS AND MITIGATING PESTICIDE RESIDUES IN THE SADC REGION

STDF/PG/694

## END OF PROJECT ASSESSMENT REPORT



November 2024

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### Disclaimer

The findings, interpretations and conclusions expressed in this document are those of the author alone. They do not necessarily represent the views of the Standards and Trade Development Facility (STDF) or its founding partners or donors

## PROJECT INFORMATION

<b>STDF/PG/694</b>
<b>Title</b> Harmonising regulations and mitigating pesticide residues in the SADC region
<b>Implementing agency</b> The International Centre for Genetic Engineering and Biotechnology (ICGEB)
<b>Partners</b> Technical partner: AG Aligned Global. Other partners: Asia-Pacific Association of Agricultural Research Institutions (APAARI), CropLife Africa and Middle East, South African Bioproducts Organisation (SABO), Southern Africa Network for Biosciences (SANBio), Southern Africa Pesticides Regulators Forum (SAPReF), United States Department of Agriculture (USDA), Food and Agriculture Organisation of the United Nations (FAO), Inter-African Union Phytosanitary Council (IAPSC)
<b>Start date</b> 01/03/2021
<b>End date</b> 29/02/2024 Extended by 6 month no-cost extension to 31/08/2024
<b>Beneficiary/ies</b> Mozambique, South Africa, Botswana, Zimbabwe, Zambia, Tanzania and Kenya
<b>Budget</b>  Project Total Value:       USD 1,459,278  STDF contribution:         USD 798,480  Other contribution:        USD 660,798

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### **LIST OF ABBREVIATIONS**

AATF	AFRICAN AGRICULTURAL TECHNOLOGY FOUNDATION
AFCFTA	AFRICAN CONTINENTAL FREE TRADE AREA
APAARI	ASIA-PACIFIC ASSOCIATION OF AGRICULTURAL RESEARCH INSTITUTIONS
CABI	CAB INTERNATIONAL
CGSCA	CITRUS GROWERS' ASSOCIATION OF SOUTH AFRICA
EAC	EAST AFRICAN COMMUNITY
ECOWAS	ECONOMIC COMMUNITY OF WEST AFRICAN STATES
FAO	FOOD AND AGRICULTURE ORGANISATION OF THE UNITED NATIONS
GAP	GOOD AGRICULTURAL PRACTICE
KEPHIS	KENYA PLANT HEALTH INSPECTORATE SERVICE
IAUPSC	INTER-AFRICAN UNION PHYTOSANITARY COUNCIL
ICGEB	INTERNATIONAL CENTRE FOR GENETIC ENGINEERING AND BIOTECHNOLOGY
IICA	INTER-AMERICAN INSTITUTE FOR COOPERATION ON AGRICULTURE
IPM	INTEGRATED PEST MANAGEMENT
MRL	MAXIMUM RESIDUE LEVEL
MUF	MINOR USE FOUNDATION
OECD	ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT
SABO	SOUTH AFRICAN BIOPRODUCTS ORGANISATION
SANBIO	SOUTHERN AFRICA NETWORK FOR BIOSCIENCES
SADC	SOUTHERN AFRICAN DEVELOPMENT COMMUNITY
SAPREF	SOUTHERN AFRICA PESTICIDES REGULATORS FORUM
SDG	SUSTAINABLE DEVELOPMENT GOAL
SPPTC	SADC PLANT PROTECTION TECHNICAL COMMITTEE
SPS	SANITARY AND PHYTOSANITARY STANDARDS
STDF	STANDARDS AND TRADE DEVELOPMENT FACILITY
THPA	TANZANIA PLANT HEALTH AND PESTICIDES AUTHORITY
USDA	UNITED STATES DEPARTMENT OF AGRICULTURE
ZEMA	ZAMBIA ENVIRONMENTAL MANAGEMENT AGENCY

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## 1. EXECUTIVE SUMMARY

The aim of the Standards and Trade Development Facility (STDF) is to drive catalytic Sanitary and Phyto-Sanitary (SPS) improvements in developing countries that facilitate safe trade, contributing to the Sustainable Development Goals (SDGs) related to sustainable economic growth, poverty reduction, and food security. It is in line with this aim that the STDF allocated USD 798,480 to the International Centre for Genetic Engineering and Biotechnology (ICGEB) to implement a three-year (March 2021 – February 2024) project on *Harmonising regulations and mitigating pesticide residues in the SADC region* (STDF/PG/694). The project covered six Southern Africa Development Community (SADC) countries, namely Botswana, Mozambique, South Africa, Tanzania, Zambia, and Zimbabwe, with support from Kenya.

The project's primary objective was to implement interventions that would help countries meet residue compliance requirements in various markets by leveraging the residue-mitigating benefits of biopesticides. Its long-term aim was to boost crop exports from the six participating countries by enhancing compliance with residue standards through the use of biopesticides. Outcome 1 focused on facilitating biopesticide registration by harmonising regulations across selected SADC countries. Meanwhile, Outcome 2 aimed to promote the adoption and use of biopesticides to address specific residue challenges in two of the participating countries, Tanzania and Kenya.

Specific project objectives were: i) Regulatory harmonisation: working with countries to develop common biopesticide regulatory practices in the SADC region to enable them to benefit from, among others, reciprocal acceptance of data generated, or registrations concluded, elsewhere – and hence enhance biopesticide registration and use, ii) Residue mitigation: developing a system for biopesticide-based residue mitigation through supervised field trials and laboratory analyses of pesticide residues, followed by residue decline studies utilising biopesticides at the end of the season to ultimately develop a system by which residue levels can be mitigated and compliance with Maximum Residue Limits (MRL) limits enhanced, and iii) Promoting Integrated Pest Management (IPM) and Good Agricultural Practice (GAP) strategies: developing various informational materials, including a toolkit on IPM and GAP, including an easily accessible database to make farmers and other stakeholders aware of the biopesticide products available on the market.

The project developed harmonised guidelines for the registration of biopesticides and biological control agents in Southern Africa. These guidelines have the support<sup>1</sup> of 15 of the 17 SADC Member States and have been presented to the SADC Plant Protection Technical Committee (SPPTC). The harmonised guidelines are expected to be approved by the SADC Council of Ministers in January 2025. Additionally, the project conducted residue mitigation studies that focused on the strategic incorporation of non-residue-producing biopesticides on mangoes and avocados, following the application of conventional pesticides, to help reduce pesticide residue levels and enhance compliance with MRL standards, thereby promoting trade. The studies showed that strategic incorporation of biopesticides in pest control programmes at the end of the crop season has the potential of reducing pesticide residue issues. The project also developed a number of tools to promote IPM and GAP protocols as part of the strategy to reduce the use of synthetic chemical pesticides, decrease residue violations, minimise environmental damage, and promote trade. Finally, recognising the crucial role of soft skills (the knowledge, attitudes, and behaviours needed to ensure that individuals and organisations can effectively work to achieve the project objectives), such as teamwork, conflict resolution, and strategic thinking, in the success of any undertaking, the project provided training geared towards strengthening the soft skills and capacity of key stakeholders (222 female (42%) and 312 male (58%)) so that they are able to effectively implement project outputs.

The technical Project implementation partner was Ag Aligned Global. Other partners included the Asia-Pacific Association of Agricultural Research Institutions (APAARI), CropLife Africa and Middle East (CLAME), South African Bioproducts Organisation (SABO), Southern Africa Network for Biosciences (SANBio), Southern Africa Pesticides Regulators Forum (SAPReF), United States Department of Agriculture (USDA), Food and Agriculture Organisation of the United Nations (FAO) and the African Union Inter-African Phytosanitary Council (AU-IAPSC). Project beneficiaries included national (bio)pesticide regulatory authorities and policymakers, national plant protection organisations, researchers, farmers and farmer group representatives, industry associations, and consumers from Botswana, Kenya, Mozambique, South Africa, Tanzania, Zambia and Zimbabwe.

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<sup>1</sup> Fifteen of the 17 SADC Member Countries expressed support for the guidelines during a SAPREF meeting held between 04 – 08 September 2023 in Johannesburg, South Africa.

The end-of-project assessment was conducted to ascertain the relevance, coherence, efficiency, effectiveness, impact and sustainability of the project. More specifically, the assessment aimed to: i) make a factual and independent assessment of the performance of the entire project and results achieved at the national, regional and global level (including potential impacts on trade), ii) analyse the risks faced during the project (including the impact of the COVID-19 crisis), the mitigation measures taken, and the response obtained, and iii) identify good practices that can be replicated or expanded at the national/regional/global level, as well as lessons learned, and propose practical recommendations related to the project sustainability and/or scaling-up targeted at relevant stakeholders (including the implementing organisation, beneficiaries, other project stakeholders, as well as other development partners more broadly).

The approach for the assessment followed the principles of co-design and people-centred development. The first step was a document review, which gave a thorough understanding of the project and facilitated the development of the project evaluation tools. This was followed by interviews and data collection, synthesis, triangulation, and use of multiple data sources and methods to cross-check information and ensure reliability and reporting. A de-briefing and validation discussion was then undertaken during an end-of-project workshop held in South Africa from 27<sup>th</sup> to 28<sup>th</sup> August 2024, and the final step was finalisation of the end-of-project assessment report.

The **project is highly relevant** as it aligns with broader national, regional, and global goals of sustainable agriculture and trade enhancement. This aligns closely with STDF's mission, as it addresses the critical need to enhance the trade of safe food for both domestic and international markets, which is central to STDF's mandate. By focusing on harmonising biopesticide regulations, the project outcomes would facilitate easier registration and use of biopesticides across SADC member countries, hence making it possible for these products to be used in mitigating pesticide residues, meeting international market standards and enhancing trade opportunities.

The project's strong focus on capacity development ensured that stakeholders gained the knowledge and skills needed to implement its activities **effectively**, contributing significantly to its success and long-term sustainability. It directly addressed regional Sanitary and Phytosanitary (SPS) policies and priority needs, which are vital for facilitating international trade. Through consultations and collaborative efforts, the project promoted cooperation among stakeholders to tackle food safety and trade challenges. By engaging regulators, farmers, and the private sector<sup>2</sup> across six countries, the project was aligned to local contexts and also fostered a sense of local ownership, enhancing its relevance and overall impact.

The project's residue mitigation studies on avocados in Tanzania and mangoes in Kenya involving 78 farmers (53 [19 women] in Tanzania and 25 [11 women] in Kenya) demonstrated a regional approach to solving challenges in complying with MRLs of local and export markets. This collaboration recognised the different levels of development among countries and leveraged existing laboratory facilities in Kenya for analysis.

The **project was coherent** as it was in line with the SADC Revised Regional Indicative Strategic Development Plan 2015-2020, which, inter alia, aims to increase market access for agricultural products through regional cooperation, integration and harmonisation. This project was implemented in close consultation with SANBio and SAPReF, which are institutions that hold great leverage in the region as they are comprised not only of key policymakers but are also major players in the regional body, SADC. The project built upon other related interventions on biopesticides led by governments, regional and international organisations like FAO, OECD, USDA, CABI, African Agricultural Technology Foundation (AATF), and regional economic communities including SADC and the East African Community (EAC). Furthermore, the guidelines developed under the project were also aligned to the FAO/WHO Joint Codex Alimentarius Commission standards.

This **project was efficiently implemented**, and this was influenced by the STDF secretariat's flexibility, responsiveness, and support, which was crucial throughout the project. There was strong collaboration between project partners and not only participating countries, but the SADC members in general. The success of the residue mitigation studies was due to meticulous planning around crop and pest seasonality, timely procurement of equipment and consumables, and clear

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<sup>2</sup> Private sector representatives from all project countries were included on the Project Advisory Board.

communication with farmers to gain their trust in utilising their orchards for the trials. The project management's proactive approach during and after the COVID-19 pandemic, including setting deadlines for feedback and following up with stakeholders, was key to achieving project outcomes. The Project demonstrated efficient use of its resources, contributing to its economic delivery. The budget was strategically allocated, ensuring all activities were within the overall budget. Efficiency was also enhanced through collaboration with other ongoing projects in the Asia-Pacific and Latin America regions, promoting cross-regional learning and collaboration.

By harmonising biopesticide regulations and developing strategies to enhance compliance with international standards, the project has the potential to significantly improve future trade opportunities for agricultural products from the SADC region. However, the **impact** on trade facilitation could not be fully assessed at the time of this assessment, as more time will be needed to measure the long-term outcomes of developing policy guidelines and regulations. Despite this, several indicators suggest a positive trajectory. The agreement among countries to adopt harmonised regional guidelines demonstrates regional commitment, while the promising results from mitigation studies further highlight the project's potential. Additionally, survey responses from growers indicate a willingness to adopt the approaches introduced by the project on a long-term basis. Together, these factors provide a strong foundation for assessing the project's future impact. Beyond trade facilitation, the promotion of biopesticides alongside synthetic chemicals is expected to enhance food safety for consumers both within and outside the SADC region. The project also supports environmental sustainability by encouraging practices that reduce reliance on or misuse of synthetic pesticides. Furthermore, its training and capacity-building activities have significantly improved the skills and knowledge of regulatory bodies and farmers, enabling better implementation of biopesticide regulations and fostering sustainable pest management practices.

The **sustainability of the project is supported by several factors**. The project created a baseline upon which other initiatives by FAO and the African Union (AU) on biopesticides will build. Five of the six participating SADC project countries developed roadmaps to facilitate domestication of the harmonised guidelines, with countries like Mozambique and Zambia planning to allocate government funding to continue the work in the future. To date, it is unclear how much the governments will allocate, as it might be a lump sum to support different ongoing activities from which departments will then choose. The fact that this project is a SADC regional project provides a basis for sustainability as indications are that SAPReF will play a critical role in coordinating and monitoring the progress of this initiative into the future.

Through the consolidation of the biopesticide products registered in each of the participating project countries, and the publication of these lists on the publicly available CABI BioProtection Portal and the ICGEB website, the project has connected CABI to the respective regulators; to ensure that the databases are kept current beyond the life of the project.

The project demonstrated that developing a regional project supported by both public and private entities with varied expertise gives better results as there is sharing of knowledge and expertise. This expertise was instrumental in developing harmonised biopesticide guidelines to increase trade since the project was effectively delivered based on best practices from both the public and private sectors, who shared a common vision. Training and capacity-building activities are integral to all project activities, thus enhancing the skills and knowledge of regulatory bodies and farmers and ensuring the sustainability of project outcomes. The studies done in Kenya and Tanzania, leveraged existing resources and expertise, fostering collaboration and addressing common challenges effectively. The promotion of biopesticides and sustainable pest management practices supports environmental sustainability and long-term agricultural productivity. These lessons highlight the importance of strategic planning, collaboration, capacity building, and a long-term perspective in achieving and sustaining project goals.

By simultaneously addressing trade access, food safety and environmental concerns, the project demonstrated that holistic approaches are more effective. The regulatory harmonisation, residue management, and sustainable practices should be integrated for optimal outcomes and this work should be replicated across several African countries and regions to improve trade and food safety. It is recommended, among others, that ICGEB establish a centralised knowledge hub for sharing information, research findings, and best practices related to biopesticides and residue mitigation and partner with local and international research institutions to stay updated on the latest advancements and innovations. The government authorities should allocate resources and funding to support



research, development, and commercialisation of biopesticides. They should also support programmes to test new biopesticide technologies and practices before their wide-scale implementation.

## **2. INTRODUCTION**

### **2.1 Purpose and context**

Agriculture plays a crucial role in sub-Saharan Africa (SSA) as it supports the livelihoods of about 90% of the population. The agricultural sector accounts for a large share (4%-27%) of Southern African Development Committee (SADC) member states' Gross Domestic Product (GDP) and roughly 13% of their overall export earnings. It also accounts for around 8% of the continent's export income, worth approximately USD 40 billion annually. Some SADC countries have, however, continued to face trade barriers due to the presence of pesticide residues (due to overreliance on, or misuse of, synthetic chemical pesticides) in agricultural products, leading to residue violations in export markets. There is, therefore, a growing need for measures that could help countries avoid residue violations and, hence, ensure compliance with market requirements. Exceeding established Maximum Residue Levels (MRLs) is a common issue that poses numerous challenges to agricultural commodities trade, particularly for crops treated with synthetic pesticides to manage late-season pests. Compounding this challenge, different countries maintain varying MRL standards, complicating exporters' efforts to comply with all regulations. Additionally, this complexity leads to confusion and increased costs for farmers and exporters alike. Small-scale farmers, in particular, often lack the resources to meet standards, facing substantial costs for testing and compliance. For high-value crops, surpassing MRLs can result in costly penalties and loss of international market access. Additionally, many farmers in sub-Saharan Africa lack access to the latest pesticide technologies and safe usage knowledge, contributing to higher residue levels. The lack of harmonisation between international and national MRL standards further exacerbates these challenges, creating trade barriers and diminishing the competitiveness of agricultural products from sub-Saharan Africa.

Ensuring that agricultural products meet MRL standards is crucial for trade and food safety. However, the lack of consistent standards can undermine consumer confidence and affect market demand. Addressing these challenges requires coordinated efforts to harmonise MRL standards, improve farmer education, and enhance access to residue mitigation strategies or technologies. Biopesticide use within integrated pest management (IPM) programs provides an opportunity to enhance compliance with MRLs in SADC; however, there were no guidelines for registering these products across countries, and where they exist, they are implemented in isolation.

While regulatory harmonisation would ensure more products are registered and available for growers, it is also necessary to develop specific strategies on how they can be used to mitigate residues of synthetic pesticides. Additionally, it is necessary that growers are equipped with the necessary tools to be able to use these products. The project, therefore, aimed at developing the biopesticides registration guidelines and to harmonise regulations and mitigate pesticide residues by combining conventional pesticides with biopesticides covering 6 SADC countries (Botswana, Mozambique, South Africa, Tanzania, Zambia, and Zimbabwe) with support from Kenya (Figure 1). Additionally, it developed materials to promote the use of biopesticides as part of IPM and GAP.

**Figure 1: Focus project countries (Botswana, Mozambique, South Africa, Tanzania, Zambia, and Zimbabwe)**



The main project interventions are summarised in Table 1 below.

Project Component	Key Activities	Key Performance Indicators
Regulatory Harmonisation	Collaborate with countries to develop common biopesticide regulatory standards. This facilitates reciprocal acceptance of data generated or registrations concluded elsewhere, enhancing the registration process and use of biopesticides.	<ul style="list-style-type: none"> <li>• Mutually acceptable and harmonised standards for registration of biopesticides and biological control agents.</li> <li>• Number of biopesticides standards approved for use across countries.</li> </ul>
Residue Mitigation	By strategically incorporating non-residue-producing biopesticides after conventional pesticides, to help reduce pesticide residue levels. Biopesticides, which are not subject to MRLs in importing countries, play a crucial role in achieving this goal.	<ul style="list-style-type: none"> <li>• Number of residue mitigation strategies developed and used by growers.</li> <li>• Number of non-residue producing biopesticides incorporated with conventional pesticides.</li> <li>• Increase in uptake of biopesticides used in the residue mitigation studies.</li> </ul>
Capacity Development	Equip individuals and organisations with the necessary skills, knowledge, attitudes, and behaviours to effectively achieve their objectives.	<ul style="list-style-type: none"> <li>• Number of training needs identified.</li> <li>• Number of individuals trained.</li> <li>• Number of organisations trained.</li> <li>• Number of countries with the capacity to implement the outcomes of the project.</li> </ul>

**Table 1: Understanding the key project components**

The project promoted biopesticides as part of an IPM strategy for pesticide residue mitigation. Biopesticides control pests by targeting specific pests without harming other beneficial organisms. One of the main advantages of using biopesticides is that they generally do not leave residues on crops. This helps growers meet international trade standards and reduces the risk of producing crops that will be rejected by importing countries due to MRL exceedances.

The project worked with the six SADC countries to develop common biopesticide regulatory standards. This would facilitate the reciprocal acceptance of data generated, or registrations

concluded elsewhere, ultimately enhancing the registration process and biopesticide use. The project also conducted residue mitigation studies and provided training and capacity-building programs for stakeholders, including industry representatives, farmers, researchers and regulators.

## 2.2 Implementing partner and beneficiaries

The ICGEB served as the lead implementing partner for the project, coordinating all activities and ensuring that objectives and milestones were achieved. The ICGEB team comprised a Project Manager and a Programme Specialist. Earlier on in the project, there was also an Administrative Assistant who, however, was not confirmed following his probation period. Ag Aligned Global acted as the technical implementing partner, with responsibilities that included providing technical support for the development of draft harmonised guidelines, guiding the formation of in-country project teams for residue studies in Kenya and Tanzania, and overseeing the conduct of these studies. Additionally, Ag Aligned Global provided advice to the Project Steering Committee, Project Management, and relevant experts, prepared technical reports on the progress of residue mitigation activities for submission to the Project Steering Committee, conducted relevant training, and participated in steering committee and advisory board meetings.

The Southern Africa Pesticides Regulators Forum – SAPReF (an umbrella association bringing together all (bio)pesticide regulators from across the SADC region) was the main project partner for the residue mitigation studies. It not only assisted in the constitution of the Technical Working Group that developed the guidelines but also shared the drafts with its membership for comments. SAPReF was also one of the main links to the SADC Secretariat and will, going forward (and as explained elsewhere in this document), play a key role in the domestication and implementation process of the guidelines.

Details of other key project partners and their roles were as shown in Table 2 below.

**Table 2: Project partners**

Partner name / Beneficiary group	Contributions to the project
Asia-Pacific Association of Agricultural Research Institutions (APAARI)	Took the lead in provision of training on soft skills. Shared key insights and recommendations based on their experiences implementing a more or less similar project in the Asia Pacific region. APAARI was also implementing STDF/PG/634 Asia project.
CropLife Africa Middle East (CLAME)	Was one of the industry representatives on the Technical Working Group that developed the draft harmonised guidelines for the registration of biopesticides and biological control agents in the SADC region. Was represented on the Project Steering Committee, which provided overall guidance for project implementation.  Contributed towards some of the in-country workshops to develop domestication roadmaps for the draft harmonised guidelines.  Was one of the organisations that supported and participated in a regional workshop to discuss the possibility of up-scaling harmonisation efforts on the continent.
South African Bioproducts Organisation (SABO)	Was represented on the Project Steering Committee, which provided overall guidance for project implementation.
Southern Africa Network for Biosciences (SANBio)	Was one of the links between the project and the SADC Secretariat. Was involved in various project meetings and in-country workshops.
National (Bio)Pesticide Regulatory Authorities	Were represented on the Project Advisory Board that ensured that the project was implemented in such a manner as to remain responsive to country needs. Were responsible for organising the in-country workshops to discuss the development of domestication roadmaps for the harmonised guidelines.

National Plant Protection Organisations	Were represented on the Project Advisory Board that ensured that the project was implemented in such a manner as to remain responsive to country needs. Were responsible for organising the in-country workshops to discuss the development of domestication roadmaps for the harmonised guidelines.
Researchers and scientists	Contributed to research, development, and efficacy studies of biopesticides. Participated in the training of trainers' program on residue studies and subsequently provided similar training to other researchers and scientists in their home countries.
Industry Associations and Farmer Groups	Were represented on the Project Advisory Board that ensured that the project was implemented in such a manner as to remain responsive to country needs.

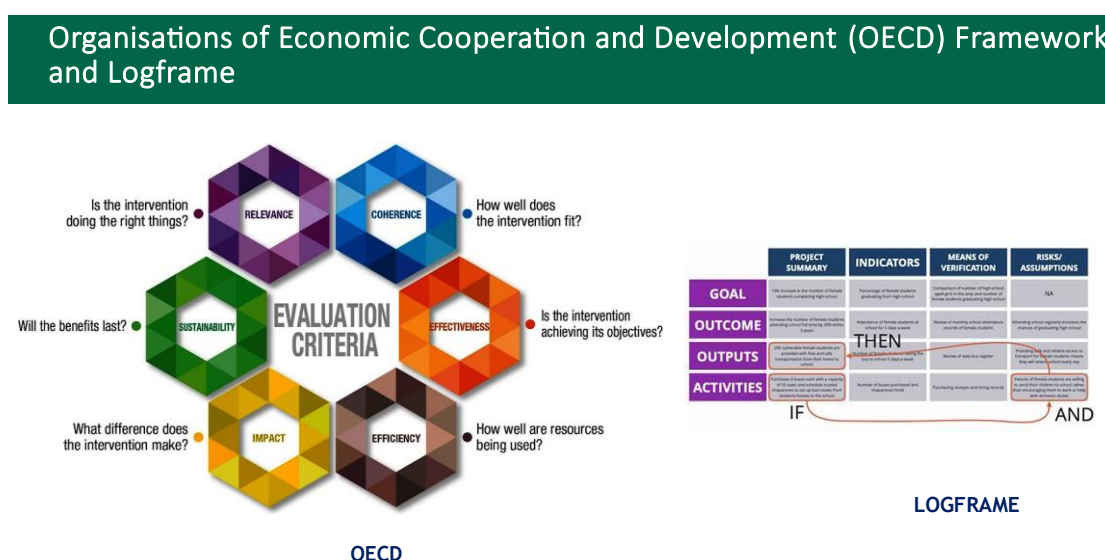
The governance of the project involved collaboration among various stakeholders. The project was led by a Steering Committee comprising representatives from international organisations, project partners and relevant bodies. These included Ag Aligned Global, APAARI, CGSCA, CLAME, EAC, ECOWAS, FAO, IICA, IAPSC, SABO, SAPReF, STDF, and USDA. The Steering Committee was responsible for strategic decision-making and project oversight. A Technical Working Group (TWG) composed of regulators (and an industry representative) from the project countries took the lead in the development of the harmonised guidelines. At the project level, there was the Project Management Team, which was a centralised administrative body that managed project logistics, finances, reporting, and communication. It was also responsible for liaising with stakeholders and facilitating collaboration. A project advisory board comprising academics, regulators, researchers, extension personnel and industry representatives from participating countries ensured that the project remained responsive to country needs.

The steering committee and advisory board meetings were held bi-annually to review progress, address challenges, and adjust strategies. The TWG meetings for specialised discussions were held regularly to develop the harmonised guidelines.

### 3. METHODOLOGY OF THE ASSESSMENT

The consultant followed a five-step approach while integrating participatory principles to ensure that the process was inclusive and captured the perspectives of all stakeholders. This involved planning the assessment to determine the project's impact. The consultant, with input from the ICGEB and STDF, agreed on the use of the Organisation for Economic Co-operation and Development's (OECD) DAC evaluation criteria alongside the Log Frame to provide a holistic approach to the assessment (Figure 2).

**Figure 2: OECD Framework and Log Frame**



Based on the OECD criteria, relevant questions to guide the assessment were developed. This was followed by establishing the scope of the assessment to take four months covering the six participating SADC countries, as well as Kenya, where residue studies and group training were done. With the support of the ICGEB, the consultant then agreed on the relevant stakeholders, including project staff, to target for this assessment. The indicators that reflect the project's qualitative and quantitative objectives were agreed on. A total of 59 people were interviewed. The sampling strategy ensured the representation of different groups, including the 6 members of the Steering Committee, 5 members of the Advisory Board, 5 members of the Technical Working Group (TWG), 8 regulators, 15 scientists, 12 private sector, and 8 farmers.

Following the principles of co-design and people-centred development, the consultant engaged the ICGEB Project Manager and all project stakeholders to ensure the relevance and accuracy of the strategic analysis required to conduct the research and make strategic and practical recommendations. By following these steps, we ensured that the end-of-project assessment was thorough and inclusive, provided valuable insights into the project's effectiveness and identified areas for improvement. The steps for this end-of-project assessment were:

- a) A document review was conducted from 12<sup>th</sup> May to 4<sup>th</sup> June 2024. This led to the development of tools and the prioritisation of the assessment target respondents from 5<sup>th</sup> to 26<sup>th</sup> June 2024.
- b) Interviews and data collection (online Key Informant Interviews [KII] and telephone calls) were done from 28<sup>th</sup> June to 31<sup>st</sup> August 2024. This was also followed by a field visit to KEPHIS, Kenya from the 16<sup>th</sup> to 20<sup>th</sup> July 2024.
- c) Synthesis, triangulation, and use of multiple data sources and methods to cross-check information and ensure reliability and report writing was done from 10<sup>th</sup> August to 5<sup>th</sup> September 2024.
- d) De-briefing and validation discussion during the project closing workshop was done from 26<sup>th</sup> to 30<sup>th</sup> August 2024.
- e) The finalisation of the project assessment report document was done by 30<sup>th</sup> September 2024; details are highlighted below.

**(i) Literature Review**

A thorough literature review of the project documents (including, but not limited to, project proposal, Log Frame, budget, newsletters, project annual reports, reports of project partners, informational material developed under the project, project budget, legal assessments, in-country workshop reports, project study reports, media articles, training resources, and videos) was done to get a comprehensive overview of the project's activities.

**(ii) Personal interviews**

Interviews were conducted with 59 people including project management team members, Project Advisory Board members, Project Steering Committee members, project partners, policymakers, regulatory officials, farmers, researchers, and academia who participated in the project. A field visit was done to KEPHIS in Kenya to get a thorough understanding of the residue mitigation studies done using biopesticides on mangoes and to evaluate the process, capacity, and results and how this experience can be replicated in other similar investments in the future. The questionnaires were administered using open interviews with specific questions aimed at generating information for the value chain for each country, the magnitude of the challenge of pesticide residues, the level of knowledge of using biopesticides to reduce the residues, the standards and regulations, the level of trade that is impacted, etc. These questions also investigated the level of understanding of the project's objective, the expectations and the progress, including the challenges faced. The personal interviews helped to identify challenges, opportunities, and lessons learned.

**(iii) Key Informant Interviews (KIIs)**

Given the busy schedule of the project participants and the fact that some participants are in different time zones, an online questionnaire was sent to those participants with a balanced and expert view of enhancing trade through regulatory harmonisation and biopesticide-based residue mitigation in the SADC region. The questionnaires were also aimed to capture and assess additional insights on the project results. A total of 20 questionnaires were sent out and 13 participants responded. Most key informant interviews focused on the six OECD evaluation criteria of Relevance,

Coherence, Effectiveness, Efficiency, Impact, and Sustainability of the project intervention. The idea was to get a balanced view from all stakeholders.

This evaluation was planned well enough and with ample time. A total of almost five months, from 4<sup>th</sup> May to 30<sup>th</sup> September 2024, gave the consultant enough time to do a thorough assessment, analysis, and draft the project report. Some challenges included:

**Table 3: Methodological and contextual risks and mitigation measures**

Assessment-related risks and potential limitations	Mitigation measures
<p><i>Non-availability of some partners during the interviews:</i> Difficulty in securing the participation and availability of key partners for interviews, data collection, and consultations during the assignment period may limit the comprehensive assessment of partnerships during the exercise.</p>	<ul style="list-style-type: none"> <li>• The consultant engaged with partners from May to August 2024 to establish their commitment and availability for interviews, data collection, and consultations.</li> <li>• The consultant maintained regular communication with the ICGEB Project Manager to ensure ongoing engagement and address any scheduling conflicts or constraints.</li> </ul>
<p><i>Contradictory findings from various data sources:</i> Different informants, including project participants, may provide varying opinions, perceptions, and interpretations of the partnerships and their effectiveness, leading to contradictory findings and conclusions. Findings from primary data may contradict findings from secondary data.</p>	<ul style="list-style-type: none"> <li>• The consultant employed rigorous data triangulation methods, using interviews, field visits to Kenya and Zimbabwe, and case studies, workshop validation, and data collection techniques to validate and cross-reference findings.</li> <li>• The consultant conducted a thorough data analysis, critically assessing the consistency and credibility of different perspectives.</li> <li>• The consultant acknowledged and transparently addressed any contradictory findings or divergent views, providing a balanced and nuanced interpretation of the data.</li> </ul>
<p><i>Potential breach of data privacy/data protection:</i> Risks associated with the handling, storage, and transmission of sensitive data collected during the evaluation, which may include personal or confidential information, leading to a breach of data privacy or data protection regulations.</p>	<ul style="list-style-type: none"> <li>• The consultant established clear protocols and guidelines for data handling and storage, ensuring compliance with relevant data protection laws and regulations.</li> <li>• The Consultant obtained informed consent from participants regarding data collection, and use, emphasising confidentiality and anonymity where applicable.</li> </ul>

#### 4. FINDINGS AND ANALYSIS

The project sought to address trade barriers caused by pesticide residues in agricultural products within the SADC region. It was built on the realisation that most SADC and African countries face significant challenges in complying with MRL standards, resulting in high levels of pesticide residues in agricultural products. These residues often lead to the rejection of produce and potential economic losses due to food waste. To tackle this, the project was established to develop regional harmonised biopesticide regulations, as most SADC countries lacked relevant frameworks and relied on synthetic pesticide regulations. The underlying assumption was that harmonising regulatory guidelines would facilitate the registration and use of more biopesticide products for residue mitigation. This would not only improve compliance with international standards but also enhance market access and trade opportunities for SADC countries while protecting environmental and public health.

The theory of change outlined the pathway the project aimed to achieve in the long run and was organised around the following goal, outcomes and outputs:



- **Goal:** Increased export of mangos and avocados from the 6 countries
- **Outcome 1:** Harmonised biopesticide regulations for selected SADC countries
- **Outcome 2:** Increased usage/adoption of biopesticides by the private sector in 2 out of the 6 countries
- **Output 1:** Government authorities in 6 countries have a regulatory system in place specifically for biopesticides
- **Output 2:** New residue data and improved knowledge to interpret this data related to the use of biopesticides (combined with conventional pesticides) to mitigate pesticide residues
- **Output 3:** Established IPM strategies and GAP for key pest /crop combinations and using biopesticides

The theory of change included several assumptions, some of which are the realisation that for the project to be successful, stakeholders, including regulatory bodies and policymakers, should be willing to adopt and implement harmonised regulations, and there is a commitment from all participating countries to collaborate and align their regulatory frameworks. Equally important is adequate resources, including funding and technical expertise, to support capacity-building activities and the implementation of harmonised regulations. Other assumptions would be that there was sufficient infrastructure to conduct residue testing.

#### 4.1 Relevance

The project aligns with SADC's goals of sustainable agriculture and trade enhancement while supporting broader regional objectives. It contributes to the African Union's Agenda 2063 by promoting modern, sustainable agriculture. The promotion of biopesticides supports the AUC's Biotechnology and Biosafety Strategy by advancing eco-friendly, safe agricultural solutions. Regionally, the project complements COMESA's Regional Agriculture Investment Plan and the EAC's Agricultural and Rural Development Policy by facilitating sustainable pest management and cross-border trade. By harmonising biopesticide regulations, it addresses the Tripartite Free Trade Area (TFTA) goals of reducing trade barriers and supports AfCFTA's vision for integrated agro-trade, enhancing both resilience and regional cooperation.

The project also forms the fundamental basic need to increase safe food production for local and export consumption. The focus on regulatory harmonisation and residue mitigation through biopesticide use is crucial for addressing the challenges faced by the SADC region regarding meeting international standards for pesticide residues. The SADC Protocol on Trade (Article 16(1)) holds that Member States shall base their Sanitary and Phytosanitary (SPS) measures on international standards, guidelines and recommendations to harmonise them for agricultural production. This project similarly recognises that regional trade can be bolstered by the development and implementation of harmonised regulatory frameworks consistent with relevant international standards (e.g. the Food and Agriculture Organisation (FAO)/ World Health Organisation (WHO) Joint Codex Alimentarius Commission guidelines), and therefore more likely to be implemented by the project countries and remaining SADC states.

The project was relevant to the SPS needs, priorities and policies of the six SADC countries, linked to harmonising biopesticide regulations and facilitating easier registration and use of biopesticides across member countries with the aim of reducing synthetic pesticide residues for the benefit of the environment and human health. Observance of SPS measures enhances the implementation of the SPS Agreement, thereby addressing any would-be bilateral trade issues and expanding trade opportunities. This project enhances SPS implementation and facilitates consultation and cooperation between parties to address specific issues related to food safety and trade from the SADC region. Moreover, the emphasis on capacity development was key to ensuring that stakeholders were equipped with the necessary knowledge and skills to implement the project's strategies effectively. This project was also relevant as similar work on harmonised biopesticide registration guidelines has been concluded in the EAC on harmonisation of biopesticide regulations, and Asia on pesticide residue mitigation through the promotion of biopesticides and enhancement of trade opportunities, showcasing the importance of using biopesticides to reduce pesticide residues.

By involving country regulators, farmers and the private sector across the six countries, the project had local context, ownership, processes, and stakeholders, who were fully considered in the project design and implementation. The fact that the project undertook studies in Tanzania on avocados

and in Kenya on mangoes showcases a regional approach to solving sustainability challenges. The project also took cognisance of the fact that countries are at different levels of infrastructural development for research, and thus, collaboration remains critical. Kenya's ISO certified laboratory facilities were vital to conduct the analysis of the samples that were shipped from Tanzania. By involving South Africa, which had existing biopesticides regulations, this project had baseline information which countries built on; whilst South Africa had a baseline to improve upon.

## 4.2 Coherence

The project was in line with the SADC Revised Regional Indicative Strategic Development Plan 2015-2020 which, inter alia, aims to increase market access for agricultural products through regional co-operation, integration and harmonisation. This project was implemented in close consultation with SANBio and SAPReF, institutions that hold great leverage in the region. SANBio sits on the SADC Secretariat, while SAPReF is a sub-committee of SADC - constituted of pesticide regulators from all SADC Member States. The involvement of SAPReF ensured that relevant technical personnel and decision-makers were involved in project implementation, ensuring their buy-in. SANBio provided the necessary political leverage to ensure that the outcomes of the project can ultimately be integrated into country plans.

There are global, regional and national efforts being made to streamline the registration processes for biopesticides, including regulations that promote the registration of low-risk compounds and provide incentives for their commercialisation. Africa has not been left out in this trend. These initiatives are crucial for the development of sustainable agriculture and for supporting small-scale farmers in their transition to using more environmentally friendly pest management practices. These projects reflect the growing interest and investment in biopesticide research and use, aiming to reduce the environmental impact of synthetic pesticides and support sustainable agricultural practices that lead to safe food and increased trade.

The project built on other related interventions led by governments, regional and international organisations and regional economic communities, especially those on biopesticides led by SADC, SAPReF and the EAC. Existing interventions, including regional policies, guidelines, strategies and priorities for pesticide residue mitigation, were synergistic with the project's aim. A case in point is the consideration of the regional harmonised registration guidelines by SADC through its approval by SAPReF members. These are in line with the SAPReF and SADC objectives on plant health. The harmonised guidelines developed under the project will play a crucial role in supporting the implementation of the 2022–2036 Plant Health Strategy for Africa. In collaboration with CABI and other partners, AU-IAPSC has been spearheading efforts to advance sustainable pest management across the continent. With support from USDA, these efforts are set to expand through further studies, consultative workshops, and the anticipated publication of a position paper. To elaborate, through a new project<sup>3</sup> funded by USDA, AU-IAPSC and CABI plan to foster the establishment of a continental framework for pest control products, including biopesticides. This framework will draw on best practices and models such as the SADC Biopesticide Guidelines, alongside those from ECOWAS and EAC, to create harmonised guidelines that promote safe, sustainable, and effective pest management solutions across Africa.

The private sector played a crucial role in the project, contributing expertise and resources to support the development of harmonised registration guidelines for biopesticides in six SADC countries. Companies such as CropLife Middle East, CropChem Ltd Zambia, Dudutech Zimbabwe Ltd, PHI Agrichemicals Botswana, Agrifocus Mozambique, Meridian Agritech South Africa, and Syngenta Mozambique brought a wealth of global and regional knowledge to the Project. The private sector was represented on both the Project Steering Committee and Project Advisory Board, and in-country workshops, providing valuable insights. In addition, the project having included APAARI, EAC, ECOWAS, FAO, AU-IAPSC, SABO, SAPReF, STDF, USDA and several government authorities, shows the best practices for a coordinated approach; aligning the project, building the relevant capacity needs, addressing problems, and sharing lessons learned to ensure the achievement of the project objectives.

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<sup>3</sup> CABI will lead two initiatives to align pesticide regulatory systems and harmonise MRLs to make accessing new export markets more transparent and predictable for U.S. producers. A USD 4-million project will focus on Southeast Asia, while a USD 3-million project will focus on regional collaboration in Africa. Please see news release [here](#).



### 4.3 Effectiveness

Many factors influenced the achievement of the project objectives, outcomes (harmonised biopesticide regulations for selected SADC countries, and increased usage/adoption of biopesticides by the private sector in 2 out of the 6 countries) and outputs. The project's log frame indicators, at the goal level (focusing on long-term goals), highlight the ambitious nature of achieving substantial outcomes within the three-year project timeframe. Therefore, while the project has laid a strong foundation, continued efforts and investment from other stakeholders are essential to sustain momentum in the region.

The project particularly achieved the following outputs:

*Output 1: Government authorities in the six participating countries have a regulatory system in place specifically for biopesticides.*

Representatives from the six project countries (as well as Malawi) forming the Technical Working Group (TWG) developed biopesticide registration guidelines over the 3-year project timeline. The draft guidelines were then taken by SAPReF, whose Annual General Meeting (AGM) was held on 16 July 2024, and approved by the forum. It was agreed that SAPReF would take the lead in following up on the guidelines' approval through the SADC approval mechanism.

The final draft of the guidelines was presented, discussed, and approved at the SADC Plant Protection Technical Committee (SPPTC) meeting on 24 July 2024. SPPTC Members were given until the end of September 2024 to review them. The harmonised guidelines are expected to be approved by the SADC Council of Ministers in January 2025. This is a clear achievement of the project that the guidelines are being considered for adoption at the SADC level (i.e., all 17 Member States), beyond the six project countries.

At the country levels, five countries, namely Mozambique, Tanzania, Zambia, Botswana and Zimbabwe, conducted in-country regulatory workshops to develop roadmaps to domesticate the regional harmonised guidelines. South Africa, on the other hand, opted to pursue a separate process although the regional guidelines drew significantly from the existing South African guidelines, indicating there would still be significant alignment between the regional and South African guidelines.

These guidelines, will enable reciprocal acceptance of registration data, streamline the registration process and support the agricultural sector, a key contributor to GDP and export earnings for SADC member states. However, domestication and implementation of these guidelines are lengthy processes, typically requiring 3-5 years to integrate into national policies and regulatory frameworks. Additionally, ensuring biopesticide registration and farmer awareness to reduce MRL violations and increase exports is expected to take at least five years, as noted by South African regulators. A significant challenge lies in the lack of infrastructure and funding in some member countries. For instance, Mozambique, Zambia, and Zimbabwe reported that their laboratories lack ISO certification and the necessary equipment for conducting MRL analyses.

*Output 2: New residue data and improved knowledge to interpret this data related to the use of biopesticides (combined with conventional pesticides) to mitigate pesticide residues.*

- One residue mitigation study was conducted by KEPHIS in Kenya, to control the anthracnose pest on mango. The test substance was Rodazim [carbendazim], and the biopesticide used was Neem oil [Azadirachtin].
- Another residue study was conducted by TPHPA in Tanzania for lepidopterans [False Codling Moth (FCM)] on avocados. The test substance was Matron [methoxyfenozide], and the biopesticide used was Cryptogran [*Cryptophlebia leucotreta*].
- The results show that the use of biopesticides with conventional pesticides has the potential to increase MRL compliance, increase food safety, and thus increase exports and revenue for farmers exporting agricultural produce.

The two studies validated the strategy of substituting the final application of a conventional pesticide with a non-residue-producing biopesticide, demonstrating its effectiveness in mitigating pesticide residues while satisfactorily protecting target crops from late-season pest damage. Key to the project's success was meticulous planning around crop and pest seasonality, timely procurement of

equipment and consumables, and effective communication with farmers, which built trust and secured participation from 78 farmers (53 [34M:19F] in Tanzania and 25 [14M:11F] in Kenya). Proactive project management, including setting deadlines and maintaining follow-ups, further enhanced project outcomes.

*Output 3: Established IPM strategies and GAP for key pest-crop combinations and using biopesticides.*

A Guidance Document for Evaluating the Usefulness of Biopesticides in Integrated Pest Management (IPM) Programmes was developed. The purpose of the document was:

- To empower diverse stakeholders, such as farmers, advisors and regulators.
- To assess the fit of a biopesticide within their specific IPM program.
- To make informed decisions regarding biopesticide selection and application.

The Good Agricultural Practice (GAP) guides developed included info sheets on the benefits of biopesticide use, as well as factsheets on key pest /crop combinations – namely those investigated through the residue mitigation studies of the project: anthracnose fungi on mango and false codling moth on avocado. These materials were developed in consultation with project partners, and disseminated widely to key project stakeholders, e.g., growers and farmer groups. The Info sheets included:

- Biopesticide Classification and Applications
- Biopesticides: Benefits and Challenges
- Biopesticides and IPM
- Promoting the Use of Biopesticides by Smallholder Farmers in Africa
- Biopesticide Production, Commercialisation and Availability in Africa

The materials were presented to key stakeholders, industry, farmers groups, regulators and researchers during the various in-country meetings. Ag Aligned Global LLC has also indicated that they will seek opportunities to utilise the materials in the various capacity-building initiatives they are involved in, including a project<sup>4</sup> that was recently funded by the USDA focused on import MRLs in Asia-Pacific Economic Cooperation member economies, supporting trade with key export markets for U.S. specialty crops. The materials, already passed by the Project Technical Team, will be widely disseminated through ICGEB social media channels as well as SAPReF once all are approved by STDF. ICGEB and CABI have also discussed, and continue exploring, the possibility of having some of the material on the CABI BioProtection portal.

In November 2022, 30 scientists (21M:9F) from all the participating countries (Botswana - 3 [1M:2F]; Kenya - 10 [10M:0F]; Mozambique - 4 [1M:3F]; South Africa - 2 [1M:1F]; Tanzania - 3 [2M:1F]; Zambia - 4 [3M:1F]; Zimbabwe - 4 [3M:1F]) underwent five days of in-person training in Kenya, covering both field and laboratory practices. Out of the 30 participants, 16 laboratory scientists underwent training tailored to laboratory work, while 14 field scientists received training focused on fieldwork. The workshop focused on risk assessment and management of pesticide residues in agricultural products, analytical chemistry techniques for detecting and quantifying pesticide residues, and the application of international standards such as Codex MRLs to ensure compliance. Participants also gained a solid understanding of biopesticides, including their efficacy and safe use. Theoretical workshops organised by project countries, along with practical training for field and laboratory technicians on residue decline studies, expanded the training's reach through extension services. Participants shared the knowledge and materials acquired with colleagues (especially in Mozambique and Tanzania as reported during interviews), ensuring that all project activities adhered to best practices, minimizing risks of failure. This capacity-building effort was instrumental in enhancing trade and food safety in the region and received positive feedback in a follow-up survey, highlighting its impact and effectiveness.

Other factors that influenced the achievement of the project's outputs:

- a) The project developed a strategy to enhance knowledge sharing by partnering with CABI to publish the lists of biopesticide products registered in the six project countries on their BioProtection portal, the largest free resource for information on biological plant protection, which was instrumental to disseminating information to all interested stakeholders.

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<sup>4</sup> Ag Aligned Global, which was the Technical Partner on this project will lead a \$3-million project focused on import MRLs in Asia-Pacific Economic Cooperation member economies, supporting trade with key export markets for U.S. specialty crops. Please see more details [here](#).

- b) This project involved CropLife, SABO and other private sector representatives for total buy-in. Their involvement and contributions indicate the willingness of the private sector to develop new products and techniques to lead to smoother trade processes and better alignment with international standards. In addition, by involving APAARI, and later IICA (the implementing partners of other STDF-funded biopesticides projects), in bi-annual project steering committee meetings, the project leveraged upon lessons learnt from their respective projects in Asia and Latin America, facilitating effectiveness. The ICGEB Project Manager was also a member of APAARI and IICA's project steering committee and contributed input and shared lessons to foster collaboration. In return, APAARI actively participated in both virtual and in-person workshops organised by the project and the ICGEB kept close communication with IICA.
- c) Flexibility, responsiveness and support of STDF Secretariat that was seen throughout the project.
- d) There was also strong collaboration from project partners and participating countries, particularly within the SADC member states. These partners established positive relationships with regulators and policymakers. This strategic collaboration provided essential insights into the regulatory landscape, ensured alignment with national and regional processes, and secured vital support from statutory bodies.
- e) The project management ensured to timeously disburse the finances required to enable countries and partners to carry out their project-related work.

#### 4.4 Efficiency

The project made efficient use of its available resources, contributing to its economic delivery. The project had a total value of approximately USD 1 459 278.02, with USD 798,480.00 contributed by the STDF. Other project costs were covered through the contributions of ICGEB, USDA and in-kind contributions from the project countries. This budget was strategically allocated to various components, including regulatory harmonisation, biopesticide research, and capacity building, and nothing was done outside the budgeted activities. The project leveraged on existing partnerships with SABO, SANBio, CLAME, APAARI<sup>5</sup> and others to maximise on its financial resources. For example, it complemented ongoing projects in the Asia-Pacific and Latin America regions, promoting cross-regional learning and collaboration through attending meetings and workshops in which lessons learnt were shared and some training undertaken. The project also had localised country workshops and with little travel across countries, leading to the efficient utilisation of resources.

The project was managed efficiently, and the project governance structure contributed to the success of the project. The day-to-day responsibility of managing the project and tracking progress was vested in the Project Manager, who was assisted by a Programme Specialist. There was support from a Technical Director, who would oversee the work done by technical implementors at country level, and a Functional Capacity Building Coordinator who oversaw the soft skills training component. Consultants were also hired to support the work.

The project started in March 2021 and was originally due to end by February 2024. However, there was the Covid-19 pandemic that led to the suspension of travel and in-person activities in 2021. During this time, the project seamlessly transitioned to virtual events, ensuring continued progress as per the original workplan. In-person events resumed once travel restrictions were lifted. As a separate challenge, in instances where partners or stakeholders exhibited delayed responses, project management conducted regular follow-ups through email or phone calls, highlighting the importance of their feedback to the project outcomes and encouraging timely responses. Overall, the project implemented several strategies to manage risks and unforeseen challenges effectively. However, despite these efforts, a 6 month no-cost extension from 29 February 2024 to 31 August 2024 was requested, motivated by the following:

- i. The development of the draft guidelines experienced delays primarily due to protracted lags in getting feedback from SADC Member Countries. Following a meeting in September 2023,

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<sup>5</sup> SABO (Alison Levesley, General Manager), SANBio (Ereck Chakauya, Network Manager), CLAME (Stella Simiyu, Director Regulatory Affairs), APAARI (Ravi Khetarpal, Executive Secretary)

it was mutually agreed to allow Member States an additional opportunity to provide comments.

- ii. The delay in finalising the draft guidelines had a cascading effect on the scheduling of in-country workshops to develop implementation roadmaps. Four of these workshops (Mozambique, Zambia, Botswana and South Africa) were thus planned to be undertaken during the period of the no-cost extension.
- iii. Phase 2 of the Tanzanian residue mitigation study experienced a delay. Originally planned for mid-2023, the field trial was rescheduled to align with the peak flight time of the false codling moth (December-February) to ensure more meaningful results. Consequently, additional time was required for the finalisation of the studies, laboratory analysis and formulation of findings.

Even when the project faced the above delays, the no-cost extension of six months gave the opportunity to have all the pending milestones completed by 28<sup>th</sup> August 2024, when the end-of-project workshop was concluded.

The project progressed well considering that harmonising biopesticide regulations across multiple countries was more complex than anticipated due to varying national standards and regulatory frameworks. All countries had limitations in terms of technical expertise and infrastructure as most laboratories did not have ISO certification, except for Kenya and South Africa. Thus, samples from studies in Tanzania had to be sent to KEPHIS for analysis. Ensuring consistent and effective communication among diverse stakeholders, including farmers, regulators, and researchers can be challenging, and gaining market acceptance for biopesticides can prove to be slow and difficult as farmers and consumers are more accustomed to conventional pesticides.

The project had a well laid out monitoring and evaluation plan including project committees that oversaw the progress and streamlined the activities. The continuous monitoring and evaluation helped identify and address issues promptly, reducing delays and resource wastage. These measures contributed to the project's overall success in managing risks and ensuring efficient resource allocation.

Seven evaluation reports were prepared by ICGEB to analyse the effectiveness of the implemented strategies and identify areas for improvement. Feedback from stakeholders, including farmers, regulators, and researchers was collected through surveys and feedback forms to address any emerging issues promptly. At least ten workshops and eighteen meetings were held by project partners and participating countries to facilitate direct communication between stakeholders and project implementers. The workshops were attended by regulators, researchers, industry representatives, academia and farmers. The project managed to share knowledge and information through emails, publications, and social media platforms (LinkedIn, Facebook, Twitter, and the dedicated project website). The project adopted an adaptive management approach, allowing for adjustments based on stakeholder feedback to improve project outcomes. These strategies ensured that the project remained responsive to the needs and challenges of its stakeholders, enhancing its overall effectiveness. These measures helped in identifying deviations early and implementing corrective actions to minimise delays and resource wastage.

A total of USD 1,459,278.00 was allocated for all project activities, with STDF contributing USD 798,480.00. Looking at the work done, the number of countries and teams involved, and the training done, this project was cost-effective as all its three outputs were realised.

Overall, the efficient allocation and utilisation of financial, human, and technical resources contributed to the project's economic delivery and its potential to enhance trade within the SADC region.

#### **4.5 Impact**

The project generated significant positive intended higher-level impacts in developing harmonised guidelines for biopesticides registration and commercialisation in the SADC region, with opportunities for replication in other regions in Africa, Asia and Latin America. Whilst the project was only for three years, which is not enough time to reliably quantify impacts on trade within the project timelines, the milestones achieved have set up the right trajectory for an improved domestic and regional SPS situation, measurable impact on trade in the future and contribution to sustainable economic growth,

in the region. The quantifiable differences the project has made include developing the biopesticide registration guidelines, advances towards harmonisation of this regulatory framework and procedures across SADC countries, and implementation of IPM and GAPs. By advocating for the integrated use of conventional pesticides and biopesticides and facilitating the testing of this combination, the project has come up with potential residue mitigation strategies that could promote food safety, environmental sustainability and potential for increased trade in the region.

The project aimed to promote safe and inclusive trade by ensuring that agricultural exports from SADC countries can align with international trade standards, which have a primary focus on protecting human and environmental health. This aligns with the STDF's overarching goal of facilitating safe and inclusive trade for developing countries.

The project indicators at the goal level based on the Log frame were partially achieved. This is mainly because of the following:

- a) The USD value of exports for target harmonised system (HS) code products and markets – At the time of the assessment, this information was not yet available as the project had just had the guidelines for registration approved and their adoption and implementation were yet to happen. However, increased imports from such interventions will normally and realistically be realised after 5 to 7 years. Thus, it was ambitious to already expect an increase in trade from a policy intervention within the three years of the project. In addition, there were no baseline studies to ascertain the levels of exports before the intervention to allow for an analysis of the value of exports.
- b) Firms with increased exports, disaggregated by gender and firm size - Given the timeframe of three years for the project, it is too early to have an overall assessment on the increase in exports. However, indications are high that the strategic use of biopesticides with conventional pesticides will reduce pesticide residue and thus contribute immensely to increased safety and trade for SADC countries. Suffice it to note that in Tanzania, there is already reported interest in replicating the use of biopesticides in mangoes, grapes and bananas following the pilot study on avocados. This interest shows the potential to increase trade in these value chains while protecting human, animal and environmental health.
- c) Number of SPS non-compliance alerts/notifications – Given that the harmonised registration guidelines have recently been developed, it is too early to have non-compliance alerts. However, Tanzania already observed a decrease in non-compliance reports, from 45 in the year 2020–2021 to 38 in the year 2022–2023 and 25 by June 2024. This could be because Tanzania also benefits from the EAC's harmonised biopesticides guidelines that are currently being implemented.
- d) Evidence of market access and exports/imports facilitated through STDF support – Again, this is an outcome expected to be realised in the future.

The project contributed to the two key outcomes and the overall programme goal in STDF's Theory of Change as follows:

**Outcome 1: Improved SPS Capacity** - By harmonising biopesticide regulatory frameworks and building capacity, the project has strengthened the SPS capacity of six SADC countries with spill-over benefits to other African countries. This aligns with the STDF's goal of enhancing SPS capacity to facilitate safe trade.

**Outcome 2: Enhanced Market Access** - The project's efforts in reducing pesticide residues and ensuring compliance with MRLs will directly contribute to enhanced market access for the SADC countries. This supports the STDF's objective of improving market access for developing countries through better SPS measures.

The approvals at a regional level by the SADC Council of Ministers, which is expected to be done in January 2025, set out work toward achieving the project's objectives, including the development of strategies to enable the sustainable registration and promotion of biopesticides for late-season pests in key export crops. This means that the project influenced the development of strategies to enable the sustainable registration and promotion of biopesticides on the agenda of the SADC Council of

Ministers. In addition to the guidelines, the development of the Biopesticides Application Form (appended to the guidelines) sets out the need for uniformity in application.

#### 4.6 Sustainability

The project was a partnership consisting of various international entities, including the ICGEB, CropLife Africa and Middle East, SABO and SAPReF, among others. The six SADC countries' involvement in these partnerships helped to align the project's efforts with broader regional and international initiatives. The involvement of SAPReF is fundamental for the sustainability of this project, as SAPReF is involved in promoting regional collaboration and harmonisation of pesticide regulations among pesticide regulators in the SADC region. By harmonising pesticide regulations, SAPReF helps ensure consistent standards and practices across countries, which is essential for trade facilitation. SAPReF also contributes to creating a conducive environment for safe and sustainable agricultural trade within the SADC region by promoting effective pesticide regulation and collaboration, and this regional approach ensures sustainability. During the interviews by the consultant, it was made clear that SAPReF will continue supporting the process towards implementation and domestication of the harmonised guidelines after the project end as this is part of its mandate. This is to be achieved by keeping the countries accountable such that SAPReF would expect them to report on progress during its regular general meetings.

It is important to highlight the sustained benefits of this investment hinge on ongoing commitment, stakeholder engagement, and adaptive management. The long-term sustainability of the project's benefits has been strengthened through the following key areas:

- a. **Regulatory adoption:** The six SADC countries successfully developed the biopesticides guidelines. They intend to harmonize their biopesticide regulations and plans are underway to maintain consistent implementation to ensure that the benefits can endure (*viz.* country regulatory roadmaps). Even other SADC countries outside the six target countries have agreed to adopt the guidelines. It is therefore important that SADC oversees and tracks the implementation across the countries.
- b. **Biopesticides roadmaps:** All the five countries have developed the roadmaps that will be implemented. It is, however, important that each country commits resources to ensure that these roadmaps are implemented. During their in-country regulatory workshop, Mozambique and Zambia indicated that they will now commit resources from their national budget to implement use of the guidelines.
- c. **Capacity building:** The project invested in building local capacity (e.g., training farmers, researchers, and regulators), and this improved technical expertise is expected to lead to lasting change. Knowledge transfer will ensure that practices continue beyond the project duration. However, there is need to sustainably continue with more training as the staff turnover in government institutions is high.
- d. **Market demand:** Sustainable benefits rely on market demand for compliance of residue-standards by farmers at both local and export markets. Given the importance of food safety (consumers and importers will continue to prioritize the observance of food safety), the project's impact will continue over the years. With increased demand for safe food, this project provides a sustainable approach that needs upscaling. A good example is Tanzania, where there is now an increased demand to replicate the use of biopesticides in mangos, grapes, apples and other crops.

#### 4.7 Other unexpected results

There were a number of unexpected results, that took place during project implementation, as well as unplanned synergies/collaboration with other projects, new projects being developed/funded, etc, thanks to the project. The following are some of the examples: The Project Manager participated at the Fourth Global Minor Use Summit that was held from 5-9 February 2024 in Madrid, Spain. He shared the biopesticide-based residue mitigation concept being developed under the project. This generated interest from the Avocado Producers Association of Mexico who asked the Project Manager to share the ideas with avocado farmers in Mexico. The Project Manager subsequently travelled and made a presentation on the biopesticide-based residue mitigation approach at the Annual General Meeting of the Avocado Producers and Exporters Association of Mexico. It is an approach which is



receiving very positive reactions and one that could undoubtedly go a long way in helping growers deal with residue issues and, hence, be able to access a larger export market. The regional project workshop, initially to be fully funded by ICGEB, generated significant interest from various partners, including USDA, FAO, CABI, CropLife Africa Middle East, the Inter African Phytosanitary Council (IAPSC), and the Africa Food Safety Initiative. In addition to discussing the sub-regional guidelines, the workshop provided a platform for discussions on developing continental guidelines—a process now being led by IAPSC in liaison with other partners who engaged during the workshop.

During the impact assessment discussions with FAO, it was noted that FAO is developing another project to look at highly hazardous pesticides and the use of biopesticides as an alternative to be implemented in several SADC countries, some of which are the countries are also part of the STDF/PG/694 countries. The progress in the development of this project was at an advanced stage, with FAO stating that they are still working on the formative documentation for the project, with relevant agreements expected to be signed by September 2025. In the proposed project, they will be working with RECs, including the EAC and SADC. They are yet to finalise the budget and pilot countries. During the interviews with FAO, it was made clear that FAO will build on the (STDF/PG/694) project, and this will eventually lead to a reduction in conventional pesticide use and an increase in trade and exports.

Another FAO project<sup>6</sup> in Zimbabwe will support the domestication process of the harmonised guidelines.

The AU, through the Inter-African Phytosanitary Council (AU-IAPSC) and in collaboration with CABI (through the USDA-funded project mentioned in Section 4.2), will actively support African countries in adopting biopesticides by spearheading the harmonisation of regulatory frameworks for both pesticides and biopesticides across the continent. This will include facilitating discussions to develop cohesive guidelines tailored to specific regional pest challenges and fostering collaboration among key stakeholders in the continent.

## **5. CROSS-CUTTING**

### **5.1 Gender**

The project incorporated gender equality as a cross-cutting issue in several ways. Reaching 222 women (and 312 men), the project ensured that women were actively involved in all stages, from planning to implementation. This included engaging female farmers, researchers, and regulators to ensure their perspectives and needs were addressed. The mitigation studies involved the participation of 30 women and 48 men growers. During the end of project workshop, at least 21 of the 49 participants were women (43%). The project also involved the Women Environs of Zambia, which has 3,000 smallholder women farmers, and this shows inclusivity.

The training programmes were designed to be inclusive, actively providing opportunities for women to enhance their skills and knowledge on biopesticide use and IPM strategies. The way the project was structured had specific initiatives aimed at empowering women in the agricultural sector. These initiatives focused on increasing women's access to resources, information, and decision-making processes, as women constitute 56 to 75% of the farmers in SADC (FAO, 2022).

The project used several gender-specific indicators to monitor progress on gender equality. These included tracking the number of women participating in training programmes, workshops, and project activities compared to men. By addressing gender equality, the project not only aimed to improve agricultural practices but also to enhance the socio-economic status of women in the SADC region.

### **5.2 Environment, Biodiversity and Climate Change**

There has been increased calls on careful considerations when using conventional pesticides across the globe to safeguard human health and the environment. The introduction of biopesticides provides

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<sup>6</sup> Capacity Building Related to Multilateral Environmental Agreements in African, Caribbean and Pacific regions. Phase 3 ongoing. Phase 4 to commence on 01 October 2025. Budget € 9,9 million. Duration 2019 - September 2025. <https://www.fao.org/in-action/building-capacity-environmental-agreements/activities/africa/zimbabwe/en/>

farmers with options to reduce crop loss and manage residues. However, there is need to train farmers on the use of these biopesticides and ensure that the private sector is commercialising biopesticides to ensure that farmers have alternatives, as this will increase adoption by the farmers.

The project addressed environmental, biodiversity, and climate change issues in several ways. The involvement of the Zambia Environment Management Agency (ZEMA) and the South African Department of Forestry, Fisheries and the Environment (DFFE) is lauded as a recognition of the importance of the environment in this project. These entities highlighted the importance of protecting the environment and the challenges of climate change in the respective countries. This helped incorporate environmental issues into the discussions on developing guidelines for biopesticide regulations. The project promoted the use of biopesticides, especially for controlling late-season pests in key export crops. By reducing reliance on synthetic chemical pesticides near harvest, it contributed to providing successful examples for compliance with MRLs based on international standards. By ensuring that pesticide residues in crops remain within acceptable limits, it supports safe trade and minimises environmental contamination. Misuse and over-reliance on synthetic pesticides pose risks to the environment and public health and potential harm to non-target organisms (including beneficial insects, soil microbes, and pollinators), thus the project showcased mechanisms for sustainable pest control to support environmental sustainability and biodiversity conservation while enhancing productivity.

The fact that there were capacity-building activities to enhance knowledge and skills related to biopesticides, residue management, and regulatory harmonisation strengthened capacities that contribute to sustainable agricultural practices and better environmental outcomes.

The project indirectly contributes to climate change mitigation by promoting the adoption of biopesticides, which could help reduce the carbon footprint associated with pesticide production, transportation, and application.

## **6. LESSONS**

A thorough analysis was undertaken to explore the lessons learned from the project aimed at reducing MRLs non-compliance and enhancing trade opportunities in the six participating SADC countries. The following are some of the lessons learnt:

- a) The studies undertaken in Kenya and Tanzania indicated that the integration of biopesticides alongside conventional pesticides can reduce pesticide residues to within MRL limits. Given that the use of biopesticides is relatively new in SADC, capacity building and awareness activities related to MRL data interpretation and development of the regulatory guidelines' harmonisation was critical.
- b) Regional collaboration is crucial for addressing trade concerns related to pesticide residues. The project involved six SADC countries and Kenya. By having a regional project, there were a lot of synergies and sharing of lessons and use cases that will make the project impactful. The project highlighted the importance of collaboration among international, regional and national stakeholders, including governments, research institutions, and industry players. Effective partnerships facilitated knowledge sharing, capacity building, and successful project implementation.
- c) Holistic approaches yield better results. By addressing trade access, food safety and environmental concerns simultaneously, the project demonstrated that holistic approaches are more effective. The regulatory harmonisation, residue management and sustainable practices should be integrated for optimal outcomes and this work should be replicated across several African countries and sub-regions to improve trade, food safety and build capacities.
- d) Capacity building plays a vital role in promoting safe and sustainable agricultural practices, thus investing in training and capacity development is crucial for increased efficiency and effectiveness in project delivery. Equipping local experts with knowledge about biopesticides, residue mitigation studies, and regulatory frameworks ensures long-term success and sustainability.



- e) Striking a balance between trade facilitation and environmental protection is challenging but necessary.
- f) The project encountered unforeseen challenges, such as Covid-19, changing climate conditions, limited laboratory facilities in the participating SADC countries (resulting to use of facilities at KEPHIS in Kenya) and evolving trade dynamics. Being adaptable and flexible allowed stakeholders to adjust strategies and overcome obstacles.
- g) Successful adoption of biopesticides requires knowledge dissemination and skill development. The adoption of biopesticides will result in sustainable food systems, play a key role in IPM and improve access to new markets by African farmers.
- h) Ensuring that more than one key individual is involved in managing and reporting on the project is crucial. The departure of the Programme Specialist significantly hindered the Project Management team's ability to meet reporting deadlines. As such, prioritising personnel management is essential for the success of a project of this magnitude.

## 7. CONCLUSIONS AND RECOMMENDATIONS

The project has made significant contributions to the SADC region and Africa's agricultural trade and regulatory landscape. This project successfully facilitated the development of harmonised biopesticide registration guidelines for SADC member states. This harmonisation will lead to a more streamlined and efficient regulatory process and will eventually reduce barriers to trade within the region and across the globe. By aligning standards and regulation, the project has enhanced Mutual Recognition Mechanism (MRM) of biopesticide registrations, making it easier for countries to approve registrations for biopesticide products without facing regulatory hurdles. The integration of biopesticides with conventional pesticides will result in lower pesticide residue levels in key export crops. This will help SADC countries meet the MRLs required by importing countries. Improved compliance with MRL standards will reduce the rejection of agricultural exports, thereby increasing the market access and export earnings for SADC countries. The project provided extensive training and capacity-building initiatives for stakeholders, including government officials, farmers, researchers and agribusinesses. Enhanced knowledge and skills will empower stakeholders to effectively use and regulate biopesticides, ensuring the sustainability of the project's outcomes.

Overall, the project has been highly effective in achieving its objectives and contributing to the broader goals of the STDF. By addressing regulatory barriers and promoting the use of biopesticides, the project will not only lead to enhanced trade within the SADC region but also ensure that agricultural exports meet international market standards. The capacity-building initiatives further ensured the sustainability of these achievements, making a lasting impact on the region's agricultural trade landscape. However, it is important to note that some of these achievements are long term in nature and thus the consultant noted that whilst a lot of impact on trade will be realised in the future, this impact will also depend to how effective the implementation of the harmonised regulations will be.

The project was successfully implemented and to ensure sustainability, there are some clear and actionable recommendations for the various stakeholders involved in the project:

1. **International Centre for Genetic Engineering and Biotechnology (ICGEB)**
  - a. Organize regular workshops and seminars to update stakeholders on new regulatory frameworks for biopesticides, available technologies, and best practices.
  - b. Work with SADC countries to support adoption of harmonised biopesticide regulatory guidelines.
  - c. Establish a centralized knowledge hub for sharing information, research findings, and best practices related to biopesticides and residue mitigation.
  - d. Maintain partnerships with local and international research institutions to stay updated on the latest advancements and innovations.
  - e. Develop platforms for sharing knowledge and best practices among stakeholders to promote the use of biopesticides.
  - f. Provide technical assistance to countries in developing and implementing biopesticide regulations.

- g. Implement ongoing training for farmers, regulators, and stakeholders on the use of biopesticides and compliance with MRLs.
- h. Establish feedback mechanisms to gather input from farmers and stakeholders to continuously improve practices and policies.

## **2. Government Authorities**

- a. Implement policies, laws, regulations and administrative mechanisms that support the registration and use of biopesticides, ensuring they are aligned with international standards.
- b. Work towards harmonizing biopesticide regulatory frameworks across SADC countries to facilitate easier trade of agricultural products and mutual recognition of biopesticide registrations.
- c. Allocate resources and funding to support capacity-building, research, development, and commercialisation of biopesticides.
- d. Conduct additional pilot projects to test new biopesticide technologies and practices before wide-scale implementation.
- e. Promote the reciprocal acceptance of biopesticide data and registrations among SADC countries to streamline the approval process.

## **3. Private Sector**

- a. Encourage the adoption of biopesticides through awareness campaigns and training programmes for farmers and agribusinesses.
- b. Collaborate with research institutions and government bodies to ensure sustained development and use of effective biopesticides.
- c. Advocate for supportive policies and funding from governments and international organisations to sustain the project's initiatives.
- d. Support countries in their efforts at domesticating the draft guidelines.

## **4. Regional Economic Communities (RECs)**

- a. Facilitate coordination among member states to harmonize biopesticide regulations and standards.
- b. Support capacity-building initiatives to enhance the skills and knowledge of stakeholders involved in biopesticide regulation and use.
- c. Establish mechanisms for monitoring and evaluating the implementation of harmonised regulations and their impact on trade.

## **5. STDF's Global Partnership and Donors**

- a. Continue providing financial support for projects that promote regulatory harmonisation and biopesticide use.
- b. Foster partnerships between SADC countries and international organisations to leverage global expertise and resources.
- c. Share the outputs of the project with other relevant projects that it is currently supporting.

## **6. Farmers**

- a) Farmers are encouraged to use biopesticides, especially for late-season pests. Biopesticides help reduce pesticide residues on crops, making them safer for export markets.
- b) Implementing IPM strategies can help manage pests more sustainably. This includes using a combination of biological, cultural, mechanical, and chemical methods to control pest populations.
- c) Farmers should participate in training programmes to better understand the use of biopesticides and compliance with MRLs. This knowledge will help them meet international standards and improve their market access.

- d) Farmers should work closely with local agricultural extension services and regulatory bodies to stay updated on the latest guidelines and best practices for pesticide use and residue management.
- e) Following GAPs can enhance crop quality and safety. This includes proper application techniques, timing, and dosages of biopesticides to minimize residues.

**7. Wider Community of Donors and Development Partners**

- a. Advocate for the benefits of biopesticides and the importance of regulatory harmonisation in enhancing trade.
- b. Mobilize resources to support research, development, and capacity-building initiatives related to biopesticides.
- c. Collaborate with local and regional stakeholders to ensure the successful implementation of biopesticide-related projects.
- d. Consider developing additional project phases as well as working in other subregions in Africa to foster the implementation of the African Continental Free Trade Area (AfCFTA).

## 8. ANNEXES

### ANNEX 1

#### **ASSESSMENT FRAMEWORK FOR THE END OF PROJECT ASSESSMENT OF HARMONISATION AND BIOPESTICIDE-BASED RESIDUE MITIGATION IN THE SADC - STDF/PG/694 PROJECT**

##### **1.0 Background and introduction**

The agricultural sector accounts for a large share (4%-27%) of SADC member states' GDP and roughly 13% of their overall export earnings. However, some countries in the region experience significant economic losses due to the rejection of produce by importing countries due to exceedance of established Maximum Residue Levels (MRLs) - especially for crops on which certain synthetic chemical pesticides are used to control late-season pests. The strategic use of biopesticides has the potential to significantly mitigate pesticide residues as most of these pest control products are not subject to MRLs within importing countries. However, despite the advantages of biopesticides, their adoption and use are hindered by challenges in their research, development, registration, and commercialisation.

##### **1.1 Overview of the project**

The Standards and Trade Development Facility (STDF) funded project *Enhancing trade through regulatory harmonisation and biopesticide-based residue mitigation in the SADC region* (STDF/PG/694) is a regional initiative that seeks to address low export challenges (due to noncompliance with existing maximum residue level (MRL) trade standards) experienced by some countries in the Southern African Development Community (SADC) region. The global partnerships of the STDF drive catalytic SPS improvements in developing countries that facilitate safe trade, contributing to the Sustainable Development Goals (SDGs) related to sustainable economic growth, poverty reduction and food security.

The International Centre for Genetic Engineering and Biotechnology (ICGEB) was allocated USD 798,480 by the STDF to implement the three-year project (March 2021 – February 2024) covering 6 SADC countries (Botswana, Mozambique, South Africa, Tanzania, Zambia, and Zimbabwe), with Kenya as a partner country. The project developed harmonised guidelines for the registration of biopesticides and biological control agents in Southern Africa so that countries would have common regulatory practices, and hence be able to benefit from, among other things, reciprocal acceptance of data generated, or registrations concluded elsewhere, thus enhancing biopesticide registration and use. Additionally, the project conducted residue mitigation studies that focused on the strategic incorporation of non-residue-producing biopesticides following conventional pesticides, to help reduce pesticide residue levels and enhance compliance with MRL standards, thereby promoting trade. The project also worked towards developing the skills, knowledge, attitudes, and behaviours needed to ensure that individuals and organisations can effectively work to achieve the project objectives.

Preliminary assessment indicates that the project progressed well. However, there was a no cost extension of 6 months (from February 2024 to August 2024) that has been described as having been motivated by the following:

- i) The development of the draft guidelines experienced delays primarily due to protracted lags in getting feedback from SADC Member Countries. Following a meeting in September 2023, it was mutually agreed to allow Member States an additional opportunity to provide comments.
- ii) The delay in finalising the draft guidelines had a cascading effect on the scheduling of in-country workshops to develop implementation roadmaps. Four of these workshops (Mozambique, Zambia, Botswana and South Africa) were thus planned to be undertaken during the period of the no cost extension.
- iii) Phase 2 of the Tanzanian residue mitigation study experienced a delay. Originally planned for mid-2023, the field trial was rescheduled to align with the peak flight time of the false codling moth (December-February) to ensure more meaningful results. Consequently, additional time was required for the finalization of the studies, data analysis and formulation of findings.

The project end date was thus revised to 31 August 2024.

The approved STDF funder contribution to the project was USD 798,480. The total amount received (disbursements, plus interest generated, plus tax refunds to ICGEB) was R12,379,291.58. Total expenditure was R11,916,007.75 (i.e 83 % of the STDF contribution).

## 1.2 Project partners and organisational set up

The Project partners are the Asia-Pacific Association of Agricultural Research Institutions (APAARI), CropLife Africa and Middle East, IR-4 Project - Rutgers University, South African Bioproducts Organisation (SABO), Southern Africa Network for Biosciences (SANBio), Southern Africa Pesticides Regulators Forum (SAPReF), United States Department of Agriculture (USDA), Food and Agriculture Organisation of the United Nations (FAO), Inter-African Phytosanitary Council (IAPSC), The audience for the assessment comprises, but not limited to the Project Advisory Board, Project Steering Committee, Project partners, policymakers, regulatory officials, farmers, researchers, and academia.

The day-to-day responsibility of managing the project and tracking progress is vested in the Project Manager (who was assisted by a Programme Specialist who however – on the expectation that the project was to be completed in February 2024 - resigned), who works closely with the Technical Director and project partners.

## 2.0 Objectives of the assignment

The end-of-project assessment aims to assess the performance, results, and lessons of the STDF-funded project. More specifically, the assessment aims to:

- i. Make a factual and independent assessment of the performance of the entire project and results achieved at the national, regional and global level (including potential impacts on trade).
- ii. Analyse the risks faced during the project (including the impact of the COVID-19 crisis), the mitigation measures taken, and the response obtained.
- iii. Based on the findings, identify good practices that can be replicated or expanded at the national/regional/global level, as well as lessons learnt, and propose practical recommendations related to the project STDF/PG/694 sustainability and/or scaling-up, targeted at relevant stakeholders (including the implementing organisation, beneficiaries, other project stakeholders, as well as other development partners more broadly).

## 2.1 Understanding the key project components.

Project Component	Key Activities	Key Performance Indicators
Regulatory Harmonisation	The project collaborates with countries to develop common biopesticide regulatory standards. This facilitates reciprocal acceptance of data generated or registrations concluded elsewhere, enhancing the registration process and use of biopesticides.	Mutually acceptable and harmonised standards for registration of biopesticides and biological control agents.  Number of biopesticides standards approved for use across countries.
Residue Mitigation	By strategically incorporating non-residue producing biopesticides after conventional pesticides, the project helps reduce pesticide residue levels. Biopesticides, which are not subject to MRLs in importing countries, play a crucial role in achieving this goal.	Number of residue mitigation strategies developed and used by growers/ Number of non-residues biopesticides incorporated with conventional pesticides.  Increase in uptake of biopesticides used in the residue mitigation studies.
Capacity Development	The project aims to equip individuals and organisations with the necessary skills, knowledge, attitudes, and behaviours to effectively achieve its objectives	Number of training needs identified.  Number of individuals trained.  Number of organisations trained.  Number of countries with capacity

		to implement the outcomes of the project.
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## 2.2 Project LogFrame

The evaluation will review project activities and progress against the approved project Log Frame and hence assess the progress in the implementation of all the agreed targets.

## 3.0 Assessment criteria and questions

The assessment will be structured around the OECD evaluation criteria including relevance, coherence, effectiveness, efficiency, impact, and sustainability. The consultant will provide semi-structured questionnaires for each audience, including informed consent to be agreed upon with each participant. The sampling methodology for the qualitative component will be purposive, which will make it possible to obtain sample information from the most informed groups and individuals. The data analysis will identify patterns and trends categorized as per the OECD criteria selected. Key assessment questions will be built around the project's LogFrame in terms of what the project goal, objectives, outcomes, activities and impact were expected to be and to what extent these were achieved. The questions are outlined below but will be selected to fit different stakeholders depending on their roles and contribution to the project.

### b) Relevance: Did the project do the right things?

- i. To what extent did the objectives and design of the project respond to the needs of the beneficiaries and other stakeholders involved to mitigate pesticide residue issues impacting trade?
- ii. How were local contexts, ownership, processes, and stakeholders considered in the design and implementation of the project?
- iii. To what extent did the project remain relevant, even if the circumstances changed over the course of implementation?

### c) Coherence: How well did the project fit?

- i. To what extent did the project built on other related projects or interventions led by other entities, government, or regional bodies in the region?
- ii. To what extent did any of these other interventions (including policies) support or undermine the project, and vice versa?
- iii. To what extent did the project align with regional policies/guidelines/strategies/priorities for pesticide residue mitigation?
- iv. What measures were put in place to ensure complementarity and/or coordination between the project and other relevant programmes/projects in the region?

### d) Effectiveness: Did the project achieve its objectives?

- i. To what extent were the project objectives achieved or are likely to be achieved (based on the LogFrame indicators) including any differential results across groups?
- ii. Did the project develop the capacity of beneficiaries and stakeholders to be able to develop/implement biopesticide based residue mitigation strategies? If so, how?
- iii. Have there been any new registration of biopesticides products that can be directly attributable to the project interventions? If so, please explain.
- iv. Were there dialogues (seminars, workshops, courses) between government authorities and other regional bodies on the harmonisation of their systems and, if so, how did these help further project objectives?
- v. Have the regulatory standards developed under the project been domesticated i.e. incorporated into national regulatory processes? To what extent have they been aligned to international standards (e.g. Codex, etc.)
- vi. What types and how many knowledge products (IPM strategies, GAP guides) did the project generate?
- vii. Were there any new collaborative networks, relationships, initiatives at global, regional and/or national level that support the delivery of change in sanitary and phytosanitary systems and/or climate change?

**e) Efficiency: How well were resources used?**

- i. To what extent did the project deliver results in an economic and timely way, based on the project document?
- ii. What changes and risks, if any, occurred during project implementation, and how was the project able to adapt to these changes and manage risks?
- iii. Was the project a cost-effective contribution to addressing the needs of the beneficiary?
- iv. How well was the project managed?

**f) Impact: What difference did the project make?**

- i. To what extent did the project generate, or is expected to generate, significant positive or negative, intended, or unintended, higher-level effects (for instance improved domestic and/or regional SPS situation, measurable impact on trade, contribution to sustainable economic growth, poverty reduction and food security)?
- ii. What real difference (expected and/or unexpected) has the project made, or is likely to have, on the final beneficiaries including on people's well-being, gender equality and the environment?
- iii. How did the project catalyse any other action or change, for instance raising awareness on SPS challenges and/or mobilizing additional resources for SPS capacity development?

**g) Sustainability: Will the benefits last?**

- i. To what extent are the benefits of the project continuing, or are likely to continue over the longer term, after the end of STDF funding?
- ii. To what extent was sustainability addressed at the design stage and during the project, and what are the major factors (including risks) influencing sustainability?
- iii. Are the necessary capacities and systems (financial, social, institutional, etc.) in place to sustain the project results over time?

**h) Lessons learnt.**

- i. What lessons can be learned from the project regarding the process of project design and implementation?
- ii. What lessons can be learned from the project, which may be of importance to the broader donor community, and which should be disseminated more widely?

## **4.0 Methodology**

The recommended methodology will follow a four-step approach while integrating participatory principles. The steps for this end of project assessment are (1) Review of documents; (2) Interviews and data collection (online KII and telephone calls); 3) Synthesis and reporting; and (4) Discussion workshop (de-briefing and validation). Following the principles of co-design and people-centred development, the consultant will engage ICGEB Project Manager or his designate and all projects' stakeholders to ensure the relevance and accuracy of the strategic analysis needed to conduct the research and make strategic and practical recommendations. An overview of the recommended methodological framework is presented by Table 2 below:

<b>Phase 1: Review of Documents</b>	<b>Phase 2: KII, Interviews (online data collection, telephone calls )</b>	<b>Phase 3: Synthesis and reporting</b>	<b>Phase 4: Discussion workshop and final report</b>
<ul style="list-style-type: none"><li>▪ Desk review of project documents including, but not limited to, Project proposal, log frame, budget, newsletters,</li></ul>	<ul style="list-style-type: none"><li>▪ Conduct KIIs using semi structured questionnaires.</li><li>▪ Conduct one on one interviews with identified key stakeholders in</li></ul>	<ul style="list-style-type: none"><li>▪ Draft preliminary findings and presentation</li><li>▪ Interview stakeholders during the Final</li></ul>	<ul style="list-style-type: none"><li>▪ Presentation of findings during final project workshop on 27-28 August 2024.</li><li>▪ Conduct interviews to</li></ul>

project annual reports, reports of project partners, informational material developed under the project, project budget, legal assessments, in-country workshop reports, media articles, training resources and video clips. ▪ Development of Key Informant Interviews (KII) Tools. The questions will be tailored to the different stakeholder categories. For instance, issues pertaining to development and domestication of biopesticide regulations will be best addressed by regulatory personnel. ▪ Validation by ICGEB and make any necessary changes.	Kenya, Tanzania and South Africa ▪ Qualitative and Quantitative data analysis	Workshop, to validate preliminary findings. ▪ Draft assessment report with preliminary findings along with practical and strategic recommendations	validate the findings during the workshop on 27-28 August 2024 ▪ Validation of draft assessment report submitted. ▪ Revisions from ICGEB, partners and stakeholders, and the STDF, and final report submission.
<u>Mainstreaming:</u> Participatory approaches, Do No Harm, Partnerships Diplomacy			
5 days	20 days	20 days	5 days

*Table 2: Methodological Framework*

The consultant will use both primary and secondary data collection methods to have qualitative and quantitative data. He will do literature review of project documents as secondary research which will be supported by primary research where the consultant will have online questionnaires administered digitally to all the project stakeholders. In addition, the consultant will have one on one interviews with purposively selected key project partners and beneficiaries.

(i) Literature Review

A thorough literature review on the project documents (review of project documents including, but not limited to, Project proposal, log frame, budget, newsletters, project annual reports, reports of project partners, informational material developed under the project, project budget, legal assessments, in-country workshop and reports, media articles, training resources and video clips.) will be done to develop an in-depth understanding of the low export challenges (due to noncompliance with existing maximum residue level (MRL) trade standards) experienced by some countries in the Southern African Development Community (SADC) region. There will also be a review on the use of biopesticides to reduce the spraying of chemical pesticides and an analysis of the value chains that are targeted in each of the 7 countries. More information will be analysed on the guidelines and regulations on use and commercialisation of biopesticides including an analysis



to check on whether the countries have the capacity to domesticate the regulations.

(ii) Personal interviews

Interviews will be conducted with selected members of the project management team, Project Advisory Board, Project Steering Committee, Project partners, policymakers, regulatory officials, farmers, researchers, and academia from all the 7 countries. We will follow up on the trials done in Kenya and Tanzania to look at the process and the results and how this experience can be replicated in other similar investments in the future. These will be administered using open interviews and will involve asking specific questions aimed at generating information for the value chain for each country, the magnitude of the challenge of pesticides residues, the level of knowledge of using biopesticides to reduce the residues, the standards and regulations, the level of trade that is impacted, etc. These questions will also investigate the level of understanding of the objective of the project, the expectations and the progress including the challenges faced. The questions on the questionnaires will vary according to the category of stakeholder. Further, the personal interviews will help to identify challenges and opportunities. These interviews will be open-ended to allow for unlimited responses, deliver new, often unexpected, insights, provide more detail, offer deeper, qualitative data and capture sentiment and opinions. The open-ended questions allow respondents to share their experiences throughout the entire project, providing a holistic view of their interactions with your product or service.

(iii) Key Informant Interviews (KIIs)

Using an online interview guide, the consultants will interview subject matter experts, beneficiaries, implementing partners, and collaborating organisations to obtain a balanced and expert view of enhancing trade through regulatory harmonisation and biopesticide-based residue mitigation in the SADC region. Most of the key informant interviews will focus on the 6 OCED evaluation criteria of Relevance, Coherence, Effectiveness, Efficiency, Impact, and Sustainability of the project intervention. The idea is to get a balanced view from all stakeholders. We will use semi-structured questionnaires to conduct the survey.

#### 4.1 Methodological and contextual risks and mitigation measures

Assessment-related risks and potential limitations	Mitigation measures
<i>Lack of availability of partners during the interviews:</i> Difficulty in securing the participation and availability of key partners for interviews, data collection, and consultations during the assignment period may limit the comprehensive assessment of partnerships during the exercise.	<ul style="list-style-type: none"> <li>Engage with partners early on to establish their commitment and availability for interviews, data collection, and consultations.</li> <li>Maintain regular communication with ICEGB to ensure their ongoing engagement and address any scheduling conflicts or constraints.</li> </ul>
<i>Contradictory findings from various data sources:</i> Different informants, including project participants, may provide varying opinions, perceptions, and interpretations of the partnerships and their effectiveness, leading to contradictory findings and conclusions. Findings from primary data may contradict findings from secondary data.	<ul style="list-style-type: none"> <li>Employ rigorous data triangulation methods, using multiple sources and data collection techniques to validate and cross-reference findings.</li> <li>Conduct thorough data analysis, critically assessing the consistency and credibility of different perspectives.</li> <li>Acknowledge and transparently address any contradictory findings or divergent views, providing a balanced and nuanced interpretation of the data.</li> </ul>
<i>Potential breach of data privacy/data protection:</i> Risks associated with the handling, storage, and transmission of sensitive data collected during the evaluation, which may include personal or confidential information, leading to a breach of data privacy or data protection regulations.	<ul style="list-style-type: none"> <li>Establish clear protocols and guidelines for data handling and storage, ensuring compliance with relevant data protection laws and regulations.</li> <li>Obtain informed consent from participants regarding data collection, storage, and use, emphasizing confidentiality and anonymity where applicable.</li> </ul>

## 5.0 Timelines

<b>Review and assessment tasks</b>	<b>Number of weeks (40 days total)</b>															
	May 2024				June 2024				July 2024				August 2024			
Desktop review of project documents																
Development of study tools, and data collection																
Field visits																
Drafting and submission of draft assessment report																
Presentation of findings during the workshop on 27-28 August 2024																
One-on-One interviews during the August workshop to validate the findings																
Submission of final end-of-project assessment after comments from ICGEB and STDF (may include several rounds of review before final submission), following STDF's template																

## ANNEX 2: PROJECT LOGFRAME

	Project description	Measurable indicators	Target	Actual Result	Progress
<b>Goal</b>	Increased export of mangos and avocados from the 6 countries	% increase in quantity of exports (to both new and existing markets) of targeted crops from participating countries by end of the project.	10%	Please see the comments under "progress".	Whilst the project goal was to increase export volumes of mangos and avocados from the six countries, it can be noted that any project dealing with policies and procedures will take time to have all the necessary approvals, and the 3 years were not enough to have these results. Being a regional project also meant a lot of negotiations and dialogue that would need more time. However, the fact that there was the development and harmonisation of the guidelines means there will be increased exports in the future if these guidelines are implemented as agreed. Good progress was seen in Tanzania, where it was reported that farmers were seeing an opportunity to increase the volumes of avocados because of the intervention brought about by the residue mitigation studies.
<b>Outcome 1</b>	Harmonised biopesticide regulations for selected SADC countries	1.1 Mutually acceptable standards <sup>7</sup> of biopesticide regulation	1	1	The draft harmonised guidelines for the registration of biopesticides and biological control agents for the SADC region were developed and have the support of 15 of the 17 SADC Member States. The Guidelines were presented to the SADC Plant Protection Technical Committee (SPPTC) and, once translated into Portuguese and French, are expected to be approved by the SADC Council of Ministers. The fact that the guidelines are being considered for adoption at the SADC level (i.e., all 17 Member States), going beyond the six project countries, is a clear overachievement of the project.
		1.2 # new biopesticide registrations	6	5	Mozambique reported 30 new registrations during the project period, while Tanzania reported to have had at least 5 new biopesticide registrations during the project duration. Other participating countries did not report any new registrations. Even though a direct link cannot be established between the project and new biopesticide registrations (as the harmonised regional biopesticide registration guidelines were only approved by SAPReF towards the end of the project (in July 2024) and the domestication and implementation by SADC member states is expected to begin in 2025, after the end of the project), Tanzania reported that 'The media publicity created by the avocado team inspired the companies to register more products for use in avocado and this extended to other crops such as cashew and cotton'. The new products registered were Biosuperneem (0.03% EC), Bioneem oil extracts (100%); Bisuf Neem Oil (100%). Snow Mwarobaine (0.03% EC) has also been registered (label extensions) in avocado, coffee and cotton. Snow Mwarobaine was initially registered for grapes. Byter Tembo has also been registered (in 2022) for <i>Tuta absoluta</i> in tomato and stalk borers in maize while Snow Verde has also been registered for Spider Mites, Caterpillars and <i>Tuta absoluta</i> in tomato (same company that registered Snow Mwarobaine). The number of biopesticide products registered in Tanzania is now up from 37 to more than 42.
		1.3 # of SPS non-compliance alerts/notifications		2021-2022 (45) 2022-2023 (38) 2023/June 2024 (25)	The registration guidelines had not been implemented by the end of the project, so any SPS non-compliance alerts/notifications cannot be directly attributable to the project.  However, Tanzania provided the following figures on SPS alerts: 2021-2022 (45), 2022-2023 (38), and 2023/June 2024 (25). These were on sesame and vegetable crops. Zimbabwe did not have this data, while South Africa reported no non-compliance alerts. Kenya provided the following information on notification incidences; 2020(56), 2021(57), 2022(71), 2023(59), 2024 to date (46). The crops notified for residue exceedances were French beans, green chillies, peas, and coffee. One incident was reported on avocados in 2022. The molecules frequently notified include Chlorpyrifos, Carbendazim, Acephate, Methamidophos, Procymidone, Hexaconazole and Imidacloprid.  Zimbabwe reported that this information was not available, while the other countries did not provide it.
		1.4 Percent increase in market penetration (data from biopesticide sellers) of Cryptogran and neem oil	20	53 <sup>8</sup>	In Tanzania, the sale of Neem oil increased significantly, with 400 litres sold in October 2023 compared to 1,500 litres in March 2024, reflecting a growth of over 26%.  In Zimbabwe, import permits were issued for 20 litres of Cryptogran and 500 litres of Neem in 2022, followed by 21 litres of Cryptogran in 2023. In 2024, the country issued permits for 100 litres of Cryptogran. Despite efforts to gather information from other countries, it was not available.
<b>Outcome 2</b>	Increased usage/adoption of biopesticides by the private sector in 2 out of the 6 countries	2.1 % increase in Volume/Quantity of biopesticides used on mango and avocado (Disaggregated by type and crop)	20	7.5% and 12%	Usage of biopesticides among sampled avocado farmers in Tanzania <sup>9</sup> increased by 7.5% while usage in Mango Kenya increased by 12%.

<sup>7</sup> These are regional guidelines/standards of biopesticide regulation that all project countries are intended to adopt.

<sup>8</sup> Figure obtained as an average of the percentage increases of both Neem and Cryptogran in the countries that provided the information.

<sup>9</sup> Industry could not give figures for biopesticide sales related to specific crops; hence, the information was obtained from growers. The information from Tanzania was obtained from three avocado growing regions, Kagera (6 farmers [5M:1F] and an investment group with a total of 111 ha of avocado: Increase from 151.1 unit (litres or kgs) to 200.5), Kilimanjaro (a large export company and 6 farmers [5M:1F] with a total of 209 ha of avocado: Increase from 247.6 to 220 units) and Arusha (6 farmers [2M:4F] with a total of 18 ha: Increase from 21.9 - 30.9 units). Litres and Kilograms were lumped together for the purposes of this report. Information on Kenya was obtained from the Lower Muranga Cooperative Society, comprising 1,100 farmers [895 men and 205 women], where estimates of an increase from 2,100 to 2,350 units.

	Project description	Measurable indicators	Target	Actual Result	Progress
	(Tanzania and Kenya)	2.2 Number of intended beneficiaries <sup>10</sup> who use biopesticides, disaggregated by gender	120	78	A total of 78 farmers (intended beneficiaries), 53 [34M: 19F] women] from Tanzania and 25 [14M:11F] from Kenya were directly involved in this project. However, the number of farmers using biopesticides was reported to be quite high in the study region in Kenya (Makuyu, Murang'a County), where 950 (approx.400 women) small-scale farmers (out of 1,110) were reported as using biopesticides. Tanzania reported that all the farmers who were involved in the project now use biopesticides and that these farmers previously just used traps with pheromone lures. The biopesticides now used are SnowMarobaine (a neem product) and Cryptogran.
		2.3 Number of growers using the biopesticide-based residue mitigation system (BBRM) to comply with MRLs	20	12 <sup>11</sup>	A total of seven large-scale avocado growers in Tanzania and five in Kenya are reported to have been using the methods developed under the project (the biopesticide-based residue mitigation system (BBRM) to comply with MRLs.
		2.4 % of growers satisfied with biopesticides, and willing to continue implementing their use		80	Given the success of the biopesticides' use in Tanzania and Kenya for the residue mitigation study, five responses to a survey posed to farmers <sup>12</sup> of the participating project countries indicated that 80% (four out of the five responses received) of growers are satisfied with biopesticides and willing to continue using them.
<b>Output 1:</b>	Government authorities in 6 countries have a regulatory system in place specifically for biopesticides	1.1 # of dialogue (seminars, workshops, courses) between government authorities and other regional bodies on the harmonisation of their systems	10	15	The project has held 14 meetings/workshops, bringing together various stakeholders: Two in Botswana, one in Kenya, four in South Africa, one in Mozambique, one in Tanzania, one in Zambia, and one in Zimbabwe. There were country project meetings and training workshops held in Kenya and South Africa, including the end-of-project workshop that was held in South Africa from 27-28 August 2024. There was also a continent-wide meeting bringing together regulators, researchers, the private sector and other players.
		1.2 # of new partnerships developed between regulators in targeted countries and registrants	6	15	The project facilitated the formation of new partnerships between regulators and registrants in the six project countries, with Kenya participating as a supporting country. These engagements enabled meaningful interactions between the regulators, represented by SAPReF, and registrants across all six countries. Although these partnerships were not formalised, the project team believes that the workshops created valuable opportunities to foster their development.
		1.3 # of National biopesticide regulatory standards harmonised with international standards (Codex, etc.)	6	5	Five out of the six countries developed roadmaps for domestication or incorporation of provisions of the guidelines into their national regulatory processes. South Africa, however, opted to pursue a separate process, even though the regional guidelines also drew significantly from the South African guidelines, indicating there would still be alignment between the regional and the South African guidelines.
<b>Output 2:</b>	New residue data and improved knowledge to interpret this data related to the use of biopesticides (combined with conventional pesticides) to mitigate pesticide residues	2.1 Up to 4 field residue mitigation studies on specific pesticides/ commodities	4	4	Two studies were conducted in Kenya, and another two in Tanzania, creating new residue data and improving knowledge to interpret this data related to the use of biopesticides (combined with conventional pesticides) to mitigate pesticide residues.
		2.2 Residue data of target crops: pest combinations following use of the BBRM strategy	2	2	Two studies, conducted on avocados and mangoes, evaluated the effectiveness of Neem oil and Cryptogran in reducing residues from carbendazim and methoxyfenozide while ensuring adequate pest protection. Results showed that replacing the final pesticide application with biopesticides provided equivalent pest control to using conventional pesticides throughout the season, while lowering pesticide residues by upto 50%. These findings support the potential of a biopesticide-based residue mitigation system for growers.
<b>Output 3:</b>	Established IPM strategies and GAP for key pest /crop combinations and using biopesticides	3.1 # of knowledge products (IPM strategies, GAP guides) developed by the project for growers	5	7	The project established IPM strategies and GAP for key pest /crop combinations and using biopesticides. The seven knowledge products (IPM strategy, GAP guides) developed by the project for growers include the "IPM Toolkit", <i>Guidance Document for Evaluating the Usefulness of Biopesticides in Integrated Pest Management Programs</i> ; Biopesticide Classification and Applications; Info sheet and factsheets on Anthracnose and False codling moth (biology and control); Biopesticides and IPM; and Biopesticides: Benefits and challenges.

<sup>10</sup> Intended beneficiaries refers to the growers.

<sup>11</sup> Although this data was reported only for large-scale mango growers, information from the study area in Kenya (Makuyu, Murang'a County) indicates that many small-scale farmers have also adopted the approach. Mango farmers in the region have formed a cooperative called the Lower Murang'a Cooperative Society, comprising 1,100 farmers [895 men and 205 women]. The farmers became aware of the biopesticide-based residue mitigation approach; since 2022, more farmers have started using it. Estimates obtained indicated that up to 900 farmers [750 men and 150 women] are now employing the approach, which is also being actively promoted by the Muranga County Government.

<sup>12</sup> The Grower's survey was sent to the PAB members (23), who were encouraged to disseminate to their networks. However, only 5 responses were received.

	Project description	Measurable indicators	Target	Actual Result	Progress
		3.2 Development of SOPs and guidelines for GAP	1	6	Several SOPs and guidelines for GAP developed, including: <ol style="list-style-type: none"> <li>1. Biopesticide Classification and Applications</li> <li>2. Individual factsheets on Anthracnose and False codling moth (pest biology and control)</li> <li>3. Biopesticides and IPM</li> <li>4. Biopesticides: Benefits and challenges</li> <li>5. Promoting the use of biopesticides by smallholder farmers in Africa</li> <li>6. Biopesticide production, commercialisation and availability in Africa</li> </ol>
		3.3 Development of a database of biopesticides registered in all project countries available and accessible through ICGEB website	1	1	Information for 5 of the 6 countries has been obtained (Tanzania, Mozambique, Zimbabwe, South Africa and Zambia) and uploaded to the CABI Bioprotection portal and a link is provided on the ICGEB website. Please see <a href="#">here</a> . Information on Kenya was already available on the portal. Furthermore, as per the project document, Kenya was only playing a supporting role in the residue mitigation component of the project. The Project team has made concerted efforts to follow up with Botswana, but the authorities have indicated they are yet to obtain the required approvals to upload the information that they have onto the portal.
		3.4 Commercially available biopesticides from project countries listed in the CABI BioProtection Portal	1	166 <sup>13</sup>	Four (Mozambique, Tanzania, South Africa and Zimbabwe) of the six project countries' information has been published in CABI's BioProtection Portal. Botswana has indicated that they have already compiled the information but are waiting for official approval before information can be shared with ICGEB. Information from Zambia was provided, but during the in-country workshop, some stakeholders indicated that the information was incomplete and that there was a need to update it before having it loaded onto the CABI Bioprotection Portal. Relevant training on how to use the database has been provided, and all countries now have access to it and know how to use it.
		3.5 Country organised and hosted workshop on regulatory guidelines, IPM and GAP	6	5	Five in-country workshops were held (Botswana, Tanzania, Zimbabwe, Mozambique and Zambia). It was agreed that only 5 of the 6 countries will be covered as South Africa's Department of Agriculture does not accept funding for such projects. However, they are in the process of reviewing their national guidelines.

<sup>13</sup> Figure refers to the total number of biopesticides from the Project countries listed in the CABI Bioprotection Portal.

### **ANNEX 3: LIST OF STAKEHOLDERS INTERVIEWED AND CONTACTED**

#### **ANNEX 4: LIST OF DOCUMENTS AND WEBSITES USED**

1. STDF Project Grant Application Form
2. STDF PG 694 Project LogFrame
3. Biopesticides Newsletter Issues: 1 to 9
4. Legal Review of the Biopesticide Regulatory Frameworks in Selected Countries in Southern Africa
5. Codex and Harmonisation of Biopesticides
6. Domestication of regional harmonised guidelines for biopesticides and biological control agents – detailed country plans including timelines
7. Residue mitigation – key highlights, results and conclusions
8. [www.sabiop.co.za](http://www.sabiop.co.za)
9. <https://standardsfacility.org/PG-694>
10. <https://health.uct.ac.za/environmental-health-projects/biopesticides-project>
11. Presentations on the Training Workshop: Application of Harmonised Biopesticide Registration Guidelines for the SADC Region
12. Presentations on the Closing Workshop on Enhancing Trade Through Regulatory Harmonisation and Biopesticide Based Residue Mitigation in the SADC Region
13. STDF PG 694 Closing Workshop recommendations
14. List of attendance for Training Workshop on Key Elements of Pesticide Residue Decline Assessment and Biopesticide-Based Residue Mitigation
15. Lessons learned across biopesticides projects
16. GAP and GLP training field/laboratory report
17. Residue decline data for study reports in Kenya and Tanzania
18. Biopesticide efficacy study reports
19. Guide to the Development of Regulatory Frameworks for Microbial Biopesticides in Sub-Saharan Africa (2013) by the African Agricultural Technology Foundation (AATF)
20. Jaffee, *et al.* (2019). Why Food Safety Matters to Africa: Making the Case for Policy Action
21. AGRA (2022). Africa Agriculture Status Report. Accelerating African Food Systems Transformation (Issue 10). Nairobi, Kenya. Alliance for a Green Revolution in Africa (AGRA)
22. Driving Safe Food Trade in the midst of a Food Crisis in Africa: A critical step for the success of the AFCFTA. July 2023
23. Monitoring, Evaluation and Learning Guidance for STDF Project Implementing Organisations. November 2022
24. Harmonizing regulations and mitigating pesticide residues in the SADC Region  
<https://standardsfacility.org/PG-694>.
25. Southern Africa Biopesticides Project Newsletters.  
[https://health.uct.ac.za/sites/default/files/media/documents/icgeb\\_biopesticides\\_newsletter\\_issue](https://health.uct.ac.za/sites/default/files/media/documents/icgeb_biopesticides_newsletter_issue)
26. Mitigating pesticide residue through promotion of biopesticides in Asia.  
<https://standardsfacility.org/PG-634>.