

**STDF PROJECT GRANT APPLICATION FORM**

<b>Project Title</b>	<b>Enhancing Trade Through Regulatory Harmonisation and Biopesticide Based Residue Mitigation in the SADC Region</b>
<b>Objective</b>	Develop a strategy to enable registration and promote the use of biopesticides for late-season pests in key export crops to reduce reliance on synthetic chemical pesticides, enhance compliance with MRL limits, and facilitate trade.
<b>Budget requested from STDF</b>	\$ 798 480
<b>Total Project budget</b>	\$1 459 278
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<sup>1</sup> Letters of cooperation/support have been signed by the authorised signatories of the respective organisations and not necessarily by the individuals listed here who are, however, the contacts for each of the institutions represented in this proposed project.

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## I. BACKGROUND & RATIONALE

Although agricultural exports<sup>2</sup> are a major contributor to the economies of Member States of the Southern Africa Development Community (SADC)<sup>3</sup>, some countries in the region experience significant economic losses due to the rejection of agricultural produce exports, due to non-compliance with relevant residue standards. The Southern African Pesticide Regulators Forum (SAPReF)<sup>4</sup> attributes this to the lack, in many countries in the region, of effective and fully operational pesticide regulation systems. Widespread overuse, misuse, mishandling and mismanagement of pesticides is, therefore, rampant; contributing to residue violations in export markets. Exceedance of established Maximum Residue Limits (MRLs) is particularly common, especially for crops in which synthetic chemical pesticides are used to control late-season pests. Use of biopesticides<sup>5</sup> could significantly mitigate pesticide residues, since most of these pest control products (with the exception of biochemical derivatives) are not subject to MRLs within importing countries. However, despite the advantages of biopesticides, their widespread adoption and use is affected by challenges in respect of their research, development, registration and commercialisation. The well-developed biopesticide regulatory systems in South Africa presents an ideal opportunity for South-South cooperation between South Africa and other SADC countries, facilitating the sharing of technical advice and best practices. In this proposed project, South African government officials will provide training to regulators from other project countries, to facilitate the harnessing of the benefits of its well-

<sup>2</sup> About 70% of the SADC region's population also depends on agriculture for food, income and employment. The performance of this sector therefore has a strong influence on food security, economic growth, social stability and poverty reduction.

<sup>3</sup> Angola, Botswana, Comoros, Democratic Republic of Congo, Eswatini, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Tanzania, Zambia and Zimbabwe.

<sup>4</sup> SAPReF is a sub-committee under the Plant Protection Technical Committee of the SADC Sanitary and Phytosanitary (SPS) Annex VIII to the SADC Protocol on Trade, Article 14 (6) working on pesticides and pesticide-related issues. SAPReF has the role of promoting regional information exchange and collaboration on pesticide and pest management as well as regulation. With a membership which includes pesticide regulators and/or Designated National Authorities of the Rotterdam Convention, pesticide risk managers from diverse backgrounds and disciplines from all the SADC countries it seeks to achieve sound management of pesticides and biopesticides.

<sup>5</sup> A generic term generally applied to a substance derived from nature, such as a microorganism or botanical or semiochemical, that may be formulated and applied in a manner similar to a conventional chemical pesticide and that is normally used for short-term pest control <http://www.fao.org/3/a-i8091e.pdf>

developed systems; as further described in Section II (Project goal, objective, outputs & activities) of this proposal.

Countries in the SADC region have varying (or non-existent) policies regarding the registration and application of biopesticides. Most do not have well established biopesticide regulatory frameworks; and are therefore reliant largely on processes better suited to conventional pesticides. For example, the registration process for *Aflasafe*<sup>TM</sup> (a biopesticide developed from harmless types of *Aspergillus flavus* and used for the management of aflatoxins) in Zambia was unreasonably protracted, as the country did not have a pre-existing biopesticide regulatory framework. Lesotho, similarly, does not have guidelines and regulations to guide the registration of biopesticides. In Eswatini, in contrast, even though the Pesticide Management Act<sup>6</sup> makes provision for the regulation of biopesticides, these are yet to come into force; pesticide regulation is, therefore, handled by the Eswatini Environmental Authority, whilst the country establishes institutions specifically mandated to regulate the use of pesticides (including biopesticides). In Zimbabwe, biopesticides are regulated by the provisions of the Fertilisers, Farm Feeds and Remedies Act<sup>7</sup>, the Pesticides Regulations<sup>8</sup>, and the National Biotechnology Authority Act<sup>9</sup><sup>10</sup>. While Tanzania has policies that make some reference to the regulation of biopesticides (including, among others, the Plant Protection Act<sup>11</sup>, Tropical Pesticides Research Institute Act<sup>12</sup>, and the Environment Management Act<sup>13</sup>), the country has no clear and comprehensive legislative, policy and regulatory guidelines facilitating the development, registration, commercialisation and use of these products. However, Tanzania has recently participated in an initiative (experiences of which would guide the development of some of the outputs of this proposed project) to develop *Harmonised Guidelines for the Registration of Biopesticides and Biocontrol Agents for Plant Protection* within the East Africa Community (EAC). South Africa has a Pesticide Management Policy, which encourages the development and use of alternative pest control products, and techniques to reduce over-dependence on chemical plant protection products. In South Africa, use of biopesticides as part of Integrated Pest Management (IPM) programmes is promoted through public-private partnerships involving, among others, government, the agro-chemicals industry, farmers, Community Based Organisations, Non-Governmental Organisations, consumer groups, other national stakeholders as well as international initiatives. The South Africa Pesticide Management Policy advocates for the expedited registration of lower-risk products – including biopesticides – to complement synthetic chemical pesticides. South Africa also has well-developed [guidelines on the registration of agricultural remedies](#).

In recent years, there has been increasing consensus that the abovementioned disparity in SADC countries' regulations adversely impacts their import-export transactions. Harmonisation of regulations has the potential to reverse this trend, contributing substantially to the promotion of trade. To this end, some efforts towards the harmonisation of SADC-region pesticide regulations have been undertaken in recent years. SAPReF (one of the institutions involved in the proposed project), whose formation resulted from such efforts, is mandated to, *inter alia*,: i) promote regional collaboration and harmonisation of pesticide regulation; and, ii) implement the objectives of the Plant Protection Technical Committee and the SADC Sanitary and Phytosanitary Annex to the SADC Protocol on Trade, which requires Member States to take necessary measures to facilitate the simplification and harmonisation of trade documentation and procedures. In addition to the harmonisation of biopesticide regulations, identifying, prioritising and addressing specific residue trade barriers through regional coordination – and mitigating such challenges – would go a long way towards enhancing both regional and international trade. Increased understanding and compliance with Codex MRLs could boost agricultural producers' ability to access important export markets.

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<sup>6</sup> No. 14 of 2017

<sup>7</sup> No. 36 of 1937

<sup>8</sup> No. 144 of 2012

<sup>9</sup> No. 3 of 2006

<sup>10</sup> In some jurisdictions, products that have the pesticide or resistance mechanism manufactured within the plant (also referred to as Plant Incorporated Protectants, PIPs) may be regulated as biopesticides. Even though the project will focus largely on microbial and biochemical biopesticides, relevant regulations regarding biotechnology will be considered for harmonisation, in cases such as with Zimbabwe, where provisions are made for the regulation of PIPs as biopesticides.

<sup>11</sup> No. 13 of 1997

<sup>12</sup> No. 18 of 1979

<sup>13</sup> No. 20 of 2004

## 1. Relevance for the STDF

This project is relevant for STDF funding because it seeks to address the trade challenges SADC member countries face on account of their inability to meet Sanitary and Phytosanitary (SPS) Standards and MRL requirements; which is attributable to their agricultural producer's excessive reliance on synthetic chemical pesticides. This objective is in line with the STDF goal of assisting farmers, processors and traders in developing countries to meet food safety, animal and plant health requirements; and ultimately promote trade, increase incomes and boost economic development.

The project design is premised on the recognition that biopesticide usage (particularly for late-season pests) has the potential to reduce chemical residue levels in harvested produce, thereby mitigating residue violations. Use of biopesticides for late-season pests would not only provide pest control during the pre-harvest interval (PHI) - the time between the last application of the conventional product and harvest - but would also enhance compliance with MRL requirements and hence trade with export markets. The proposed project acknowledges, and seeks to address, the fact that the research, development and commercialisation of biopesticides is impeded by current regulatory constraints, which include: i) the absence of predictive and efficient regulatory processes to ensure product safety and consistency without inhibiting commercialisation; ii) a lack of harmonisation in the legislation of different SADC member countries addressing product-relevant issues and concerns, which constrains, and adversely impacts, import-export transactions; iii) regulation of biopesticides by systems originally designed to oversee chemical pesticides, which creates market entry barriers, especially through the imposition of burdensome costs on the biopesticide industry; iv) a lack of human resource capacity well-versed in biopesticide regulation, and; v) regulatory approval and efficacy testing procedures that are not aligned with international best practices, and which disincentivise potential registrants because of burdensome and, arguably, largely unnecessary costs.

Registration challenges limit farmers' options in respect of suitable biopesticide alternatives and complements for late season pest control - leading to disproportionate reliance on synthetic chemical pesticides and increased residue violations. In many instances, such violations are also caused by farmers' failure to comply with established international standards on synthetic pesticide use. To address the challenges and constraints outlined above, this project will comprise of the following components:

- i) **Regulatory harmonisation** - this will entail working with various institutions and stakeholders to develop harmonised biopesticide guidelines for the participating SADC countries. This will be preceded by a detailed assessment of the legal landscape in each of the countries to facilitate a clear understanding of what is required to ensure that regional guidelines are eventually translated and integrated into national legislation. It is expected that the development of effective regulatory guidelines will facilitate increased biopesticide approval by regulators and hence promote greater registration and commercial adoption of these products. Regulatory harmonisation would also eliminate trade barriers between different countries and regions caused by differences in respective standards. Increased availability of biopesticides would ultimately reduce agricultural producer's disproportionate reliance on synthetic pesticides, consequently minimising residue violations and promoting trade. Cognisant of the fact that it may not be possible within the timeframe of the project<sup>14</sup> to finalise the integration of all developed guidelines into national legislation, one of the outcomes of the regulatory harmonisation programme would be a clear, comprehensive, workable and implementable roadmap on how the regulations developed under this project can eventually become translated and integrated into national legislation.<sup>15</sup> ICGEB would support specific short-term fellowships for key personnel from some of the project countries, in order facilitate the drafting of harmonised guidelines feeding into national legislation.
- ii) **Residue mitigation** - will entail conducting studies to identify biopesticides with the potential to be used as alternatives to late-season pesticides identified as contributory to residue

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<sup>14</sup> Projects working on developing guidelines that would be applicable across several jurisdictions typically take a significant amount of time, as the process of consensus building is generally protracted; and it is essential that the needs of all the players are continuously integrated into the process. Development of the harmonised biopesticides guidelines for the East African Community, for instance, took about three years.

<sup>15</sup> Recognising that incorporating all the guidelines into national legislation may not be feasible within the timeframe of this project a clear and feasible implementation roadmap will be an integral outcome of this project.

violations. Such biopesticides will be promoted in order to enhance compliance with MRL requirements and hence promote trade in participating countries.

- iii) **Functional capacity building** – Functional skills<sup>16</sup> are integral to individuals and organisations' achieving the project's stated objectives; therefore, they will be integrated into the aforementioned project components.

This proposed SADC project is closely related to a Biopesticide Residue Mitigation Project implemented in the Asia Pacific region ([STDF/PG/634](#)), which was developed in consultation with the ASEAN Expert Working Group on MRLs, Inter-Regional Research Project ([IR-4](#)<sup>17</sup>), Rutgers University, USDA and CropLife Asia. The ASEAN project is ongoing (a virtual project inception workshop was held from 6-7 August 2020) with implementation commencing in March 2020 and overseen by the Asia-Pacific Association of Agricultural Research Institutions (APAARI). While both the ASEAN and SADC projects are pursuant of the same goal – namely promoting trade through interventions targeted at improving compliance with pesticide MRLs – the focus of the former is largely residue mitigation (and less so regulatory harmonisation); whereas this SADC proposal is concerned primarily with regulatory harmonisation (and less so residue mitigation). However, it is expected that both projects will benefit from the cross-fertilisation of strategies, ideas and technical knowledge (this is elaborated in subsequent sections of the proposal).

## **2. Specific issue/problem to be addressed**

### *(i) Food and agricultural trade flows*

The agricultural sector accounts for a large share (4-27%) of SADC Member States' Gross Domestic Product, and approximately 13% of their overall export earnings. The highest average share (45%) of total SADC exports is to the Asia-Pacific (AP) market, followed by the European Union (EU) (27%), and the rest of the world (15%). Trade within Africa is the lowest, with the majority of this being intra-SADC trade. Notwithstanding the importance of agricultural exports to the SADC region, Member States (with the exception of South Africa) have largely been unable to meet SPS measures, resulting in a decrease in the agricultural export value of preferential market access offered by the EU and under the US Africa Growth Opportunities Act (AGOA). According to the [World Bank's 2019 Doing Business Report](#), SADC ranks very low in terms of trading across borders (with a weighted regional average of 119/190) - in part attributable to the above-stated reasons. One major constraint to SADC Member States meeting SPS (as well as MRL requirements) is the high synthetic chemical pesticide residue found in their respective agricultural produce. According to the Food and Agriculture Organisation (FAO) database, [FAOSTAT](#), Southern Africa has the highest pesticide usage per area of crop land in Africa. Pesticide usage in Southern Africa increased from about 1.8 kg/ha of cropland in 2008 to approximately 2.0 kg/ha of cropland in 2018. Rates of pesticide usage per area of cropland in Eastern, Western and North Africa are 0.2, 0.03 and 0.64 kg/ha respectively; much lower than the 2.0 kg/ha in Southern Africa. Use of biopesticides can go a long way towards reducing pesticide usage, and in so doing resolve residue violations caused by extensive synthetic pesticide usage. Compliance with MRL requirements would increase the agricultural sector's contribution to the economies of SADC countries, through enhanced exports, the promotion of domestic employment, wealth creation and poverty reduction.

As already mentioned, trade with the AP region forms the bulk of exports from the SADC region. This proposed project would, therefore, benefit from working closely with the Biopesticide Residue Mitigation Project ([STDF/PG/634](#)) currently being implemented by APAARI in Asia. The involvement of APAARI, and the implementation parallel with the Asia Residue Mitigation Project, will ensure: i) that issues pertinent to Africa regarding trade with Asia are considered during project implementation; ii) greater harmonisation in the development of guidelines for the SADC region and Asia – greatly reducing trade barriers between the two regions; iii) facilitate the sharing of technical knowledge and expertise; iv) synergies in the development and

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<sup>16</sup> Functional capacities are the skills, knowledge, attitudes and behaviours needed to apply, organise and coordinate technical capacities so that individuals and organisations can work effectively.

<sup>17</sup> The IR-4 Project was established in 1963 as a partnership between USDA and the state agricultural experiment stations to assist specialty crop growers by developing data that is necessary to support the registration of safe and effective crop protection chemicals (pesticides) on fruits, vegetables, herbs, and other specialty horticultural crops.

implementation of the SADC Project; and, v) cross-regional (Asia-Africa) learning as well as overall wider project impacts. As IR-4 and APAARI are involved in both projects, virtual<sup>18</sup> workshops will be held with representation from the Asia and Africa groups, to facilitate reciprocal learnings from their respective successes. This will also be useful to plot export strategies for SADC; since Asia is an important market for commodities from the SADC region. Time will also be set aside before each of the workshops for ICGEB-APAARI discussions. Further details of how the ICGEB-APAARI collaboration will be materialised is provided in Section IV of this proposal.

*(ii) Institutional framework for SPS management*

SADC Member States have largely been unable to meet SPS measures, undermining their respective trade opportunities. The Southern African Economic and Research Council suggests that some of the trade challenges between SADC countries could be addressed by among other things: i) adopting common and mutually recognised standards; and, ii) harmonising regulations across the region. Facilitating trade at an international level, therefore, requires the development of harmonised regulations, based on relevant international standards, such as the FAO/WHO Joint Codex Alimentarius Commission guidelines.

The [SADC Protocol](#) (Annex 16) on Trade stipulates, *inter alia*, that Member States shall, to the greatest extent practicable, make compatible their respective standards-related measures, so as to facilitate trade in goods and services within the Community. It further suggests that Member States shall base their SPS measures on international standards, guidelines and recommendations, in order to harmonise the same for agricultural and livestock production. The Codex Alimentarius is the globally recognised body responsible for setting food safety standards to help in the facilitation of international trade in safe foods. The SADC Protocol is also aligned to the WTO SPS Agreement, which encourages Members to harmonise or base their national measures for food safety on the international standards, guidelines and recommendations developed by Codex. However, while all countries in the SADC region are members of the Codex, their participation in relevant Codex standard-setting bodies is limited, due largely to resource constraints. According to a [USDA report](#), most Southern African countries do not attend the Codex Pesticide Residue Meetings. For example, between 2015 - 2018 meeting attendance by SADC countries was as follows: 2015 - only Mauritius; 2016 - none; 2017 - only South Africa, and; 2018 - only Madagascar. This makes it difficult for the countries to consistently ensure that their standards are set in such a manner as to enhance compliance. To develop appropriate harmonisation guidelines for the SADC region, the proposed project intends to leverage existing ones, most notably those developed by the [AATF, USDA, IITA and USAID](#); the Global Environmental Facility, through the United Nations Industrial Development Organisation, on [Capacity Strengthening and Technical Assistance for the Implementation of Stockholm Convention National Implementation Plan in Africa LDCs of the COMESA and SADC sub-regions](#) and the ASEAN Biocontrol for Sustainable Agrifood Systems Project which was implemented by GIZ and developed [Guidelines on the Regulation, Use, and Trade of Biological Control Agents for the ASEAN region](#).

*SPS situation and issues*

Diagnostic Trade Integration Studies (DTIS's) have been conducted in a number of SADC countries, including, among others: Angola (2006); Comoros (2007 and updated in 2015); Democratic Republic of Congo (2010); Lesotho (2003 and updated in 2012); Madagascar (2001 and updated in 2015); Malawi (2003 and updated in 2014); Mozambique (2004 and updated in 2015); Tanzania (2005 and updated in 2017); and, Zambia (2005 and updated in 2014). These studies have, among other things, advocated for the optimal use of trade to spur development. Therefore, assisting countries to comply with SPS standards related to MRL regulations will greatly enhance their trade opportunities and promote economic development in the region. In addition to developing a coordinated framework to address regulatory barriers to biopesticide research, development and commercialisation, it is also necessary to develop strategies to integrate

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<sup>18</sup> The launch of the APAARI Biopesticide Residue Mitigation Project was held virtually (between 6-7 August 2020). Going by the high attendance and the quality of the discussions, it is apparent that virtual meetings could be an efficient and cost-effective way of conducting some of the project activities; one key advantage being the ability of reaching so many attendees at minimal cost. Whenever possible project activities will be conducted virtually. This would also enable many project activities to continue despite the on-going Covid-19 pandemic.

biopesticides into pest management programmes in order to sustainably avoid residue violations and enhance trade.

Between 2012 and 2017, the STDF funded three regional projects to support selected countries - in ASEAN countries (STDF/PG/337), Africa (STDF/PG/359) and Latin America (STDF/PG/436) - to meet pesticide-related export requirements based on international (Codex) standards. The external evaluation of these three projects (July, 2019) further highlighted the importance of MRLs in trade and the related capacities that need to be developed through an innovative approach. This proposed SADC Project is consistent with the recommendations of these previous STDF projects. For instance, the report of the STDF/PG/359 noted that pesticide registration processes could be improved through the development of regulations that ensure, *inter alia*: i) mutual recognition of efficacy data across countries; ii) mutual recognition of residue data, and; iii) common data packages towards a single regional submission system. The report concluded that regional discussions on harmonisation of data requirements (efficacy, residue and registration requirements) and the development of mutual recognition agreements should be encouraged to enable reciprocal acceptance of efficacy data and labelling requirements. It observed that fulfilling these three objectives would significantly reduce the time required for newer, safer pesticides to be registered and made available to farmers, facilitating more widespread adoption and implementation of Codex MRLs.

### **3. Links with national/regional development plans, policies and strategies**

The project is in line with the [SADC<sup>19</sup> 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 revised development plan is also focused on securing harmonised strategies, policies and regulatory frameworks. Acknowledging that there exist variations in levels of development and technical capacity of the various SADC Member States, efforts are, therefore, often geared towards supporting individual countries. The approach of this project will be to support individual countries (by working to ensure that provisions of the harmonised guidelines are translated and integrated into their national legislation), whilst cognisant that ultimately, they must be capacitated to work together.

It is acknowledged that the success of this project is dependent upon the close coordination and partnerships of several key stakeholders; all of whom have committed to collaborate on implementation. This project will be implemented in close consultation with SANBio and SAPReF. These institutions 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. 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 would, therefore, ensure that relevant technical personnel and decision makers are involved in project implementation – ensuring buy-in - while SANBio (and by extension SADC) provides the necessary political leverage to ensure that the outcomes of the project can ultimately be integrated into country plans.

The Food Safety Capacity Building on Residue Control (FSCBRC) Project is an example of an initiative designed by SADC to fill a gap and build the capacity of Member States to establish a comprehensive framework addressing and harmonising WTO/SPS standards to ease the trade of agri-products within and outside the region. The FSCBRC aims to harmonise food safety control regulations, guidelines and procedures through institutional strengthening in the SADC region in conformity with international requirements - in order to increase exports while complying with consumer safety requirements. Rather than developing regional standards, which would encroach upon the role of Codex within the region, SADC's reinforcement of harmonisation includes the development of regional guidelines to provide Member States with practical guidance on how best to implement international standards. This proposed project intends to develop relevant, regional, biopesticide-focused guidelines. The EAC has recently completed the development of '*Regionally Harmonised Guidelines for the Registration of Bio-pesticides and Biocontrol Products*'; this proposed SADC harmonisation intervention is expected to build upon these, especially as Tanzania (one of the project countries) is a member of both the EAC and SADC.

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<sup>19</sup> SADC plays a significant role in coordinating and ensuring harmonisation in the implementation of food safety regulations adopted from international standards.

The West African sub-region has embarked on a process of harmonising regional pesticide registration, as part of the West Africa Pesticide Registration Committee (WAPRC) initiative involving 17 ECOWAS and Sahel countries. The ECOWAS initiative is building upon the model of the regional pesticide regulator, for the Sahelian countries, the Comité Sahélien des Pesticides (CSP), which was successfully launched in 1994, and has, since then, been used to jointly register pesticides.

Representatives of SADC, ECOWAS and CSP will be involved in all the project workshops not only to facilitate the exchange of ideas and lessons learned, but also to ensure that the project is pursuant, from the onset, of greater harmony between the guidelines of various regions - which would greatly enhance intra-continental trade opportunities.

A Project Advisory Board comprising representatives of the regulatory agencies, extension services, industry and farmer organisations, private sector partners (including pesticide and biopesticide manufacturers), local agricultural commodity export organisations, and industry associations will meet virtually every 6 months (and before the Project Steering Committee meetings) to ensure that their views are discussed at the PSC meetings to ensure that the project, even though regional in coverage, remains responsive to national circumstances at all times.

SAPReF representatives from each of the participating countries will be considered the country focal points and will be provided with relevant training and materials to be able to organise relevant meetings to support the project activities in their home countries.

Private sector partners will, in parallel with supporting the technical aspects of the project, provide in-kind contributions to facilitate additional efficacy trials and determine the most appropriate GAPs, considering potential use patterns across multiple global regions. CropLife Africa Middle East (hereinafter referred to as CropLife) will coordinate in-kind support for the provision of test substances for field residue and efficacy trials, as well as analytical standards for laboratory analysis. The South African Bioproducts Organisation (SABO) will help to develop a long-term priority list and implementation strategy, based on the experience and lessons learned from this project. In addition, the various partners will help organise meetings, participate in harmonisation workshops and assist with the dissemination of project results, in order to integrate conventional pesticide products and biopesticides.

APAARI will provide technical backstopping on the integration of functional capacities in this technical project, based on the implementation of a similar project (STDF/PG/634) and experience in Asia-Pacific. APAARI's strategy is based on the Common Framework for Agricultural Innovation Systems (CD for AIS), developed by the partners of the Tropical Agriculture Platform hosted by FAO Rome – an important APAARI partner. This strategy recognises that developing the overall capacity of the project stakeholders requires a focus not only on the competencies needed to achieve technical results, but also on what it takes to build more effective and dynamic relationships among multiple actors who constitute part of the whole agricultural innovation system. Therefore, both technical and functional capacities are recognised as essential for individuals and organisations' achievement of long-term project objectives. APAARI will work with the project implementation team on the design and execution of the strategy, to ensure that these functional capacities are prioritised alongside the core technical skills envisioned to be developed by the project.

The planning meeting for this project involved consultations with registration authorities, to not only plan for the regulatory harmonisation and residue mitigation programmes but also assist with the identification of crop/pesticide combinations to be considered under this project. Considerations in selecting these combinations included: national needs, specific pests to be controlled, market considerations, availability of commercial biopesticide alternatives for the various pests (i.e. only commercially available biopesticides would be tested), and the benefits of learning from other countries within the continent. Provisions of relevant standards including, for instance, the International Plant Protection Convention (IPPC)<sup>20</sup> and KEPHIS<sup>21</sup> and other local requirements will be taken into consideration in the selection and use of biopesticide alternatives.

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<sup>20</sup> Notably **ISPM 3** (Guidelines for the export, shipment, import and release of Biological Control Agents and other beneficial organisms) and **ISPM 11** (Pest risk analysis for quarantine pests).

<sup>21</sup> KEPHIS (2016) Guidelines for introduction and use of bio-products, Biological Control Agents (BCAs) and related products, Kenya Plant Health Inspectorate Services, Nairobi, Kenya.

As already stated, this project also aims to promote cooperation between governments within the SADC region, as well as cooperation with other relevant projects across regions (including the ASEAN, East and West African regions and potentially also Latin America and the Caribbean in the event a similar project is launched within the region), to establish common work protocols and coordinate work sharing and responsibilities, as appropriate.

Overall, the proposed project will contribute to the higher development goals of poverty reduction and economic growth, with technical and functional capacity building delivery as a means to achieve these. By reducing the use of conventional pesticides off-target applications will similarly be reduced, leading to a decrease in bees and other sensitive species' exposure in the environment. Although conventional pesticides are safe when used appropriately, in developing countries good agricultural practices are frequently not followed. In these cases, use of lower-risk biopesticides serves to protect not only those administering pesticides, but also the environment, providing ecological sustainability by conserving natural enemies and biodiversity. In addition, the project is expected to stimulate increased demand for biopesticides, which will contribute to the attainment of the broader development goals of improved human and environmental health (including reduced risk to consumers, pesticide applicators, and the environment).

#### 4. Ownership and stakeholder commitment

This project is based on, and aims to address, the needs identified and articulated by beneficiary countries. Government authorities have been actively consulted and engaged, including through the STDF PPG meeting held on 14 – 15 October 2019 in Cape Town, South Africa, regarding the specific regulatory and residue problems they face.

This project has local ownership and commitment from government agencies in at least six SADC<sup>22</sup> countries, namely: Botswana, Mozambique, South Africa, Tanzania, Zambia and Zimbabwe, all of which face different challenges in relation to the registration of biopesticides and compliance with MRL (and by extension SPS) standards. Kenya (which has also provided a letter of support) will be involved in the project as one of three Partner countries (including Tanzania and South Africa which are considered both 'beneficiaries' as well as 'partners'). A detailed description of country involvement is provided in the following sections.

The regulatory harmonisation component of the project will involve Botswana, Mozambique, South Africa, Tanzania, Zambia and Zimbabwe; whereas the residue mitigation component will involve South Africa and Tanzania, as both are SADC countries with significant international market export volumes (as well as the requisite laboratory facilities and expertise for the work earmarked for this component), as a result of which both contend with residue issues. In order to facilitate wider learning, Kenya will also be included in this component, since it is a main exporter with the capacity to carry out many of the residue studies, from which SADC countries can derive learnings. For the residue mitigation component, the other project countries will be 'observer' countries, positioned to benefit from peer learning. Personnel from Kenya and Tanzania who previously received training on Pesticide Residue Data Generation (under STDF/PG/359) will be recruited as co-trainers for certain training programmes. In addition, the lessons and experiences of the countries involved in STDF/PG/359 will be shared with other participating countries so that all are ultimately capacitated to design and conduct studies of this nature.

Table 1 below is a matrix showing how various countries will be involved in the project.

**Table 1: Summary matrix of planned country participation in project**

Country	Inception Workshop & PSC Meeting	Biopesticide Regulatory Harmonisation	Lab & Field Training	Residue mitigation studies	Final Results and Planning for Dissemination of Project outcomes
<b>1. Botswana</b>	√	√	√	Obs	√

<sup>22</sup> The participating countries have been selected based on their level of interest in the programme, with their commitment demonstrated by the provision of letters of support. This sub-group of countries will form a nucleus around which a further initiative will be pursued with other SADC countries. SAPReF will share the outcomes of the Project with the other countries in its regular meetings that bring together regulators from all the SADC countries. ICGEB will participate at some of the meetings at which these discussions take place in order to put together the necessary processes for the development of a project that would cover the remaining SADC countries.

<b>2. Mozambique</b>	√	√	√	Obs	√
<b>3. Zambia</b>	√	√	√	Obs	√
<b>4. Zimbabwe</b>	√	√	√	Obs	√
<b>6. South Africa</b>	√-H	√-CT	√-HF/CT	√	√
<b>7. Tanzania</b>	√	√	√-CT	√	√
<b>Partner country (non-SADC)</b>					
<b>5. Kenya</b>	√	0	√-HL/CT	√	√

CT: Co-trainer; H: Meeting Host; HF: Host Field; HL: Host Lab; Obs: Observer; 0: Not participating

The target Crop/Pesticide Combinations of interest are presented in Appendix 1.

Several government agencies participated in the PPG planning meeting. Letters of support for this project have been obtained from the following.

- Botswana**<sup>23</sup> – SAPReF/Ministry of Agriculture
- Mozambique** – Ministry of Agriculture and Food Security
- Zambia** – Zambia Environmental Management Agency
- Zimbabwe** – Ministry of Lands, Agriculture, Water and Rural Settlement
- Kenya**– Kenya Plant Health Inspectorate Service
- South Africa** – Council for Scientific and Industrial Research & Department of Agriculture, Land Reform and Rural Development
- Tanzania** – Tropical Pesticides Research Institute

Other organisations who participated in the PPG meeting and have provided letters of support include:

- The South Africa Bioproducts Organisation** (an industry umbrella organisation)
- Organisations representing public sector biopesticide development institutions
  - The ToothPick Project, University of Kwazulu-Natal**
  - The IITA Aflasafe Project**<sup>24</sup>
- The Southern Africa Network for Biosciences (SANBio)**. SANBio will be the link between the project and the SADC Secretariat. SANBio has also committed to avail its laboratory facilities to make it possible for the project to conduct residue studies and to coordinate field training.

Letters of cooperation have also been obtained from the **Agricultural Association of Kenya** (which will work with CropLife to coordinate acquisition of test substances and analytical standards for studies in Kenya); **Kenya Plant Health Inspectorate Services** (which will host the trainings in Kenya); **CropLife** (will coordinate acquisition of test substances and analytical standards); **AATF** (which was involved in the development of the EAC regulations, will provide input into the development of the SADC guidelines); and **ECOWAS** (which will provide inputs to the development of the regulatory guidelines, either virtually or by participating in relevant project workshops).

**FAO**<sup>25</sup> and the [African Union Inter-African Phytosanitary Council \(IAPSC\)](#)<sup>26</sup> were also consulted and confirmed their willingness both to collaborate and provide the project with technical support. The project team expects to cooperate with these institutions right from inception. Linkages to relevant aspects of the organisations' workplans will be identified, agreed upon and finalised during the project inception meeting.

The **USDA Trade & Regulatory Capacity Building Division** will provide both technical and in-kind funding support. As outlined in the project budget, USDA will cover the costs of several project consultants.

**APAARI** played a key role in the design and development of the STDF-funded project STDF/PG/364. To ensure synergy between the two projects, APAARI contributed to the

<sup>23</sup> Botswana is the Chair of SAPReF and no separate country letter has been provided.

<sup>24</sup> The IITA Aflasafe Project was not represented at the PPG meeting on account of travel challenges; however, they provided relevant information, which was shared with and discussed by other delegates.

<sup>25</sup> Mrs. YongZhen Yang of the FAO Plant Production and Protection Division was contacted during development of the proposal. Mrs Yang confirmed that the [FAO Pest and Pesticide Management](#) team will also provide technical support to the implementation of the project.

<sup>26</sup> Dr. Jean Gérard Mezui Me Ella, Director, IAPSC was contacted during proposal development. As requested by IAPSC a Memorandum of Understanding to guide the working relationship between the two institutions is under development, to be activated should the project be funded.

development of this proposal, and will continue to be involved, especially in the knowledge management and functional capacity building aspects of the project.

## **II. PROJECT GOAL, OBJECTIVE, OUTPUTS & ACTIVITIES (LOGICAL FRAMEWORK)**

### **Project Goal / Impact**

The overall goals of this project are to: i) develop regional harmonised biopesticide regulations for selected SADC Member States – Botswana, Mozambique, South Africa, Tanzania, Zambia and Zimbabwe – in order to enhance the uniformity of their regulatory standards; ii) develop a roadmap for the translation and integration of participating countries' guidelines into respective national legislation;<sup>27</sup> iii) promote specific biopesticides for use in pesticide mitigation, in order to enhance compliance with MRL requirements in export destinations. This multi-pronged approach is expected to enhance the effectiveness and efficiency of participating countries' regulatory systems; and hence increase the number of biopesticides approved, registered and used by farmers within the SADC region. This would in turn, reduce reliance on synthetic chemical pesticides, decrease chemical pesticide residue levels, increase SPS compliance and thus boost intra- and inter-regional trade.

The project objectives will be achieved through the following separate, but complementary, activities:

#### **1. Regulatory Harmonisation**

To eventually achieve greater harmonisation of regulatory guidelines across the region, the project intends to work closely with, and build upon, other initiatives that have been working towards regulatory harmonisation, especially within the EAC region. Working with individuals who were actively involved in development of the EAC guidelines (see attached CVs), and other consultants,<sup>28</sup> this component of the project will include activities aimed at achieving regulatory harmonisation and congruence. These will include, *inter alia*: i) the development (and translation into national legislation) of uniform technical guidelines across participating authorities, and; ii) ensuring that regulatory requirements across project countries are more "aligned" or congruent over time. The latter would be accomplished by ensuring the involvement of policymakers and regulators in project activities from the onset, to ensure adequate buy-in and ownership to facilitate the adoption of project outcomes. Policymakers and regulators would, additionally, be incentivised – during project meetings and trainings, and as part of the project outcomes implementation plan – to influence the incremental adoption of internationally recognised technical guidance documents, standards and scientific principles, common or similar practices and procedures, and where appropriate, the adoption of regulatory mechanisms tailored to the relevant legal context, ensuring alignment with shared principles.

Project countries will also be supported to implement concrete actions to promote the utilisation of specific biopesticides. This will be achieved through the development of guidelines facilitating the harmonisation of biopesticide efficacy assessment and registration criteria, as well as the integration of biopesticides as GAP. These activities are expected not only to enhance registration within the various member countries, but also to facilitate biopesticide trade between them. Efficient regulation of the biopesticides sector would not only increase the availability and utilisation of these products but also enhance the development of the agricultural sector and strengthen the sale of such products nationally and globally. Harmonised biopesticide registration in the region would substantially support such a development, allowing for the application of similar requirements and quality standards across jurisdictions. Moreover, since many SADC countries face similar problems, greater coordination and information exchange among their respective pesticide authorities would help address the registration challenges currently experienced. The project outcomes implementation and action plan committee will develop a detailed strategy to facilitate greater coordination among the SADC countries. Furthermore, focal

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<sup>27</sup> It is essential that developed guidelines are eventually translated into national legislation. However, considering that this may not be feasible within the lifespan of this project, a clear implementation roadmap involving ICGEB, SANBio, SAPReF and other participating entities will be developed.

<sup>28</sup> Several consultants will be involved in this project. This is to ensure that perspectives are obtained from a large number of people who have been involved in similar or related initiatives in the past. This would ensure that the final outcomes are aligned with guidelines developed in other areas, an element that could promote greater regional and international harmonisation. Even though the number of consultants is high consultancy costs will be kept to a minimum as most of them will not be expected to travel. Furthermore, consultancy fees will be pro-rated for virtual events.

points from each of the participating countries (who will be drawn from SAPReF membership) will be trained and capacitated to organise relevant meetings and provide localised training in support of project activities.

The various projects working on relevant activities include, but are not restricted to: the EAC, CropLife, the African Agriculture Technology Foundation (AATF), FAO, USDA, the IAPSC, the WAPRC initiative and the Comité Sahélien des Pesticides (CSP) – all of which have been involved in developing and/or implementing harmonised regulations for pesticides and/or biopesticides in Africa.<sup>29</sup> These organisations, key policymakers, and representatives of industry and farmer groups will be invited to the project inception meeting (to be held virtually, drawing on APAARI's experience of a well-attended and cost-effective virtual inception workshop) with the aim of ensuring that project activities are aligned, as much as possible, with the workplans of all relevant stakeholders working on complementary activities. The first meeting of the Project Advisory Board, also to be convened virtually, will be held immediately preceding or following the inception meeting.

Working closely with, and thus tapping into, the lessons learned from previous initiatives' implementation, is anticipated to make it possible for the proposed project to make significant strides towards regulatory harmonisation in the SADC region. Given South Africa's strength in biopesticide regulation, regulators from the South Africa Department of Agriculture, Land Reform and Rural Development (the department responsible for (bio)pesticide regulations) will also be involved as trainers and discussants at the various training workshops or meetings. The project team will keep track of the on-going work by Chile, OECD and Codex<sup>30,31</sup> and will share very early drafts of the harmonised drafts with relevant personnel in this initiative for comments. This will be to ensure that the final guidelines are consistent with, and build upon, this on-going work. Furthermore, we will consult with Chile to see that biopesticides utilized in this project align with MRL exemption criteria and IPPC standards.

## 2. Residue Mitigation

This component of the project will focus on overcoming trade barriers, by promoting the strategic use of non-residue producing biopesticides towards the end of the growing season, subsequent to conventional pesticide use, in order to reduce MRL violations. The African Pesticide Residue Data Generation Project, ([STDF/PG/359](#)), which had a positive impact on the harmonisation of EAC pesticide registration guidelines, shows that interventions to reduce MRL violations contribute to the promotion of efforts to harmonise regulatory requirements. This is because in the process of generating requisite data to set MRL limits, one apparent gap is that differences in the registration requirements of different countries compromises their ability as a regional bloc to capitalise on international trade agreements and concessions; hence the desire to collectively prioritise the harmonisation of regulatory frameworks/guidelines in order to overcome this impediment. The proposed harmonisation and pesticide residue data/mitigation studies in this proposal therefore complement each other.

Biopesticides, by introducing unique modes of action, can be incorporated into integrated strategies; and, through the extension of application timings, facilitate timely PHIs and provide resistance management strategies. There is, however, currently no appropriate tool or set of criteria available to evaluate how well a proposed biopesticide use would fit within an IPM programme. Consequently, it is also necessary to develop a clear and coordinated strategy that outlines not only how to promote the inclusion of biopesticides into IPM programmes, but also their more widespread adoption. This would mitigate against conventional pesticide residues, which are potentially problematic for trade. An *'IPM Compatibility Guidance Document,'* which includes a set of instructions and examples to help IR-4 project requestors to develop a ranking and short narrative description of a proposed pesticide use within an IPM programme, has already been developed by the IR-4 project. The document describes the ways that proposed pesticide

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<sup>29</sup> Regulatory guidelines for microbial biopesticides have been developed in the EAC; while the CSP has, since 1994, succeeded in jointly registering pesticides in the Sahel region.

<sup>30</sup> Chile is leading a project of the [Codex Committee on Pesticide Residues](#) to develop international reference guidelines for biopesticide regulation.

<sup>31</sup> Representatives of the Chile led OECD programme will also be invited to participate at the inception meeting, so that their inputs can be captured, and incorporated, right from the onset of project implementation.

uses could fit into an IPM programme and encompasses 21 specific factors in eight categories, specifically: efficacy, economics, nontarget effects, resistance concerns, environmental fate, worker risk, compatibility with monitoring, and utility as a preventative measure. The IR-4 document will be adapted for use as a tool to design customised IPM programmes that incorporate the use of biopesticides.

However, it is important to note that the mere use of biopesticides may not impact chemical residue levels - late-season applications could be the most impactful. The efficacy of specific biopesticide applications later in the season needs to be demonstrated, in order to understand not only how the number of days between application and harvest reduces conventional pesticide residue, but also to determine appropriate biopesticides for use during the PHI. Development of exemptions from tolerance will also be established and recognised to promote inter-African trade. In cooperation with IR-4, information will be gathered on tolerance exemptions in African countries, contributing to Chile's global harmonisation efforts for exemption of low risk products which would include most biopesticides.<sup>32</sup> The project team will keep up to date with information emanating from the Chile biopesticides product. This will be, *inter alia*, to ensure that the biopesticides used in the residue mitigation study are in line with the developing MRL exemption criteria developed by Chile.

In addition to addressing regulatory barriers, training on how to use specific biopesticides for control of late season pests will be provided to representatives of key farmers groups (to be identified through SAPReF and with special attention given to the participation of women<sup>33</sup>) from each of the project countries. In addition to training, farmer representatives will also receive relevant materials including, brochures, pamphlets, fact sheets and video clips to enable them to conduct trainings for their members.

### **3. Capacity Development**

While guidelines are frequently developed, their adoption and consistent implementation remains a challenge – which is attributable in part, to the lack of functional skills amongst key players. This project intends, therefore, to support not only the formulation of a mechanism to ensure the development of an implementable framework, but more importantly its practical implementation by SADC countries. Furthermore, it is acknowledged – as with any new technology – that for biopesticides to have any discernible impact, a considerable investment must be made into the complex technical and commercial processes that will ultimately culminate in successful commercialisation. In addition to developing the technical capacity to formulate, review and interpret residue data in the context of Codex MRL adoption, the project will also develop the functional capacities and competencies of key stakeholders to achieve the technical results and establish an enabling environment for the adoption of regional guidelines at national level. Training on such skills (which include strategic planning, ability to formulate and implement relevant policies and norms, capacity to harness and manage knowledge, ability to build and maintain partnerships, strong leadership and the ability to navigate organisations' political dimensions) will be conducted back-to-back with all project meetings and workshops.

#### **Target Beneficiaries**

Since the project will include several components (regulatory harmonisation, residue mitigation and functional capacity building) it will incorporate a wide spectrum of players including researchers, policymakers, industry, regulators and farmers.

The primary beneficiaries of the project will be national (bio)pesticide regulatory authorities, farmers, industry associations, agri-food export companies, and domestic consumers. The specific benefits anticipated for target beneficiaries include, *inter alia*, :i) availability of effective regulatory guidelines for biopesticide registration; ii) increased availability of biopesticides for use in the PHI to reduce pesticide residues, iii) increased availability of IPM tools for farmers to better protect crops and mitigate pest resistance; iv) enhanced worker, environmental, and consumer safety through reduced residues; and, v) increased economic output as a result of enhanced access to more lucrative international markets.

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<sup>32</sup> See footnote 31.

<sup>33</sup> The farmer groups will be requested to ensure adequate numbers of women are selected to participate in the training programmes.

The trade benefits of this project, and hence its anticipated economic impact, will be assessed by determining the percentage reduction in MRL exceedance because of the project intervention. In addition, the differences in input costs with and without the biopesticide will be compared with the difference in domestic versus export crop values, to determine how the residue mitigation impacts economic returns. The risk of increased crop damage from pests will also be considered based on the ability of the biopesticide to maintain effective pest management.

#### *Gender-related issues*

Agricultural systems in Africa are disproportionately reliant on women for the performance of associated tasks. Where synthetic chemical pesticides are used, women are exposed, on a regular basis, to potentially dangerous substances. Concern is not restricted solely to their direct exposure, since these chemicals can be transferred to children, the entire household and proximate communities more broadly. The reduction of off-target application of conventional pesticides, therefore, directly and indirectly improves the livelihood of women and their families in target countries by reducing unintentional synthetic chemical pesticide exposure and increasing the exportability and trade of smallholder crops.

A baseline study (to be undertaken as part of the country reviews) will be conducted at the inception of the project to assess the specific constraints women face in respect to pesticide use and IPM. The survey will be based on a questionnaire (which will include questions specifically targeted at obtaining information from women farmers) to be developed and shared virtually (via Email and Survey Monkey® and followed by telephone calls) with the agricultural extension personnel in the project countries to use for collection of views from the women farmers. Priority will be given to develop womens' capacities to use biopesticides and increase their compliance with Codex MRLs. Key issues identified during these consultations will be incorporated into project training activities.

The capacity development of women will be, as already mentioned, be achieved not only by proactively seeking them out for the training programmes, but also through the dissemination of information via brochures, pamphlets and videos (to be distributed by ICGEB, SANBio and SAPReF through the country focal points). This will facilitate access to compliance-related resources, ensure the mainstreaming of good gender practices, and enhancing womens' capacities' on Codex MRL compliance.

#### **Project objective, outputs and activities (including logical framework and work plan)**

This project seeks to address the problem of low export market access by SADC countries, owing to the absence of strategies to ensure compliance with existing MRL trade standards. The project aims to achieve its objectives by promoting the use of biopesticides, within an IPM strategy, in a manner that equips participating countries to be better able to comply with export markets' residue requirements. The regulatory harmonisation component will, *inter alia*, ensure that countries develop common standards to benefit from among others, reciprocal acceptance of data generated, or registrations concluded, elsewhere. Residue mitigation (a combination of conventional pesticide residue, supplemented with microbial biopesticide efficacy data, will be generated and evaluated) will help resolve specific MRL trade concerns. Capacity development – both technical and functional – will be strongly embedded in the respective components and will include a series of mutually-reinforcing trainings, workshops, and consultations to be hosted back-to-back with various other project activities. The project's logical framework (Appendix 2) and workplan (Appendix 3) are attached.

While a purely biopesticide programme would result in lower residues, this may, in the absence of additional measures, be inadequate to control the pest or prove financially viable. Therefore, this project, aims to balance the advantages of conventional pesticides (generally lower costs and overall efficacy) with those of a biopesticide administered at the end of season - resulting in lower residues whilst simultaneously providing sufficient extension of pest control by extending the PHI.

#### **Regulatory harmonisation**

The harmonisation programme and guidelines emanating therefrom will be needs-responsive, drawing on data solicited through surveys, analytical reviews, studies and consultations. Since the integration of guidelines into national legislation may not be feasible within the limited timespan of the project, a key outcome of the project will be to develop a clear roadmap to ensure

that efforts to achieve this goal persist beyond the project's conclusion. As already noted, the project will support short-term fellowships to facilitate the drafting of national legislation that integrates the abovementioned harmonised regional guidelines.

### 1. Country surveys

A survey of the biopesticides regulatory systems in the various countries will be conducted, with information obtained via online survey tools (Survey Monkey®), e-mail and phone correspondence. The survey will focus on, *inter alia*:

- Priorities, objectives, and constraints of current biopesticide guidelines, including efficacy testing;
- Issues of relevance to developing a common biopesticides regulatory policy, taking into consideration any relevant recent and ongoing initiatives,<sup>34</sup> programmes and activities;
- Information on how best to integrate biopesticides into GAP.

The survey will also assess the specific constraints women face in respect to pesticide use and IPM, such that they can be addressed, as far as possible, during project implementation.

### 2. Detailed legal assessment per country on what is needed to get legal status for harmonised biopesticides regulations

Two<sup>35</sup> experienced lawyers will review the survey outcomes, which will be triangulated against their own research and analysis of each of the 6 countries' biopesticide regulations. These lawyers will identify the clear gaps inhibiting the development of a regionally harmonised regulatory system. They will, furthermore, recommend the regulatory changes and legal steps the respective countries need to take to achieve harmonisation (explaining the sequence of legal processes needing to be undertaken, as well as providing an estimated timeline for the conclusion of each step).

### 3. Validation workshop

A virtual workshop convening all stakeholders (partners, policy-makers and regulatory officials) will be held to facilitate lesson-sharing, discussion, the validation of each country's survey outcomes and the lawyers' assessments. Areas of divergence and how to harmonise these will be agreed upon. The focus of the meeting discussions will include, *inter alia*:

- Legislation and regulation;
- Minimum registration data requirements;
- Efficacy testing;
- Technical evaluation of registration data;
- Registration and licensing; and
- Post-registration monitoring.

The consultants for the regulatory harmonisation component will participate in the workshop and collect all the relevant information, which will inform the draft regulations formulated.

### 4. Development of harmonised guidelines

The regulatory consultants will develop draft guidelines based on country survey outcomes, legal assessments, validated findings and recommendations emanating from consultations, as well as the advice and guidance of regional partners including EAC, WARP, ECOWAS, CSP and industry. In addition, reference will be made to the recently published [Guidance Document on the Exchange and Use of International Efficacy and Crop Safety Data for Minor Uses](#) and [FAO/WHO guidelines](#) for the registration of microbial, botanical and semiochemical pest control agents for plant protection and public health uses as well as models from other parts of the world, including the GIZ biocontrol guidelines. The experiences of South Africa, which possesses well-developed guidelines for biopesticide regulation, will also be considered. It bears stating that this project does not seek to replace, but rather to build upon previous efforts towards harmonising

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<sup>34</sup> The objective will be to align the guidelines to those already developed in other regions, including the EAC and to include harmonised efficacy testing protocols.

<sup>35</sup> It is expected that only two lawyers will be involved in the legal work but given the importance of the legal work to the project there have been discussions with three (CVs attached) to guarantee availability in the unlikely event that one has other commitments once project implementation commences.

biopesticide regulations in the region. The draft guidelines will, therefore, also draw on past and current processes and related study reports on policy harmonisation and economic integration in other African regions, such as the East African Community. It will also take into account the [Comprehensive Africa Agricultural Development Programme](#) (CAADP) framework and the requisite steps through which to ensure consistent regional approaches to the implementation of any harmonised guidelines. These draft guidelines will be reviewed at a regional workshop (see 5. below) to be attended by representatives from the various countries. A virtual meeting convening key stakeholders, including policy makers, regulators and representatives of industry and farmer groups, will be organised thereafter to critically review and finalise the guidelines.

#### 5. Training workshop on application of guidelines

A training workshop on the application of guidelines is envisaged as the only in-person meeting of the project's regulatory harmonisation component. Targeted at regulators, policymakers, representatives of farmer groups and industry and country focal points national private sector associations and extension services, this workshop will provide information and training on the draft guidelines as well as their simulated application using two public-sector developed microbial biopesticides, Aflasafe<sup>TM</sup> and a product for the control of Striga developed by the [Toothpick Project](#). These simulations provide an opportunity to assess how the guidelines will be applied, both in respect of a relatively mature (Aflasafe<sup>TM</sup>), as well as a newer product (Toothpick project's). The results will serve as a practical example and provide insights into how the guidelines will impact registration. The country focal points and farmer representatives will be capacitated and receive information and materials enabling them to replicate similar trainings within their home countries.

#### 6. Translating harmonised guidelines into national regulations

Through sub-contracts with ICGEB, two experienced lawyers will work with each of the six countries to develop a "roadmap" clearly indicating the steps their respective national authorities need to take to translate regionally harmonised guidelines into national laws and policies.

#### 7. Implementation and adoption action plan

A committee will be constituted to oversee/monitor implementation of the project's action plan, outcomes and roadmap. SANBio (which sits on the SADC Secretariat) and SAPReF (a sub-committee of SADC) will lead the committee, with ICGEB providing supporting to ensure that the project's key milestones are tracked and implementation of deliverables beyond the project's lifespan are achieved. ICGEB, through its [Meetings and Courses](#)<sup>36</sup> programme, will convene a meeting comprising policymakers and other key stakeholders from all the of the project countries to allow for further discussions pertaining to the integration of developed guidelines into respective national legislation. Through its [Fellowships programme](#), ICGEB will offer short-term fellowships to Tanzanian and Zimbabwean<sup>37</sup> nationals, selected by the committee, who will be tasked with transforming the regulations such that they align with their respective national legalisation. The specific tasks of the abovementioned committee will include among others:

- organising stakeholder meetings and trainings on the sidelines of SANBio and SAPReF meetings, intended to inform and capacitate participants, such that they are equipped to host similar information and capacitation sessions with local stakeholders within their respective countries, facilitating the wider dissemination of information on the regional harmonised guidelines;
- serving as country focal point and project liaison and tracking the roadmap's implementation and progress;
- developing a strategy to facilitate greater coordination among SADC countries;
- leveraging personal influence, where necessary and appropriate, to provide a necessary 'push' to ensure there is sustained political will to implement the guidelines in each participating SADC country;

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<sup>36</sup> The Biopesticides Group regularly organises such meetings to discuss current issues relating to biopesticides and integrated pest management. For example see link to a workshop to evaluate [the challenges and prospects for the use of biopesticides for fall armyworm control](#) that was to be held in September 2020 but postponed due to the Covid-19 pandemic.

<sup>37</sup> These are the ICGEB Member States eligible for the fellowships tenable at the ICGEB Cape Town component.

- contributing to the development of discussion items for a regional meeting (to be hosted by ICGEB) on the process of integrating developed guidelines into national legislation ;
- recommending individuals to undertake a short-term fellowship, with the objective of drafting national legislation from their respective countries that incorporates the developed draft guidelines.

SANBio and SAPReF are excellent choices for this programme. Firstly, both organisations possess the requisite political clout at both policy development and implementation levels to be able to positively influence the adoption of project outcomes. Secondly, SaPReF's representation at national level, makes them well-positioned to assume the country focal and liaison function, ensuring the consistent reciprocal flow of information from the project to local stakeholders, and vice versa. Thirdly, both organisations have policymakers represented with their membership; hence their participation in recommending short-term fellows, who will assume responsibility to transform the draft regional guidelines into respective national legislation.

### **Residue mitigation**

Fruits and vegetables are very important in world trade. Over the past few years, there has been considerable and sustained demand for these products, particularly in the light of increased interest in healthy dietary options. The SADC region enjoys an advantage, in that its fruits are commonly harvested during the off-season of most major markets. This means that SADC can supply export markets with fruit when domestic supply is low. Based on the discussions at the PPG meeting, this project has selected focus commodities (avocado and mango) for the countries involved in the residue mitigation component of the project (South Africa, Tanzania and Kenya). It is anticipated that the results relating to residue trade irritant situations achieved using these fruits will be beneficial to several other fruit and vegetable crops facing equivalent or similar challenges.

Residue mitigation studies (as per the protocols outlined in the [FAO Pesticide Registration Toolkit](#)) will be conducted based on a scenario in which MRLs are exceeded, and hence cause trade problems. In these cases, the residue will be mitigated by extending the PHI (i.e. stopping chemical spraying earlier in the season) and then using biopesticides to control the late season pests.

The following specific activities will be undertaken:

#### **1. Field and laboratory preparations**

The first year will be spent putting in place critical field and laboratory preparations – SOPs, QA systems, documentation, data management, facilities, etc. At project inception, an in-country meeting will be convened for project staff, the consultant (from IR-4, hereinafter referred to as the Technical Director), laboratory staff, field staff, and national Principal Investigators to review the analytical requirements and provide guidance on the foundations to be set for their operations. The Project Manager (from ICGEB) will follow up with each participating country and provide assistance throughout the year, to monitor preparation progress and ensure that countries are adequately capacitated to initiate studies. Field residue trials will only be initiated once the Technical Director is confident that countries are adequately prepared.

#### **2. Field residue mitigation studies**

Once preparations are in order, the Technical Director will support national Principal Investigators to initiate the first series of trials, cumulatively handing over responsibilities to them, as deemed suitable whilst providing in-country assistance.

#### **3. Sample analysis**

Upon completion of fieldwork, samples will be prepared and analysed under the supervision of the Technical Director. Again, the Technical Director or consulting chemist will be present during the first series of analyses, with responsibilities and oversight cumulatively transferred to national Principal Investigators.

#### **4. Efficacy studies with biopesticides**

After the initial series of residue decline data are developed, biopesticides will be incorporated into the system to determine the ability of different products to maintain pest control while allowing for residue decline. An assessment of yield and quality criteria will also be performed, as quality issues are critical when developing recommendations for growers, especially for export crops. Training on how to conduct efficacy trials for biopesticides will also be conducted.

#### 5. Report writing

Once a study is complete, the Technical Director will oversee the preparation of a final report. National Principal Investigators will be supported to assume increasing responsibilities for report preparation, which they will conclude in their respective countries.

#### **Established IPM strategies and GAP for key crop/pest combinations and using biopesticides**

An IPM toolkit available, SOPs and guidelines for GAP and database of biopesticides registered in all project countries will be developed (see further details under Project outputs). Additionally, the training session on application of the harmonised guidelines (Activity 5 under regulatory will also include a session on IPM strategies and Good Agricultural Practice. The training session will adopt a 'train-the trainer model' which will then enable the representatives of the various agencies to organise similar training in the various countries. As in all other training sessions training materials that could be used for provision of the in-country training will be provided. Working closely with ICGEB and the country focal points the representatives of, among others, the farmer associations, national private sector associations, extension services; researchers and academia will organise similar training, to be supported by the project, in the various countries. It is expected that such training will be hosted in government facilities and therefore will come at minimal cost. In addition, those from ICGEB Member States (South Africa, Tanzania and Zimbabwe) will be provided with information to enable them apply for ICGEB funding (available through its [Meetings and Courses](#) programme) to host additional training programmes in their countries.

#### **Training and Capacity Development**

The project will have a strong capacity building component. An inception workshop, regulatory workshops and results workshop will be convened. This project will support South Africa, Kenya and Tanzania to strengthen their GLP capacity and participate in residue mitigation studies. This will require intensive capacity development and trainings, both in the field and lab. Authorities and scientists from South Africa, Kenya and Tanzania who have previously received such training will be solicited as co-trainers to facilitate skills transfer and eventually feed into a train-the trainer model. Lab training will be conducted in Kenya (and South Africa - should this be deemed necessary following the experiences obtained from the training in Kenya). The training will compare analysis on older analytical equipment such as GC-ECD and NPD, and GC-MS – all of which are found in less-developed countries – and compare these with LC/ MS-MS which they do not have, so as to prepare them for the future. Similarly, group field training (which will also cover the implementation of efficacy and residue trials according to Good Experimental Practice) will be conducted in South Africa, with the assistance of relevant personnel from South Africa, Kenya and Tanzania. Farmer organisation representatives from each project country will also participate in the final workshop, intended to facilitate discussion on project outcomes and to provide specific training on how to integrate identified biopesticides into crop production practices. Videos, brochures and pamphlets will also be provided to participants, which they can use to train local farmers in their respective countries. The following specific capacity building elements will be undertaken:

#### 1. Technical Capacity Building

##### Regulatory harmonisation

At least 30 key personnel (5 regulatory officials from each of the 6 participating SADC countries) will be trained on biopesticide regulatory harmonisation. The training will take account of, and build upon, previous biopesticide regulatory workshops in the region, to facilitate public-private dialogue and help identify opportunities for future collaboration. The biopesticide industry (including SABO) who will be represented within the PSC, will have an opportunity to participate and share their perspectives on the process and its anticipated impact on product development. Through involvement in both the PSC and Project Advisory Committee, industry representatives

will also be afforded the opportunity to interact with government officials to learn what their greatest needs are (e.g. pest problems without solutions, biosafety concerns and quality control issues), which will foster formal contacts between regulatory bodies and the biopesticide industry, contributing to the bolstering of relations between public and private actors. There will be close collaboration with APAARI, EAC and the West African Pesticide Registration Committee (WAPRC) to promote international cooperation in the discussions regarding regulatory harmonisation.

This training programme, which will be developed and offered in close consultation with FAO, will therefore include, *inter alia*,: i) biopesticide regulatory frameworks and potential impact for trade cooperation; ii) conducting efficacy studies and successes with biopesticides; iii) conducting and evaluating toxicology studies and scientific waivers for microorganisms; iv) stewardship; v) how to comply with MRL standards; vi) dossier evaluation; vi) developing customised IPM programmes incorporating the use of biopesticides. Relevant guidelines and manuals as well as videos of all the training programmes will be developed for further in-house training and wider sharing (by ICGEB, SANBio and SAPReF).

#### Training in pesticide residue analysis

South Africa and Kenya already have laboratories which are either operating at, or close to the level, of Good Laboratory Practices (GLP) or which have been trained in "GLP-like" activities. Tanzania and Kenya, through STDF/PG/359, have received data development training. Personnel from these countries who have received the necessary training will, therefore, be invited to serve as project co-trainers for the residue mitigation component of the project. Project trainees will be identified from the key laboratories with the capacity to analyse pesticide residues and will be selected based on their ability and availability to ultimately conduct the required studies. These laboratories include the Pesticide Residue Testing Laboratory, Division of Plant Protection (Botswana); the *Laboratório de Higiene de Alimentos* (Mozambique); and the Food and Drugs Laboratory, Ministry of Health (Zambia). This approach is expected to develop skills for future work in a 'train-the-trainer' model, which will develop a pool of regional trainers to provide additional assistance at national level. Other countries will receive technical guidance in the form of group training. The aim of this modus of training will be to assist countries to conduct trials under a supervised field trial operation. Therefore, even though part of this project's focus is on residue mitigation, it will also prepare countries to conduct residue trials to set future Codex MRLs.

#### 2. Functional Capacity Building

The project will integrate functional capacity development into the technical programme, including the inception, harmonisation and final workshop, based on the outcomes of the capacity needs to be identified in the baseline study and throughout the project.

The project will use the CDAIS framework of Tropical Agriculture Platform of FAO to facilitate project participants' analysis of their internal and external contexts, bringing various perspectives to bear through interaction, reflection and learning. Project participants will also be assisted to access, create and leverage co-creation and knowledge opportunities to learn and chart the future. In this way, innovation capacities and analytical skills will be enhanced, improving participants' ability to navigate complexity, meaningfully collaborate, learn and reflect in the area of policy/regulation harmonisation, use of biopesticides, and residue mitigation. Project participants will, furthermore, improve vulnerable groups – such as small agricultural producers – ability to engage in political processes pertaining to safe agri-food production and consumption.

#### Public awareness and education

The project will, in order to promote biopesticides as GAP in agriculture, develop a public awareness and education component. In addition to the training programmes, awareness materials (brochures, fact sheets, pamphlets and videos) targeting policy- and decision- makers and the public (including women, who are typically expected to assume responsibility for household, childcare and family activities and who therefore require interactions that take cognisance of this and minimise their burden) will be developed and disseminated through ICGEB, SAPReF, SANBio and the extension agencies in the participating countries. This will facilitate access to compliance-related resources, mainstream good gender practices as well as enhance capacity on Codex MRL compliance. Ultimately, it is envisaged that this project will lead to the development and adoption of new IPM tools by local farmers, increasing export opportunities

through MRL compliance, increased safety for field workers, and an increased safety of the food supply.

### **Key project outputs**

#### **Output 1: Harmonised guidelines to support the project countries to achieve biopesticide regulatory harmony**

A detailed, per country, legal assessment will be conducted to ascertain what is needed to obtain legal status for biopesticides, and the timeline estimated to successfully achieve this. This project will produce a set of harmonised guidelines to enable project countries to achieve biopesticide regulatory harmony. Lawyers will work with project countries to develop a "roadmap" to translate these guidelines into their respective national legislation. A multi-stakeholder network<sup>38</sup> will review the progress (through an implementation action plan to be developed as part of the project activities) towards adoption of the harmonised guidelines in project countries. A biopesticide regulatory communications e-mail network will be created to promote knowledge and experience exchange, as well as harmonisation of relevant regulations, contributing to the strengthening of biopesticide management in the region. The final workshop will also include a training session on the implementation of procedures for biopesticide registration under the harmonised framework, which will be targeted at focal points and regulatory officers from each project country. The Aflasafe and Toothpick project products will be utilised as a live practice of the harmonised guidelines. This will be the only, STDF-supported, face-to-face workshop on regulatory harmonisation planned, to allow for hands-on training on the application of the harmonised guidelines. ICGEB will also organise and support the convening of a regional workshop to bring together policymakers and stakeholders from all of the project countries; this workshop will allow for further assessment and discussion on the process of integrating draft harmonised guidelines into respective national legislation. Specific 'drafting fellowships' will be offered to key persons from South Africa, Tanzania and Zimbabwe (individuals to be identified following discussions with the countries and the project outcomes implementation and action plan committee) as part of the practical steps culminating in the incorporation of the guidelines into national legislation.

#### **Output 2: Residue data and improved knowledge to interpret this data on the use of biopesticides (combined with conventional pesticides) to mitigate pesticide residues**

This output will focus on the implementation of supervised field trials and laboratory analysis of pesticide residues, in preparation for residue decline studies utilising biopesticides in order to mitigate residues and meet MRL trade requirements. An assessment of yield and quality criteria will also be performed, as quality issues are critical when developing recommendations for growers, especially for export crops.

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

The IR-4 IPM toolkit will be customised to provide guidelines on IPM. In addition, information on all the biopesticides registered in the various countries will be consolidated into a database (to be hosted on the ICGEB Server and maintained by the ICGEB Biopesticides Group) that will be widely disseminated, including through the regular meetings of ICGEB, CropLife, SANBio, SAPReF and SABO. This will ensure that farmers and other stakeholders are aware of the biopesticides that are available on the market. The database will also be accessible through the ICGEB website. In addition, the project will partner with CABI so that it can ensure that information on biopesticides from Project countries can be loaded onto the [CABI Bioprotection Portal](#), a free, web-based tool that consolidates information about registered biocontrol and biopesticide products.

### **4. Environmental-related issues**

The project anticipates that the substitution of the last application of a conventional pesticide with a biopesticide will have a positive environmental impact through a reduction of pesticide usage. Most of the data will simply be a comparison of the substitution away from the conventional pesticides; however, the validity of the model will be improved, since data generated directly in this study can contribute to the accuracy of pesticides' half-life. A session on the use of this model

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<sup>38</sup> This will be composed of all members of the Project Steering Committee and Project Advisory Board and any other relevant stakeholders, as identified in the course of project implementation, that may be considered crucial to the adoption of the outcomes of the project.

will be included in the training, to capacitate project countries to utilise it to evaluate the impacts of related future work.

While some IPM projects have assumed a reduction in residues, the evidence of this remains patchy ([Pretty and Bharucha, 2015](#)). The unique point of the residue mitigation component of this project is its intended application of a quantitative measure on residue, MRL standpoint, as well as environmental impact(s). The project outputs will thus lead to the enhancement of capacities, contributing to reduced chemical pesticide use and the promotion of non-toxic biopesticide use as well as the adoption of IPM systems – all of which are bound to contribute to environmental protection. It should also be noted that caution has been taken in the project design to ensure that no project activities have a negative environmental impact. A quantitative measure of the impact will be determined using a model described in [Kovach et al.](#)

For the MRL data generated, the relationship between time and decline in residues will be calculated (a first order degradation model is anticipated). From the mean MRL data, the risk (probability) of exceeding the MRL will be calculated. As the chance of exceeding the MRL decreases, a greater percentage of the crop will become available for export. Therefore, it will be possible to calculate how this project is impacting the percentage of crop available for export. The differences in input costs with and without the biopesticide will be compared with the difference in domestic versus export crop values to determine how the residue mitigation impacts economic returns. The risk of increased crop damage from pests will also be considered based on the ability of the biopesticide to maintain effective pest management. Potential risks have been identified, as well as proposed measures to manage risks. Possible risks and steps for mitigation as necessary are presented in Table 2.

**Table 2: Possible risks and steps for mitigation**

<b>Regulatory harmonisation</b>			
<b>Risk</b>	<b>Impact</b>	<b>Probability</b>	<b>Prevention/Mitigation</b>
The COVID-19 pandemic making it impossible to travel and organise face to face meetings/workshops/training programmes.	High	High	Many project activities will be conducted virtually (i.e. most of the regulatory harmonisation activities). Those requiring in-person engagement will be deferred to a later stage of project implementation, by which time it is anticipated that more definite ways to handle the COVID-19 crisis will be available.
Not getting responses to survey questionnaires.	High	Low	This will be overcome through the active involvement of SAPReF, which will assist to identify suitable personnel to target with the surveys and also encourage responsiveness.
Inability to agree on issues of convergence and which are therefore amenable to harmonisation.	High	Medium	The project team will refer to best international practice and relevant international standards, which will constitute the benchmark guiding the development of various provisions in the harmonised guidelines. The team will also refer to the findings of previous pesticide harmonisation efforts in the region. With these comprehensive benchmarks in place, it will become relatively easy to address and resolve any differences of opinion.
Unwillingness of countries to adopt harmonised guidelines.	High	Medium	SANBio and SAPReF will play a significant role through their abilities to marshal countries towards a common cause. SANBio and SAPReF will bring the respective project countries' multiple stakeholders onto one platform, highlighting the importance of this work for IPM and trade, as well as developing an implementation and monitoring plan and securing commitments from the various countries. A legal roadmap for integration of the guidelines into national legislation will be developed as one of the key outcomes of the project. Additionally, a project outcomes implementation and action plan committee and network will be developed to monitor the progress

			made by the various countries in implementation of the roadmap.
Unavailability of consultants once project implementation commences.	High	Low	The project has had discussions with, and obtained commitments from, several of consultants.
<b>Residue mitigation</b>			
Inability of countries to adopt specific biopesticides by the national authorities due to lack of political will.	High	Low	There will be active involvement of SANBio and SAPReF to bring the respective project countries' multiple stakeholders onto one platform, highlighting the importance of this work for IPM and trade, as well as securing commitments. Knowledge management and dissemination on the activities and practical utility of the scientific rationale in promoting biopesticides will be a key focus. Development of both technical and functional skills will also facilitate the uptake/adoption of project outputs. The project outcomes implementation and action plan committee and network will also provide the required political 'push' necessary to ensure adoption of project outcomes.
Even with mitigation, the residues do not fall below MRLs.	High	Low	The project team will work with a substantial number of active ingredients and spans of time. This will greatly enhance the chances of identifying active ingredients for which suitable biopesticide options (and hence reduction in residues) can be recommended.
The biopesticides are not effective in controlling the pest at the end of the season.	Medium	Low	a. Mitigation-based pest management is not dependent on biopesticides alone. It is expected that conventional pesticides will provide a high level of control during the season, with residual activity of the last conventional application covering part of the period until harvest. Therefore, it will not be necessary for the biopesticide to control an intense population, and the period will be brief. b. As in the IPM philosophy, the goal is not perfect control, but rather control below an economic threshold (which may also vary by pest). For example, an aphid or thrips infestation is critical during crop development and flowering, but very close to harvest there isn't the same scale of impact. Conversely, an infestation of leaf chewing insects, e.g. diamondback moth larvae, particularly on leafy vegetables, is serious.
Biopesticides are too expensive and growers will not want to use them.	Medium	Medium	a. Even if biopesticides are more expensive, this can be partially offset by using a less conventional pesticide and increasing crop values through export market eligibility (i.e. through requisite standard compliance) b. Harmonisation of regulations will result in greater ease and speed of registration, which should increase competition and reduce costs. c. All trends point to a large increase in this market, with one key development being an effective model programme to demonstrate the utility of biopesticides, coupled with an economic incentive, both of which form the basis of this project.
Limited uptake of biopesticide due to ineffective communication of project outcomes and effective adoption of the new GAP by farmers	Low	Low	The project will put in place an elaborate communication strategy to communicate relevant information. To ensure sustainability of information dissemination, videos and brochures will be developed for distribution by CropLife, ICGEB, SANBio, SAPReF and SABO.

## Sustainability

The project is not only based on national demand and priorities, but is actively supported by relevant SADC stakeholders, including government agencies responsible for SPS management, as well as the private sector – which have provided letters of support in respect of this project. ICGEB, which is working towards the promotion of biopesticide use, particularly in Africa, further strengthens the technical capability and sustainability prospects of the project and its outputs, through the organisation's constant engagement with project countries. Additionally, ICGEB will, through regular interaction with its [Member Countries](#) across the globe, monitor and facilitate the project's sustainability by, *inter alia*, advocating for its continued focus as an important priority.

ICGEB's envisaged role throughout and subsequent to project conclusion brings to bear a substantial network of technical experts and longstanding relationships with participating SADC countries, serving to enhance the strength of project partnerships, its ability to monitor the appropriate utilisation of developed capacities, and securing requisite resources and follow-up in participating countries. The project's outputs are also expected to contribute to best practices and protocols on effective biopesticide use in IPM programmes and MRL detection capacities, which can be used regularly, not only by participating countries but also for regional scaling up of outputs.

The IR-4 project has enduring accomplishments in capacity development, which has benefited stakeholders in several developing countries. By way of illustration, several Asian, African and Latin American government authorities have benefitted from STDF's concluded regional MRL projects. These countries continue to engage IR-4 on tangential residue studies and related partnerships, building and scaling up the experiences and results achieved under previous STDF projects.

SANBio sits on the SADC Secretariat and has five nodes covering 13 of the SADC countries. It is, therefore, very well positioned to promote the outcomes of the project among SADC Member Countries. SAPReF is a sub-committee of SADC and brings together (bio)pesticide regulators from all the SADC countries and is therefore also well placed to champion and promote the outcomes of the project, especially as its mission is to promote regional information exchange, and collaboration on pesticide and pest management as well as regulation; and to achieve sound management of pesticides and biopesticides.

The residue mitigation strategy supplements the conventional magnitude of residue studies and utilises much of the same skill set applied to the latter. The entire infrastructure, therefore, which has been established in Global Minor Use Summits, priority setting workshops and Minor Use Foundation, will be incorporated into the mitigation strategy. Should other priority needs arise, it will be determined if it makes more sense to solve a given problem by using a conventional residue –MRL setting strategy, or a mitigation strategy.

Project managers will identify key national decision-makers and stakeholders, determine the role they are to play in the project, and develop strategies to co-opt and retain them at critical points at project inception, implementation and conclusion. Since rotation of public servants is common, guidelines and videos that can be used in-house will also be developed and an in-house training-of-trainers programme will be encouraged. To achieve stability, functional capacities in policy change will be developed so that the mitigation approach becomes part of the country standard for dealing with MRL-related trade issues. Surveys and interviews will be conducted to gauge recognition of the importance of involving the private sector (growers, exporters and/or their associations), universities and extension services (where they exist) in pesticide mitigation initiatives, in the interest of success and sustainability of efforts. The sustainability of the project will, further, be enhanced by the intentional prioritisation of partnerships, to enhance synergies and resource and knowledge maximisation. Also, possibilities will be explored to make SADC or any other related regional agency to be a depository of records of adoption of harmonised registrations.

This project will be supported by among other the IR-4 Program, APAARI, USDA, FAO and IAPSC all of which will provide technical guidance and share information. [The FAO Pest and Pesticide Management team](#) will be invited to all project training activities and meetings (with virtual communication in the intervening periods) and have committed to provide advice on IPM practices and regulatory harmonisation guidance. SABO through its members, and CropLife will provide

technical support of field trials, laboratory analyses (including test and analytical standards, if applicable); the data generated under this project could also be utilised for other purposes, such as for requests in respect of import tolerance in other countries/regions. Biopesticide organisations will help disseminate the project results and will incorporate its findings into strategies integrating biopesticides into conventional systems. Part of the project's KM strategy will serve as a framework to engage project stakeholders existing and similar initiatives and relevant multi-actor network interventions at national and regional levels, so as to secure the long-term sustainability of project outputs, knowledge and experiential lessons.

The project sustainability plan has been built into the dissemination plan. The results, including how to utilise the information, will be posted on the IR-4 Minor use portal and the extension website of each country's residue mitigation results as part of GAP guidance. A video will be produced and posted on YouTube to cover the field capacity building programmes and explain how to utilise residue mitigation as a strategy to avoid trade issues. An example of a video that IR-4 has previously posted on an international residue study can be found [here](#). Furthermore, knowledge materials will be shared on the STDF platform to provide broader stakeholder access to project outputs.

Pamphlets will be developed explaining the importance of pesticide residues in trade and specific strategies for the crops for which data is developed. These will be distributed through ICGEB (during its various meetings across its member countries) SABO and CropLife and also through websites and social media platform of partner organizations. We will encourage each country to form an FAO-like extension model involving both individual- and group- extension.

The project has also arranged to publicise its results and insights in professional arena including, *inter alia*, regional and international biocontrol and similar professional meetings. This will help engage others in the biopesticides market, making them aware of this approach as a viable solution to adopt within their own existing strategies. In the future, the project foresees larger companies adopting a systems package reliant on conventional products during the crop cycle and which finishes this off with a biopesticide to avoid residues.

### **III. BUDGET**

#### **Budget estimate**

Budget estimates are included as Appendix 4. ICGEB will oversee the project's logistical implementation, with technical expertise contracted from the IR-4, and with the assistance of the USDA, FAO and number of consultants. This project will facilitate the development of details and arrangements for project implementation. All partners, including FAO, CropLife, pesticide manufacturers, exporter organisations, etc., will ensure that the project plugs into similar and related efforts in target countries.

SANBio will be the link between the project and the SADC Secretariat. It will also coordinate the field training programme in South Africa. SAPReF, a sub-committee of SADC will help ensure that relevant information for the surveys is obtained, participate in project activities and also promote the project outcomes amongst its members.

USDA will provide both technical support as well as matching funds to support some of the project activities as detailed in the attached budget.

ICGEB commits to provide matching funds as outlined in the attached budget. ICGEB will also cover the costs of some of the ICGEB personnel who will be involved in various aspects of managing the project, such as procurement, accounts and auditing.

#### **Cost-effectiveness**

There are six SADC countries (and Kenya) involved in this project, making the per-country cost of this project relatively low. Travel during project implementation will be limited to what is necessary; hence cutting out costs of flight tickets, accommodation, per diems, terminals etc. Many of the project activities (especially on the regulatory harmonisation component) will be held virtually. Many of the primary contacts in the project countries participate in regular SANBio/SADC/SAPReF meetings and this presents potential avenues for further reducing project expenses. To further reduce travel costs, any essential face-to-face meetings will intentionally be scheduled to coincide with SANBio/SADC/SAPReF/SADC meetings). Compensation for consultants involved in virtual meetings or training sessions will be pro-rated based on the length

of the meetings/training sessions; but also taking into consideration also time that may be needed for preparation and report writing.

This project seeks ultimately to work closely with the various players, in order to harmonise practices and biopesticide-related standards as much as possible, thereby conserving valuable resources. Harmonising regulatory approaches across the region will, furthermore, increase registration efficiency. The project will also establish a process that will ultimately promote adherence to MRL standards across the SADC region.

#### **IV. PROJECT IMPLEMENTATION & MANAGEMENT**

##### **Implementing organisation**

ICGEB will be the lead agency in implementing the project, in close collaboration with the U.S. Inter-regional Research project (IR-4), which will provide technical expertise and coordination. SANBio will be the link between the project and the SADC Secretariat. SANBio has also committed to avail its laboratory facilities to make it possible for the project to conduct residue studies and to coordinate field training.

##### **Project management**

Critical to the success of the project will be an effective project management team with a solid, effective and efficient working arrangement. It is envisaged that the project management team will consist of the following:

##### ***Project Manager (PM)***

ICGEB's Group Leader - Biopesticides will be designated as the Project Manager (PM) for this project. He will assume day-to-day responsibility for the running of the project, will be responsible for maintaining the formal contacts with the different project partners (including STDF) as well as overseeing all operational matters. The PM will, additionally, organise the various needs-based workshops and capacity building programmes, ensure the application of a stakeholder knowledge management strategy, track project progress, serve as project liaison and attend to routine operational matters. The PM will ensure that IR4, SANBio, SAPReF, the SADC Secretariat, the Project Steering Committee and other key stakeholders are kept regularly apprised of the project progress as well as any emerging issues requiring technical and managerial input from project partners and the PSC. This will enable key technical players to remain informed, and to proactively play a technical and advisory role as efficiently as possible. The PM will also be responsible for drafting or reviewing the project progress reports. The incumbent will supervise the Administrative Assistant (AA), and be heavily involved in arranging and attending/organising regional consultations, region-based workshops as well as meetings of the Project Steering Committee. The PM will work closely with the Technical Coordinator and other project collaborators. The position will require the PM to dedicate 50% Full Time Equivalent (FTE) for the duration of the project. However, only 40% of this cost will be covered by the Project, with the difference being an in-kind contribution from ICGEB.

##### ***Administrative Assistant (AA)***

The Administrative Assistant (AA) will primarily assist the PM, ensuring that arrangements for all project activities are performed in a timely manner. The AA will possess accounting skills and the ability to effectively use office equipment and technology. They will be required to assist the PM with the daily running of the office, organisation of relevant project activities, the convening of Project Steering Committee meetings, and project missions. S/he will work with the PM to ensure that all necessary reporting is completed and submitted on time. Daily operational activities will include among others, organising sub-contracts with project partners, making preparation for trainings (i.e. purchase of airline tickets, contracting hotels, arranging local transportation, etc.). For field trial work, the AA will oversee and ensure funding transfers to participating country agencies/institutions. Under the supervision of the PM, the AA will prepare quarterly-, annual-, final- and financial -reports as needed. The AA will assume responsibility for management of the project's online visibility, including maintenance of a dedicated project website and Facebook page. The position will require an equivalent to 100% 'FTE' for the duration of the project.

##### **Project Advisory Board**

A Project Advisory Board comprising representatives of the regulatory agencies, extension services, industry and farmer organisations, private sector partners (including pesticide and biopesticide manufacturers), local agricultural commodity export organisations, and industry associations will meet virtually every 6 months and before the Project Steering Committee meetings to ensure that their views are discussed at the PSC meetings such as to ensure the project is closely aligned itself to national regulatory systems. The country SAPReF representatives from each country will be considered country focal points and will be provided with the necessary training and capacitation to enable them conduct relevant raining and meetings in the various countries.

### **Project Steering Committee**

A Project Steering Committee (PSC) will be constituted and will consist of representation from APAARI, SADC, SANBio, SAPReF, SABO, CropLife, USDA, FAO, IR-4 and the STDF. Ad-hoc advisors will be derived from the ranks of the OECD Expert Group on Biopesticides, as well as at least one grower from within the region and at least one importer. Experts may also be nominated by the STDF the ICGEB Council of Scientific Advisors, and from the initial project consultation in the regions. All PSC meetings shall be held virtually, at least once every year. The Project Manager and Technical Director will keep the PSC apprised of project's progress with respect to the regulatory harmonisation and residue mitigation studies respectively. Minutes will be taken at each PSC meeting and punctually shared with all relevant stakeholders.

The process of building capacity is dynamic; flexibility is integral to the success of any project, to ensure responsiveness to participating countries' needs, and adaptability to emerging and unanticipated factors. This iterative learning process, both on the part of the project management as well as project beneficiaries, is of prime importance. As such, adjustments may be put forward by the Project Steering Committee throughout the project cycle.

Logistics: Participating countries will, as much as possible, assist by providing the project with logistical support. For example, for the countries hosting the training programmes, a point person from the country in question would be expected - in cooperation with ICGEB - to help identify and secure training facilities, arrange local transportation, identify lodging options, etc. To ensure alignment with the ASEAN Biopesticide project, a day will be set aside before each project meeting/workshop (i.e. the day preceding the inception workshop and each regulatory harmonisation workshop) to facilitate critical discussion and progress updates, and ensure the alignment of key elements between the two projects. This alignment will further be achieved through the co-option of the Executive Secretary of APAARI to the Project Steering Committee, an advisory structure that will be convened to provide guidance to the project over the course of implementation. Virtual workshops will also be held with the Asia and African groups to learn from each other's successes. In addition, a day will also be set aside before each of the workshops for an ICGEB-APAARI discussions.

### Technical Consultants:

- For the regulatory harmonisation component, Mr. David Wafula and Ms. Dorothy Kyamapaire of the East African Community, both of whom played a significant role in the process of formulating guidelines for the East African Community, have committed to working with the project, providing their technical expertise and sharing their respective experiences in this area. The involvements of these experts will ultimately help to ensure convergence between the SADC and EAC guidelines. Over time, it is anticipated that it will become possible to 'harmonise the harmonised guidelines' between the two regions.
- IR-4 will lead work under the residue mitigation objective. Dr. Michael Braverman of IR-4 will be the overall technical lead.
- Dr. Wayne Jiang of IR-4 has provided training in the previous STDF projects and will provide laboratory analysis training.
- Dr. Joe Huesing will be supported by USDA to work with the project team on the regulatory harmonisation component.
- Mr. Luis Suguiyama will be supported by USDA and will work with the project team on the regulatory harmonisation component.
- Ms. Stella Simiyu will be supported by USDA for residue trial support and regulatory harmonisation
- Dr. Bakari Kaoneka will support the residue mitigation activities.

- Mr. Ramadhan Kilewa will support the regulatory harmonisation activities.
- Two experienced lawyers will carry out a detailed legal assessment in countries participating in the regulatory harmonisation in order to determine what is needed to get legal status for harmonised biopesticides regulations. Once the regulations are developed, they will work with the countries to develop a roadmap to translate the same into national legislation.
- APAARI will be responsible for ensuring the integration of functional capacity building activities.

The Terms of Reference (TORs) guiding the involvement of key national and international experts in the project workplan and activities can be found in Appendix 5. This includes information on assigned tasks and responsibilities, the duration of assignments, number of missions (where applicable), and qualifications/experience to be detailed in consultants' CVs.

### **Project outcomes implementation and adoption action plan committee and multi stakeholder network**

As already elaborated in Section II of this proposal, an implementation and adoption action plan and a multi-stakeholder network to oversee the implementation and adoption of the programme will be developed at the last harmonisation workshop. SAPReF (a sub-committee of SADC) and SANBio (which sits on the SADC Secretariat) will lead the committee, with ICGEB working with them to track project countries' key milestones with respect to implementation of the legal road map.

### **Financial Management**

Co-funding will be sought at every opportunity, and any resulting unused budget reported to STDF with a request that it be reassigned/added to an identified budget item.

ICGEB will make financial transfers to the relevant agencies/institutions nominated by the respective countries conducting field trials or hosting regional trainings (i.e South Africa, Kenya and Tanzania). ICGEB will also be responsible for transferring relevant funds to project consultants. For the country workshops, it is expected that ICGEB will be provided with comprehensive details on the meeting programme, dates and personnel invited following which it will advance 50%<sup>39</sup> of the required funds; with the balance remitted upon receipt of workshop reports and all relevant invoices. Transferred funds are intended, and may be used solely, to organise meetings and workshops, purchase materials and supplies, establish contracts, and other related and necessary reimbursements. Recipient agencies/institutions will provide ICGEB with itemised reconciliation of expenditure at the earliest reasonable time upon making purchase or completion of services.

## **V. REPORTING, MONITORING & EVALUATION**

### **Project reporting**

Reporting will be conducted in line with the workplan schedule, such that a progress report of activities and outputs will be generated every 6 months. The minutes and activity reports of workshops, Project Advisory Board and Project Steering Committee meetings and related activities will be produced; the main conclusions from these will be incorporated into the narrative project reports.

Project performance will be monitored using the projects logical framework, including indicators (baseline and targets) and annual work plans and budgets. At the inception workshop the logical framework will be reviewed to finalise identification of: i) outputs ii) indicators; and iii) missing baseline information and targets. A baseline survey will then be undertaken to refine the outcomes of the inception meeting. The outcomes of the inception meeting and baseline survey is expected to be a comprehensive set of defined activities, outputs and indicators (and updating of the logical framework) against which project progress will be measured. These will then be comprehensively discussed and finalised at the PSC meeting, and also shared with the STDF Secretariat, and will form the basis for tracking progress throughout the project duration.

The day to day responsibility of tracking progress will vest in the Project Manager, with project partners and country focal points expected to provide relevant information to track the indicators.

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<sup>39</sup> The costs of each country organised and hosted workshop (each expected to have at least 35 participants) will be capped at USD 7,000, to cater for a nominal per diem, local travel and meals. It is expected that the workshops will be hosted at institutional facilities and so venue charges not budgeted for.

The Project Manager will work closely with the Technical Director and other collaborators to prepare comprehensive interim progress reports and make inputs to the final project report, ensuring holistic and comprehensive monitoring of project indicators and measures.

An overall assessment of project progress against all indicators and outputs will be done towards completion of the project. A report on the same will be developed for presentation and discussion at the final meeting at which an implementation programme (involving the project multi-stakeholder network) of final project outputs will be finalised.

A draft STDF progress report will be presented and discussed with the Project Steering Committee, which will consider and advise on any modifications deemed necessary for the final report.

### **Monitoring and evaluation, including performance indicators**

ICGEB will develop a monitoring and evaluation (M&E) plan to ensure that project activities are monitored, and project outcomes and impacts are appropriately evaluated. Monitoring of activities and outputs will aim to ensure that the project is on track or course corrected as appropriate, dependent on the identification of unplanned or unintended changes. Evaluation will focus on measuring outcomes and impacts, to assess if progress is being made towards project-stipulated goals; to document any changes that have occurred; to identify whether any unintended or unplanned changes have been observed; and to gauge the durability of impacts over time. Performance indicators will be derived from the logical framework. ICGEB will also monitor and evaluate the KM and functional capacity aspects of the project. Finally, a project website will be developed along with a Facebook messenger group to facilitate communications, which will later serve as a forum through which to disseminate results.

There will be three key points of reference in the monitoring and evaluation of the project, which include progress towards regulatory harmonisation, capacity building and the residue data generation.

#### *(a) Indicators of Success*

- Increased collaborations with regulatory authorities working toward biopesticide regulatory harmonisation;
- Guidelines for the development of harmonised biopesticide regulation developed;
- Roadmap developed on how to translate guidelines into national legislation;
- Improved knowledge/skills of governments in the areas of data generation and data evaluation regarding residue MRL mitigation;
- Increased knowledge on how to integrate biopesticides as part of an IPM systems approach;
- Enhanced regional technical ability to conduct high quality residue research and studies that would be accepted by international standard setting bodies, such as Codex, or by other national governments for the establishment of MRLs (good laboratory practices (GLP), or similar criteria);
- Improved soft skills (functional capacities) of regulatory officials and researchers to collaborate, communicate, and innovate in the area of biopesticides.

#### *(b) Measures of Success*

The success will be measured based on the successful attainment of the following:

- Harmonised biopesticide regulations that are aligned as much as possible to the EAC guidelines;
- Database on commercial biopesticides in participating countries developed;
- Commercial biopesticides in participating countries listed in CABI Bioprotection portal;
- Trained field-trial personnel capable of (i) ensuring strict adherence to the study protocol and (ii) demonstrating a 20% increase in data generation competencies;
- Laboratory personnel exhibit improved precision and accuracy in analytical results, ensuring greater reliable data, contributing to enhanced confidence in results;
- Improved laboratory technique serves to incrementally advance laboratories toward ISO Certification and/or GLP recognition;
- Residue mitigation data successfully provides solutions to MRL issues and broadens the range of produce markets eligible for export due to meeting the MRLs;

- The development of a communications network facilitating the discussion of regional, regulatory harmonisation efforts;
- Greater engagement of biopesticide registrants pursuing registrations in participating countries;
- Development of Standard Operating Procedures for biopesticide efficacy trials;
- Development of a clear, workable implementable roadmap for translation and integration of harmonised guidelines into national legislation.
- The development of functional capacities among various project actors.

### **Dissemination of the Projects results**

The project will develop a KM Strategy to guide the dissemination of project results. The strategy will take care of information management, facilitation of stakeholder engagement, soft skill development, communication and outreach, and dissemination of project results to the project partners and other relevant stakeholders in the region. More defined activities, indicators and expected outputs will be developed at the inception workshop and refined by the results of the baseline study.

The following five areas will constitute the key pillars of the project's KM strategy, which will facilitate the dissemination of project results, mindset and behavioural transitions and changes towards the mitigation of pest residues and the adoption and use of biopesticides:

- 1. Information management:** Knowledge outputs, in local languages and based on the project's collected data, information, and analytical activities, will be curated through the generation of knowledge products, such as information leaflets (on safe trade and consumption for example), practical guidelines on biopesticides and tools, and policy briefs targeting different project stakeholders groups e.g. farmers, national pesticide regulatory bodies, industry associations and export companies, and consumers.
- 2. Engagement:** An interactive, face-to-face and online learning environment will be created for both project stakeholders and beneficiaries, to facilitate: opportunities to share good practices, experiences, and lessons learned; learn about new technologies, their application and evaluation; and explore new markets for biopesticides. Webinars will be used for online discussions, and innovative knowledge-sharing techniques will be integrated into technical events to promote learning and collaboration.
- 3. Capacity development:** Representatives of farmer groups will be trained and provided with the necessary materials to be able to provide similar training to their members. Various approaches will be factored into planned technical and knowledge-sharing events, including, *inter alia*, development of brochures, videos and guidelines accessible after events, integrating the development of functional capacities, for example, interpersonal and communication skills, entrepreneurial skills, and KM and analytical skills, to enable: (i) participating producers to better utilise the newly acquired technical skills in pest management by empowering them to negotiate better contracts, interact with other value chain actors and engage in political processes regarding the safety of agri-food production and consumption; (ii) industry actors to better manage industrial relations with farmers and government bodies and enhance their collaboration; and (iii) policymakers and regulators to better understand (navigate the complexity of) the evidence and knowledge created through the project's pesticide residue mitigation efforts and related policy implications. Various KM tools and processes developed through the EU-funded Capacity Development for Agricultural Innovation Systems (CDAIS) project will be used to develop these capacities in the context of planned technical events.
- 4. Communication and outreach:** The project will develop a more supportive knowledge-sharing infrastructure, to speed up the dissemination of project-generated information and knowledge. This will include creating a page devoted to project activities and outputs on the ICGEB website and using ICGEB Social Media channels (including Facebook, Twitter and LinkedIn) as the project's main tools for outreach and public communication. As already mentioned there will also be both virtual and face to face ICGEB-IR-4 - APPARI meetings. A new online newsletter will also be designed and disseminated to all project stakeholders providing updates of project news, activities and results on a biannual (six-monthly) basis. To facilitate increased outreach and learning, project resources will be linked to partners' knowledge and communication tools as well as those of other existing and relevant biopesticide user networks. Press releases will be prepared to ensure key project events and milestones are communicated widely. Short videos will also be produced, showing farmers using safe

biopesticide techniques. These will serve as testimonials supporting the project's advocacy efforts.

- 5. Dissemination of project results:** The results, and recommendations on how to utilise the information, will be posted on the IR-4 Minor Use Portal and the extension website of each country as part of GAP guidance. A video will be produced and posted on YouTube to cover field capacity building programmes and explain how to use residue mitigation as a strategy to avoid trade issues. Pamphlets will be developed to explain the importance of pesticide residues in trade as well as the specific strategies for the crops we develop data for. The focal points of each country will work with the representatives of grower groups to develop extension models involving both group extension to farmers and commodity groups, individual extension to farmers and distributing information at agricultural trade shows. Project successes will also be presented at other professional meetings to engage and encourage a broad range of stakeholders beyond the programme to adopt and market a biopesticide approach. It is envisaged that in the future, larger companies will adopt a systems package whereby conventional pesticide products are used during part of the crop cycle, with biopesticides used at conclusion to avoid residues.

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## **ATTACHMENTS**

**Appendix 1:** Crop-Pesticide Combinations

**Appendix 2:** Logical Framework

**Appendix 3:** Work Plan

**Appendix 4:** Budget

**Appendix 5:** Terms of Reference for key staff involved in project implementation

**Appendix 6:** Letters of support from organisations that support the project request (attached separately)

**Appendix 7:** Written consent from an STDF partner that agrees to implement the project **OR** evidence of the technical and professional capacity of another organisation proposed to implement the project (attached alongside letters of support).

**APPENDIX 1<sup>40</sup> : TARGET CROP / PESTICIDE COMBINATIONS / BIOCONTROL ALTERNATIVES**

<b>Crop</b>	<b>Pesticide causing a residue issue on the crop</b>	<b>Target pest(s) at the end of the season</b>	<b>Relative importance to export issues</b>	<b>PHI and retreatment interval on the label of the conventional pesticide</b>	<b>Biopesticides that can control the target end of season pest</b>	<b>Harvest season (time of year)</b>	<b>Number of harvests and days between harvests</b>	<b>Ability to analyse for the conventional pesticide, including the LOD</b>
Avocado	Buprofezin	Heart-shaped scale	HIGH	160 days	Soybean oil, Canola oil	March - September	20 – 30 days of harvesting daily	Yes, LOD = 0.010 mg/kg
Avocado	Pymetrozine	Sucking bug complex	HIGH	21 days	Soybean oil, Mineral oil	March – September	20 – 30 days of harvesting daily	Yes, LOD = 0.010 mg/kg
Avocado	Acephate	Sucking bug complex	HIGH	35 days	Soybean oil, Mineral oil	March - September	20 – 30 days of harvesting daily	Yes, LOD = 0.010 mg/kg
Avocado	Methoxyfenozide	False Coddling Moth (FCM)	MEDIUM	30 days	<i>Beauvaria bassiana</i> , <i>Cryptophlebia leucotreta granulovirus</i>	March - September	20 – 30 days of harvesting daily	Yes, LOD = 0.010 mg/kg
Avocado	Azoxystrobin	Cercospora fruit spot	MEDIUM/HIGH	28 days	Potassium bicarbonate	March - September	20 – 30 days of harvesting daily	Yes, LOD = 0.010 mg/kg
Mango	Chlorpyrifos	Mango scale, mealybug	MEDIUM	136 days	<i>Beauvaria bassiana</i> , Soybean oil, Canola oil	July - December		Yes, LOD = 0.010 mg/kg
Mango	Azoxystrobin	Anthraco nose	HIGH	21 days	Aureobasidium pullulans, Thyme oil, Citric acid	July - December		Yes, LOD = 0.010 mg/kg

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<sup>40</sup> Data on actual biopesticide awareness and actual use on the target crops will be collected as part of the baseline survey.

## APPENDIX 2: LOGICAL FRAMEWORK

	<b>Project description</b>	<b>Measurable indicators<sup>41</sup></b>	<b>Sources of verification</b>	<b>Assumptions and risks</b>
<b>Goal</b>	Enhanced compliance by project countries of pesticide MRL requirements of Codex	10% increase in exports of targeted crops from participating countries within five years of project completion  20% increase in the percent of produce grown under a residue mitigation system to comply with MRLs	SADC Statistics Yearbook  This data will enable us to determine if the export of specific commodities has increased or if market access has improved.  Online information such as EU rapid alerts and other information relating to pesticide residue MRL violations will be monitored to see if the particular problems still appear as trade issues.	<ul style="list-style-type: none"> <li>• Target markets accept Codex or currently established MRL standards.</li> <li>• Target biopesticide products are available in participating countries.</li> <li>• Regulatory authorities agree to update biopesticide registration requirements and processes in participating countries.</li> </ul>
<b>Immediate objective / Result</b>	Increased use of biopesticides to reduce pesticide residues in key crops	Mutually acceptable standards of biopesticide regulation  Increased understanding among regulatory authorities of how time, IPM production practices and end of season mitigation impact residues	Regulatory guidelines developed  Number of collaborative meetings  Data on actual amounts of biopesticides used on the target crops	<ul style="list-style-type: none"> <li>• Increased local access to biopesticides</li> </ul>
<b>Output 1:</b>	Harmonised biopesticide regulations for selected SADC countries	Government authorities in 6 countries have a regulatory system in place specific for biopesticides  # and types of dialogue between government authorities and other regional bodies on the harmonisation of their systems New partnerships developed between regulators in targeted countries and registrants	Pre/post workshop surveys  New biopesticide regulatory guidelines and other knowledge products  Legal roadmaps developed for each of the participating countries	<ul style="list-style-type: none"> <li>• Regulators available to provide required information and participate in the workshops</li> </ul>

<sup>41</sup> Some of these indicators may be reviewed, fine-tuned and made more focussed based on the outcomes of the baseline surveys.

	<b>Project description</b>	<b>Measurable indicators<sup>41</sup></b>	<b>Sources of verification</b>	<b>Assumptions and risks</b>
<b>Activities</b>	<p>Surveys to determine issues of relevance to a common biopesticides regulatory policy and also determining specific constraints women farmers face so that these can be considered during project implementation</p> <p>Detailed legal assessment to determine what is needed to get legal status for biopesticides regulations</p> <p>Validation workshops<sup>42</sup> to agree on common policy orientations to inform development of regulatory guidelines</p> <p>Development of a harmonised biopesticide guidelines</p> <p>Development of an implementation roadmap to translate guidelines into national legislation</p> <p>Development of Project outcomes implementation and adoption action plan committee to monitor translation and integration of guidelines into national legislation</p> <p>ICGEB Workshop on translation of harmonised guidelines into national legislation</p> <p>ICGEB Short term offered to individuals of South Africa and/or Zimbabwe and/or Tanzania to work on actual drafting and incorporation of guidelines into national legislation.</p>	<p>Up to 6 country reports outlining areas that are amenable to a common regulatory approach in the SADC region</p> <p># of participants (disaggregated by gender),</p> <p>A draft preliminary harmonised biopesticides regulatory framework for the SADC region</p> <p>Inputs from other relevant institutions<sup>43</sup> including the Chile led OECD biopesticides project, and incorporated into draft</p> <p>6 legal roadmaps indicating the process to translate regional guidelines into national legislation</p> <p># of participants at the harmonisation workshop (disaggregated by gender)</p> <p>Implementation roadmap</p> <p>Multi stakeholder implementation committee.</p> <p>ICGEB Workshop organised</p> <p>At least 3 'drafting' fellowships offered.</p>	<ul style="list-style-type: none"> <li>• Pre and post-workshop surveys and evaluations of trainees' knowledge</li> <li>• Meeting reports</li> </ul>	<ul style="list-style-type: none"> <li>• Many of the meetings will be held virtually.</li> <li>• There will be adequate responses to the surveys.</li> <li>• There will be agreement on issues of convergence, and which are therefore amenable to harmonisation.</li> <li>• Countries would be willing to adopting harmonised guidelines.</li> </ul>
<b>Output 2:</b>	<p>New residue data and improved knowledge to interpret this data on the use of biopesticides (combined with conventional pesticides) to mitigate pesticide residues</p>	<ul style="list-style-type: none"> <li>• Up to 6 field residue mitigation studies on specific pesticides / commodities</li> <li>• Data/results on residue declines</li> </ul>	<ul style="list-style-type: none"> <li>• Reports on residue decline analyses</li> <li>• Data on actual amounts of biopesticides used on the target crops</li> </ul>	<ul style="list-style-type: none"> <li>• In-kind and financial contributions provided by relevant stakeholders</li> <li>• Normal growing season devoid of significant inclement weather or any other confounding factors that would render the field trial data unacceptable</li> </ul>

<sup>42</sup> Training and discussions sessions for farmers, policy makers and country focal points will be held back to back with all project meetings/workshops to ensure that they are fully engaged throughout the project and ultimately 'empowered' to be able to implement project outcomes.

<sup>43</sup> These would include the African Agricultural Technology Foundation, the East African Community, the West Africa Pesticide Registration Committee, the Comité Sahélien des Pesticides, the Food and Agriculture Organisation, USDA, and the African Union Inter-African Phytosanitary Council.

	<b>Project description</b>	<b>Measurable indicators<sup>41</sup></b>	<b>Sources of verification</b>	<b>Assumptions and risks</b>
				<ul style="list-style-type: none"> <li>• Scientists available to attend trainings and apply knowledge gained in follow-up</li> </ul>
<b>Activities</b>	<p>Baseline survey to determine specific biopesticide usage in target crops</p> <p>Capacity building workshops, trainings and consultations to empower farmers with the knowledge and skills to conduct supervised field trials and lab analysis using a ToT model</p> <p>Field and lab preparations</p> <p>Field residue mitigation studies</p> <p>Sample preparation and analysis</p> <p>Efficacy studies that include biopesticides</p> <p>SOP refinement and protocol development</p> <p>End-of-project workshop to discuss and disseminate project results, experiences, and longer-term sustainability</p>	<ul style="list-style-type: none"> <li>• Percent market penetration</li> <li>• # of registered products</li> <li>• # of workshops/training events</li> <li>• # of scientists trained (disaggregated by gender)</li> <li>• # of efficacy studies planned, implemented and analysed</li> <li>• Revised SOP documents</li> </ul>	<ul style="list-style-type: none"> <li>• Sales records</li> <li>• Pre and post-workshop surveys and evaluations of trainees' knowledge</li> <li>• Meeting reports</li> <li>• Knowledge products with testimonials of trainees</li> <li>• Report on country's preparedness to initiate field trial</li> </ul>	
<b>Output 3</b>	<p>Established IPM strategies and GAP for key crop/pest combinations and using biopesticides</p> <p>Training of representatives of farmer groups on GAP relating to biopesticides and IPM. This will be held back to back with the various other project meetings.</p> <p>Countries organised and hosted by project countries.</p> <p>End line survey and report</p>	<ul style="list-style-type: none"> <li>• IPM toolkit available</li> <li>• SOPs and guidelines for GAP developed</li> <li>• Database of biopesticides registered in all project countries available and accessible through ICGEB website</li> <li>• #of commercially available biopesticides from project countries listed in the CABI Bioprotection portal.</li> <li>• At least 6 in-country workshops</li> <li>• Information on how end line indicators compare to those at the baseline</li> <li>• New product registrations</li> <li>• Percent market penetration of identified biopesticides</li> </ul>	<ul style="list-style-type: none"> <li>• Availability of IPM Toolkit, SOPs and biopesticides database</li> <li>• Training reports</li> <li>• Sales records</li> <li>• Final report</li> </ul>	

### APPENDIX 3: WORK PLAN

Activity	Responsibility	Year 1				Year 2				Year 3			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
I. Inception Workshop and Baseline Surveys	Dennis Ndolo (DN), Michael Braverman (MB; Ereck Chakauya (EC)	X											
II. Project Steering Committee Meeting	DN; MB; EC	X				X				X			X
IV. Project Advisory Committee Meeting	DN; MB; EC			X				X				X	
III. Reports to STDF (Inception Report is part of first 6-month report. Subsequent reports are on a 6-month schedule.)	DN; MB		X		X		X		X		X		
<b>Output 1: Enhanced capacities for regulatory harmonisation</b> – Government authorities will have a regulatory system in place specific for biopesticides and communicate with other regional bodies on the harmonisation of their systems.													
Activity 1.1 Country reviews	DN; EC	X	X	X									
Activity 1.2 Legal assessment of biopesticide regulations	DN; EC				X	X							
Activity 1.3 Validation workshop	DN; EC						X						
Activity 1.4 Development of harmonised guidelines <sup>44</sup>	DN; EC							X	X	X			
Activity 1.5 Training on application of guidelines	DN; EC										X		
Activity 1.6 Development of roadmap for translating and incorporating guidelines into national legislation	DN; EC										X		
Activity 1.6 Regional workshop to discuss process of integration of guidelines into national legislation (to be supported by ICGEB)	DN; EC											X	
Activity 1.7 Short term drafting fellowships offered to key personnel from South Africa, Zimbabwe and Tanzania to formulate guidelines s per national legislative requirements. <sup>45</sup>	DN										X	X	
<b>Output 2: New residue data and improved knowledge to interpret this data on the use of biopesticides (combined with conventional pesticides) to mitigate pesticide residues.</b> Scientists are able to conduct residue mitigation studies and data is generated													
Activity 2.1 Conduct GLP Training (Field)	MB		X	X									
Activity 2.2 Conduct GLP Training (Lab)	MB		X	X									
Activity 2.3 Follow up oversight Field and Laboratory activities	MB; EC				X	X	X	X	X				

<sup>44</sup> Includes seeking inputs of all relevant stakeholders before preparation of final draft.

<sup>45</sup> These may most likely commence in the year immediately preceding project completion.



## APPENDIX 4: BUDGET

A description of budget items is provided below:

The project will be comprised of three major components:

1. Regulatory harmonisation: This will consist of the following specific activities:
  - Surveys to determine areas of biopesticide regulations between the different countries that are amenable to harmonisation
  - Workshop to review information from the country reviews, develop harmonised guidelines and conduct a simulated application of the guidelines
  - Develop legal roadmaps indicating the process to translate regional guidelines into national legislation
2. Residue mitigation: Capacity building in field residue decline trial and laboratory and conducting the field residue decline trial and laboratory analysis.
3. Functional capacity building activities: To be integrated into both project components

### Contracts:

- At ICGEB, an administrative assistant will be hired to provide project management support. Other administrative support for the project, including organising travel, training logistics, contracts, and funds transfers will be covered by project overheads. Even though ICGEB overheads are usually pegged at 10% they have been reduced to 8% for this project.
- A knowledge management expert that will also cover sessions on functional capacity will also be hired. The knowledge management will cover identifying, capturing, evaluating, retrieving, and sharing all the information generated in this project. The Project Manager at ICGEB will be involved in the project for 120 days per year for a total of 360 days. ICGEB will cover 60% of his costs on the project as in-kind contribution.
- Technical experts to help lead a workshop to help build capacity and establish cooperative communications networks and subsequently lead the development of regulatory guidelines over the three-year period.
- Technical Management (IR-4) will be contracted to provide overall guidance, mentorship, and direction for the residue mitigation component of the project. The Technical Manager will advise on the final selection of crop/pesticide/country assignments, develop field trial protocols, and provide training and guidance for conducting the field trial work. It is anticipated that this will be a 44 days/year contract.
- A laboratory consultant will be contracted to ensure that national laboratories are proficient in methods and procedures required for the project. The analytical consultant provide training to national laboratory technicians and provide overall guidance to technicians when conducting project analyses.
- Lawyers will be contracted to conduct a detailed legal assessment per country on what is needed to get legal status for harmonised biopesticides regulations. They will additionally describe the legal steps to be taken in each country to achieve approving regulatory changes (explaining the legal process and providing an estimated timeline).

### Travel and DSA:

- Participant airfare: Travel for project participants is anticipated as follows:
  - Inception and steering committee meeting: This meeting will be held virtually and so no travel is expected. Consultancy fees will be pro-rated for all virtual events.
  - Validation workshop: Will also be held virtually, as per the preceding provisions.
  - Training workshop on implementation of draft of the guidelines. This will be a face to face meeting. Provisions for travel and DSAs as per attached budget spreadsheet.
  - Residue mitigation component: Travel will be necessary to prepare national experts for field trial and laboratory analysis work. The trainings will be held in parallel with actual field trial preparations in order to provide participants with actual, hands-on experience. National experts will include Principal Investigators, field technicians, and laboratory technicians. Travel funds will support participation of national experts to relevant training events.
- Contractor airfare: The Technical Director, IR-4 chemist, and consultants will travel to provide training/guidance for relevant events.
- Local travel: this includes transportation of groups to rural field sites for training and trial work that is not covered under other costs.
- USDA will also cover costs of some of the consultants as outlined in the budget spreadsheet.*

**Training:**

- Capacity building: it is anticipated that the contracted Technical Director, and experts will deliver the required training necessary to conduct the project work. Costs for participants to attend the trainings are included in previous budget section, so no additional costs are anticipated in this section.
- Project work: major costs for field trial work include compensation for field trial sites, field technician services, transportation and laboratory testing, data analysis, and professional services for trial personnel.
  - Field trials: costs include professional services of local field technicians (ideally government staff from national research facilities); field trial sites (although in-kind contributions will be sought from local or government managed farms), transportation costs. Costs of trials depends on the crop being tested, location of sites, number of trials required, etc. Costs for trials are anticipated to be low, as public-sector staff and equipment would be utilised as much as possible. The project is budgeting the field portion of the trials. This includes two phases. At first a multi residue trial followed by a specific product and combined with efficacy evaluations
  - Laboratory analysis: costs include professional services of residue laboratories, reagents and supplies.

**IT/ laboratory equipment:**

- It is anticipated that only small equipment purchases will be made to support the project, and shipping costs, as needed to carry out field trial and laboratory work.

**Project management:**

- Overall project management will be provided by ICGEB and the Technical Coordinator.

**Inputs**

Input		Output
Personnel	<ul style="list-style-type: none"> <li>● Regulatory expert</li> <li>● ICGEB staff</li> </ul>	Harmonised regulatory guidelines for biopesticide registration
Travel and per diem	<ul style="list-style-type: none"> <li>● Economy airfare</li> <li>● lodging, meals</li> <li>● local transportation</li> </ul>	
Personnel	<ul style="list-style-type: none"> <li>● National Principal Investigators</li> <li>● ICGEB staff</li> </ul>	Capacity Building: Trained technical personnel (laboratory, field trial experts, others) with the ability to conduct high quality residue research and studies.
Contracted organisations	<ul style="list-style-type: none"> <li>● Field and laboratory analytical experts</li> </ul>	
Supplies and services	<ul style="list-style-type: none"> <li>● analytical supplies</li> <li>● printing materials</li> </ul>	
Travel and per diem	<ul style="list-style-type: none"> <li>● Economy airfare</li> <li>● lodging, meals</li> <li>● local transportation</li> </ul>	
Personnel	<ul style="list-style-type: none"> <li>● ICGEB project staff</li> </ul>	Residue Data Generation: Pesticide data generated
Contracted organisations	<ul style="list-style-type: none"> <li>● Laboratory analytical experts</li> </ul>	
Equipment	<ul style="list-style-type: none"> <li>● equipment purchases for lab work – only that which is critical for the project</li> </ul>	Test pesticides registered for use in participating countries
Supplies and services	<ul style="list-style-type: none"> <li>● analytical supplies</li> <li>● printing and labelling materials</li> <li>● shipping</li> <li>● storage materials</li> </ul>	
Travel and per diem	<ul style="list-style-type: none"> <li>● airfare</li> <li>● lodging, meals</li> <li>● local transportation</li> </ul>	

**BUDGET**

	STDF	In-Kind		
		ICGEB	Beneficiaries	USDA-FAS
<b>Inception workshop</b>				
Consultancy fees	3,150			1,665
Staff time & logistics (ICGEB) <sup>46</sup>		500		
Staff time - Beneficiaries			4,312	
<b>Output 1: Harmonised biopesticide regulations for selected SADC countries</b>				
<b>Activity 1.1: Country reviews to determine issues of relevance to a common biopesticides regulatory policy (Virtual)</b>				
Staff time & logistics (ICGEB)		12,000		
<b>Activity 1.2 Legal assessment of biopesticide regulations (to involve in-country meetings with key stakeholders)</b>				
Travel	4,800			
DSA	5,280			
Consultancy fees	13,500			
Miscellaneous costs (e.g. visas & vaccinations)	100			
Staff time - Beneficiaries			7,392	
<b>Activity 1.3 Virtual Workshop #2: Validation of country reviews [2 days]; ICGEB-APAARI meeting [1 day]</b>				
Consultancy fees	3,150			2,190
Staff time & logistics - ICGEB		500		
Staff time - Beneficiaries			4,620	
<b>Activity 1.4 Development of draft regulatory guidelines</b>				
Consultancy fees	22,500			10,000
<b>Activity 1.5 Training workshop on guidelines, SOPs &amp; GAP</b>				
Travel	27,400			3,800
Training venue	3,600			
DSA	23,100			1,980
Terminals	2,500			800
Consultancy fees	6,750			6,570
Miscellaneous costs	500			
Staff time & logistics - ICGEB		2,000		
Staff time - Beneficiaries			13,860	
<b>Activity 1.6 Translating guidelines into national legislation</b>				
Consultancy fees	13,500			

<sup>46</sup> ICGEB Staff time will include engagement of a Post -doctoral fellow who will spend 20% FTE on the project.

<b>Activity 1.7 ICGEB Regional Workshop in integration of harmonised guidelines into national legislation</b>		50,000		
Staff time – Beneficiaries			18,480	
<b>Activity 1.8 ICGEB Drafting Fellowships</b>				
Short term fellowships (3)		90,000		
Staff time – Beneficiaries (Fellows)			27,720	
<b>SUBTOTAL OUTCOME 1</b>	129,830	155,000	76,384	27,005
<b>Output 2: New residue data and improved knowledge to interpret data on the use of biopesticides</b>				
<b>Activity 2.1: Lab Group training - Kenya</b>				
Bench fees	1,000			
Travel	19,000			1,000
DSA	17,160			1,560
Terminals	1,250			400
Consultancy fees				5,940
Local transport	4,800			
Small equipment & reagents	1,000			
Miscellaneous	750			
Local logistics and travel – Host institutions			2,000	
Staff time - Beneficiaries			11,088	
<b>Activity 2.2 Lab one on one</b>				
Bench fees	3,000			
Air travel	3,000			3,000
DSA	3,375			3,375
Terminals	600			600
Consultancy fees				10,260
Small equipment & reagents	1,000			
Miscellaneous	300			
Staff time & logistics - Host institutions			2,000	
Staff time - Beneficiaries			36,960	
<b>Activity 2.3: Field Group training - South Africa</b>				
Bench fees	1,000			
Travel	15,400			1,000
DSA	12,672			576
Terminals	1,250			200
Small equipment & reagents	2,000			
Consultancy fees				4,320
Miscellaneous	500			
Local logistics and travel – Host institutions			2,000	
Staff time - Beneficiaries			36,960	
<b>Activity 2.4 One on one field training</b>				
Bench fees	1,000			

Air travel	11,200			1,000
DSA	1,980			1,980
Small equipment & reagents	3,000			
Terminals	600			600
Consultancy fees				9,180
Miscellaneous	300			
Local logistics and travel - Host institutions			2,000	
Staff time - Beneficiaries			27,720	
<b>Activity 2.5 Residue Mitigation Trials</b>				
Field multi-residue decline studies	18,000,00			
Field multi-residue decline studies-Analysis	13,500,00			
Specific Residue study - Field	18,000,00			
Specific Residue Analysis	13,500,00			
Grinders & dry ice generator	6,000,00			
Field and Laboratory equipment use fees and maintenance contracts, use of hoods and physical space and scientific personnel (In-kind by hosting institutions)			5,000	
Analytical, field test substances and biopesticides contributed by industry (in-kind contributions organised SABO, CropLife and Agrochemicals Association of Kenya).			10,000	
<b>SUBTOTAL OUTCOME 2</b>	<b>176,137</b>	<b>0</b>	<b>135,728</b>	<b>44,991</b>
<b>Output 3: Established IPM strategies and GAP for key crop/pest combinations and using biopesticides</b>				
Development of IPM Toolkit				
ICGEB Staff time and logistics		2,000		
Database of biopesticides registered in project countries				
ICGEB Staff time and logistics		3,000		
Hosting of database at ICGEB - 2 years		14,400		
Development of SOPs and guidelines for GAP- Consultancy fees	10,800			3,150
Listing of biopesticides on CABI Bioprotection portal	3,600			
Country workshops on biopesticide guidelines, IPM and GAP - DSA	92,400			
Staff time - Beneficiaries			55,440	
Host institutions - training facilities and logistics			600	
<b>SUBTOTAL OUTCOME 3</b>	<b>106,800</b>	<b>19,400</b>	<b>56,040</b>	<b>3,150</b>
<b>Final results - dissemination planning workshop 3 days results; 1 day functional capacity + 1 day ICGEB-APAARI meeting</b>				
Training venue	4,050			
Travel	36,000			3,850
DSAs	26,180			1,100
Terminals	2,000			800
Consultancy fees	7,200			4380

Miscellaneous	750			
Staff time & logistics - ICGEB		2,000		
Staff time - Beneficiaries			16,170	
<b>SUBTOTAL FINAL DISSEMINATION (FD)</b>	<b>76,180</b>	<b>2,000</b>	<b>16,170</b>	<b>10,130</b>
<b>Project Management</b>				
Project Manager - Dennis Ndolo (ICGEB)	43,200	64,800		
Technical Director-Michael Braverman (IR-4)	71,280			
Ereck Chakauya - Residue testing & liaison with SADC	17,500	50,000		
Administrative Assistant	36,000			
<b>Project Management Travel</b>				
Project Manager	4,000			
Technical Director-Michael Braverman, IR-4	5,000			
Ereck Chakauya	3,200			
End of project independent assessment	15,000			
Publications-Printing, videos, brochures	20,000			
<b>SUBTOTAL PROJECT MGM &amp; OTHERS (PMO)</b>	<b>215,180</b>	<b>114,800</b>	<b>0</b>	<b>0</b>
<b>GRAND SUB-TOTAL (1+2+3+FD+PMO)</b>	<b><u>704,127</u></b>	<b><u>291,200</u></b>	<b><u>284,322</u></b>	<b><u>85,276</u></b>
Contingency funds (5% of grand sub-total)	35,207			
<u>Project total</u>	<u>739,334</u>			
ICGEB Overhead (8% of project total)	59,146			
<b>Total Requested from STDF</b>	<b><u>\$798,480</u></b>			
<b>Matching (In-kind)</b>		<b>\$291,200</b>	<b>\$284,322</b>	<b>\$85,276</b>
<b>Grand total (Requested STDF plus matching)</b>	<b><u>\$1 459 278</u></b>			

## **APPENDIX 5: TERMS OF REFERENCE (TOR) FOR KEY STAFF INVOLVED IN PROJECT IMPLEMENTATION AND THEIR CVS**

### **Project Manager (Dennis Ndolo)**

The Group Leader, Biopesticides at ICGEB will take the lead in the project, supported by the admin assistant and other ICGEB staff. The Project Manager (assisted by the administrative assistant) who has demonstrated project management experience across various countries and a sound science background of plant protection will carry out the following activities:

- Responsible for the day to day operations of the project.
- Assist with communications with stakeholders.
- Ensure smooth functioning of all operational matters, including procurement, such as purchase of equipment by various partners.
- Organise logistics for various workshops and capacity building programmes and assist in preparing a report of the events organised.
- Keep track of the progress of each project team members, support them in routine operational matters.
- Ensure the release of funds to the partners based on their activities and outputs and assist in keeping track of the utilised budget.
- Ensure timely compilation and submission of project progress reports.
- Monitor implementation and adoption action plan to ensure key milestones are met.
- Perform any other activity as may be required for smooth functioning of the project in different countries.

### **KM and functional capacity development (Martina Spisiakova)**

The KM Coordinator will develop the project's KM Strategy, and will coordinate its implementation, including the development of functional capacities to be integrated in the technical programme.

### **Technical Coordinator (Michael Braverman)**

The Technical Coordinators will develop training materials and deliver all trainings with support of additional experts. They will undertake the following specific duties:

- Provide advice to the Project Steering Committee, Project Management and relevant hired experts.
- Prepare technical reports on the progress of the residue mitigation activities for submission to the Project Steering Committee.
- Assist the Project Manager in the preparation of reports required by financial contributors.
- Conduct the training and oversee the initiation, progress and results of the actual research.

### **Other consultants**

- Participate and contribute to all relevant project activities, including workshops and training events.
- Prepare material for, and conduct, relevant training events.
- Drafting of regulatory guidelines
- Country legal assessments to determine what is needed to translate biopesticide regulations into national legislation, including timelines
- Work with participating countries to translate guidelines into national legislation.

### **Participating countries**

The countries participating in the project will:

- Actively engage in the inception meeting and Project Steering Committee Meetings.
- Participate in Biopesticide Regulatory Harmonisation Workshops (as specified in project document)
- Conduct the residue mitigation trials (as specified in project document)
- Perpetuate the utility of the project through active utilisation of the training, acquired knowledge and information to feed into the KM outputs, and a strategy for meeting MRL requirements.
- For countries hosting training events, a point contact from the country will assist the project staff and Technical Coordinator in planning, organizing, and implementing events.
- Incorporate developed guidelines into national legislation.

**CV: Dennis Obonyo Ndolo**  
Group Leader – Biopesticides  
International Centre for Genetic Engineering & Biotechnology, Cape Town, South Africa.

### **Education**

**2014:** Advanced Certificate in Project Management, University of Cape Town, South Africa  
**2009:** PhD. Entomology, University of Nairobi, Kenya  
**2004:** M.Sc. Crop Protection, Egerton University, Kenya  
**1995:** BSc. Agriculture, University of Nairobi, Kenya

### **Professional experience**

**Oct 2018 – current:** **Group Leader – Biopesticides, International Centre for Genetic Engineering & Biotechnology (ICGEB), Cape Town, South Africa**  
Managing the Biopesticides Research Group which focusses on information generation and data sourcing, collation, generation and dissemination to support the discovery, development, formulation and commercialisation of low cost, stable and effective biopesticides.

**Jan 2013 – Sep 2018:** **Programme Officer (Biosafety), ICGEB, Cape Town, South Africa**

Managing the ICGEB biosafety capacity building project for Sub-Saharan Africa (SSA). More specifically: developing the strategic planning and schedule for the implementation of Project activities; primary liaison for African collaborators and Project beneficiaries; developing scientific and technical training programmes (including Masters programmes) targeting identified needs of the Project beneficiaries; conducting relevant biosafety research and publishing the findings in relevant scientific journals; supervising the daily activities in the ICGEB Cape Town Biosafety Office; in cooperation with other members of the Biosafety Group, maintaining the online databases and Biosafety Web Pages; and, sourcing funding for Project activities.

**Feb 2009 – Dec 2012:** **Project Biosafety Specialist, ICGEB, Trieste, Italy & Cape Town, South Africa**

Coordinating the activities of the ICGEB biosafety capacity building project for SSA. Duties include: identification of biosafety capacity building and training needs across the various countries in SSA; design of curricula for regional project training workshops; identification of suitable institutions to host project training programmes (e.g workshops, post-doctoral research fellowships); identification of suitable resource personnel and participants for project training activities; organising and implementing project training programmes in liaison with host institutions; identification of relevant regional and international biosafety conferences in which participation would further project objectives; identifying and accompanying project supported delegates to various regional and international biosafety conferences

**Jun 2008 – Dec 2008:** **Deputy Coordinator, BiosafeTrain Project (a DANIDA funded Enhancement of Research Capacity Programme**

Assisting the Project Coordinator in the day to day administrative duties of the project whose primary objective was to build capacity for ecological impact assessment of transgenic plants

**Jul 2006 – Sep 2008:** **Theme Leader, Environmental Impacts Assessment Group, Insect Resistant Maize for Africa (IRMA) Project (a Syngenta Foundation funded joint KARI-CIMMYT Programme)**

Conducting studies on the potential impacts of Bt maize on non-target arthropods in Kenya

**Jan 2005 – Dec 2005:** **Research and Development Officer, Finlay Flowers (Dudutech), Naivasha, Kenya**

Coordinate trial programmes/activities to generate reliable field trial data and develop product information that for product registration; Compile high quality registration dossiers; Update/amend existing registrations to facilitate renewals, formulation changes, new end-uses, new sources of technical material, and label amendments (warning clauses, resistant management clauses etc.); Ensure that product labels are technically correct and in compliance with statutory requirements

**Jan 2004 – Dec 2004:** **Research and Development Assistant, Finlay Flowers (Dudutech), Naivasha, Kenya**

Conducting on-farm biopesticide research trials

## CV: Martina Spisiakova

Knowledge Management Coordinator, Asia Pacific Association of Agricultural Research Institutions (APAARI), Bangkok, Thailand, [m.spisiakova@apaari.org](mailto:m.spisiakova@apaari.org)

### Education and qualifications

- 2008-2011 **Master in Business Administration (MBA)**, Robert Kennedy College, Zurich, Switzerland / University of Wales (distance). Dissertation: 'The challenge of developing a knowledge culture: a culture that embraces learning, sharing, changing, and improving through the collective intelligence and knowledge of people – comparative analysis of public and private sectors'
- 2002-2006 **BSc (Hons) in Social Sciences with Economics (First-class)**, The Open University (UK) (distance learning), Project (2005): 'The impact of social segregation on cities' – Grade A (distinction)
- 2006 **Diploma in Economics**, The Open University, UK (distance learning)
- 2004 **Diploma in Environment and Development**, Open University, UK (distance learning) University project (2003): 'How effectively does community-based fisheries management, as implemented under the IFAD-supported Aquaculture Development Project, benefit the local environment and communities in Bangladesh' – Grade A (distinction)

**Short training courses (2015-2018):** gender (UN Women), project management (ESCAP), resource mobilization (ESCAP), ethics (ESCAP), KM (IFAD), negotiations in tough situations (Learning Tree International), training of trainers (MDF), mind-mapping (IFAD), high-performance teamwork (IFAD), security awareness (WFP), executive media coaching (IFAD), moderation skills (IFAD), editing and sub-editing (London College of Communication and Institute of Development Studies).

### Professional experience

- 2019-now **ASIA-PACIFIC ASSOCIATION OF AGRICULTURAL RESEARCH INSTITUTIONS (APAARI)**, Bangkok, Thailand **Knowledge Management Coordinator**
- 2019 **EUROPEAN COMMISSION (EC)**, Brussels, Belgium **Evaluator of the Horizon 2020 proposals**
- 2018-2019 **APAARI**, Bangkok, Thailand **Project Development Consultant**
- 2015-2017 **APAARI**, Bangkok, Thailand **Knowledge Management Coordinator**
- 2014-2015 **CENTRE FOR ALLEVIATION OF POVERTY THROUGH SUSTAINABLE AGRICULTURE (CAPSA), UNITED NATIONS ECONOMIC AND SOCIAL COMMISSION FOR ASIA-PACIFIC (ESCAP)**, Bogor, Indonesia – **Consultant** – *KM, communications, and monitoring, evaluation and learning (MEL) of the Network for Knowledge Transfer on Sustainable Agricultural Technologies and Improved Market Linkages in South and Southeast Asia (SATNET Asia) – EU-funded project*
- 2012-2014 **CAPSA/UNESCAP, Bogor, Indonesia Knowledge Management Officer for the SATNET Asia Project**
- 2005-2012 **INTERNATIONAL FUND FOR AGRICULTURAL DEVELOPMENT (IFAD), ASIA AND THE PACIFIC DIVISION**, Rome, Italy (*Acting*) **Knowledge Management and Communication Officer**
- 2000-2005 **IFAD, ASIA AND THE PACIFIC DIVISION**, Rome, Italy **Programme Assistant for various Country Programme Managers responsible for Afghanistan, Bangladesh, Bhutan, Central Asia, Democratic People's Republic of Korea, India, Iran, Maldives, Nepal, Sri Lanka, Pakistan and the Philippines (on rotational basis).**

### Other information:

Slovak national with over 18 years international development experience in agricultural and rural development in Asia-Pacific – programme and project management, knowledge and network management, project development, strategic planning, capacity development and learning, monitoring and evaluation (M&E), and resource mobilization.

Lived three years in the UK, twelve years in Italy, two and a half years in Indonesia, 1.5 years in Thailand, and one year in Austria. **Travelled and worked widely through Asia (short development missions):** Bangladesh, Cambodia, China, India, Indonesia, Lao People's Democratic Republic, Malaysia, Maldives, Myanmar, Nepal, Pakistan, Philippines, Singapore, Sri Lanka, South Korea, Thailand and Viet Nam.

**Languages:** Working knowledge of English, Italian, and Spanish, basic Indonesian, Malay and Russian. Mother tongue: Slovak.

### **CV: Michael Paul Braverman**

Manager Biopesticide, Organic and International, Capacity Building Programs, IR-4  
Project, Rutgers University, 500 College Road East, Suite 201W, Princeton, New  
Jersey 08540

#### **EDUCATIONAL BACKGROUND:**

A.S.	1979	Ornamental Horticulture	Valencia Community College
B.S.	1981	Agriculture(Soils)	Murray State University
M.S.	1984	Agronomy(Weed Sci.)	University of Arkansas
Ph.D.	1989	Horticulture(Weed Sci)	University of Florida

#### **PROFESSIONAL EXPERIENCE:**

2017-Present: **Manager Biopesticide, Organic and International Capacity Building Programs** IR-4 Project, Rutgers University, Princeton, New Jersey. Manage an organic and biopesticide regulatory and efficacy program leading to EPA registration of new biopesticide active ingredients with the US Environmental Protection Agency. Organise and conduct international training programs involving Good Laboratory Practices, pesticide residues and supervise pesticide residue research projects to generate new global standards for international trade of food commodities

2002-2017: **Biopesticide and Organic Support Program Manager** IR-4 Project, Rutgers University, New Jersey. Manage a national organic and biopesticide efficacy program in cooperation with about 20 university scientists annually. Routinely submit registration packages to EPA to register new biopesticides which have organic applications

1999- 2001: **Associate Coordinator.** IR-4 Project, Rutgers University, North Brunswick, New Jersey

1996-1999: **Director of Field Research.** EPL BioAnalytical Services. Clermont, Florida

1991 - 1996: **Assistant Professor**, Weed Science. Department of Plant Pathology and Crop Physiology. Focused on weed control in rice. Louisiana State University, Baton Rouge, LA.

1989-1991: **Extension Vegetable Specialist**, Texas Agricultural Extension Service Weslaco, Texas.

1985-1989: **Graduate Assistant**, Vegetable Crops Department, Univ. of Fla. Supervisor: Dr. Sal Locascio

1984-1985: **Fulbright Scholar** to Thailand, Kasetsart University, Bangkok, Thailand. Opium Substituted Crops Project.

1981-1984: **Research Assistant**, Pesticide Residue Laboratory, Altheimer Lab, Univ. of Arkansas. Supervisor: Dr. Terry Lavy

#### **OTHER PROFESSIONAL TRAINING:**

2002 **Sabbatical** - Environmental Protection Agency (EPA) Washington D.C. Six month training program in the Biopesticide and Pollution Prevention Division

#### **AWARDS**

2005	Arizona Cotton Growers Association	-Registration Assistance for
AF36. 2001	US Environmental Protection Agency	- Excellence in Teamwork- Minor Use Registration2000 Rutgers University- Team Award- Cook College

## CV: Wayne Jiang

Department of Entomology, Michigan State University, East Lansing, MI 48824

Tel: (517) 336-4672, Email: [jiangwa@msu.edu](mailto:jiangwa@msu.edu)

### Education

- Ph. D. (Chemistry): McMaster University, Hamilton, Ontario, Canada, 1999.
- M. Sc. (Chemistry): Laurentian University, Sudbury, Ontario, Canada, 1996.

### Current Academic Position

- Associate Professor, Department of Entomology, Michigan State University.
- Associate Director, North Central Region IR-4 Laboratory, Michigan State University.

### Other Current Professional Positions and Affiliations

- Governing Board Member of Federation of Analytical Chemistry & Spectroscopy Societies (FACSS).
- Senior Editor of Metabolism, Biochemistry and Analytical Methodology, for Bulletin of Environmental Contamination and Toxicology (BECT), Springer, New York.

### Employment History

- Associate Professor (2003-present), Michigan State University, East Lansing, Michigan.
- Laboratory Manager (2000-2003), University Laboratories Inc., Novi, Michigan.
- Senior Chemist (1999-2000), Caduceon Inc., Toronto, Ontario, Canada.
- Chemical Engineer (1988-1993), Nanchang Daily Use Chemical Factory, Nanchang, Jiangxi, China.

### Professional Activities

- Submitted 100+ Analytical Summary Reports (ASRs) to US EPA and AAFC Canada for supporting establishment of pesticide tolerances (IR-4 National Pesticide Clearance Research Program).
- A co-PI of the IR-4 annual grant from USDA NIFA, approximately \$2 million per year, for the North Central Region Minor Use and Pesticide Research IR-4 (2003-current).
- Managed and helped to direct the North Central Region IR-4 laboratory under EPA's Good Laboratory Practice Standards (GLP).
- Developed analytical methodology for pesticide residue analyses; Hands-on experience in instrumentation, including LC/MS/MS, HPLC/UV, GC/MS, GC/ECD, GC/NPD, and etc.; Validated analytical methods; Insured Standard Operating Procedures (SOPs) to reflect proper science; and Performed pesticide analytical work under GLP standards.
- Facilitated and trained laboratory chemists/analysts to analyze the pesticide residues under EPA GLP standards for Southeast Asian, African, and Latin American countries (2010-current). On USDA FAS capacity building assignment, traveled to developing countries for pesticide residue studies, including China, Thailand, Malaysia, Singapore, Vietnam, Philippines, Indonesia, Ghana, Senegal, Ivory Coast, Kenya, Egypt, Morocco, Costa Rica, Colombia, etc.
- On the USDA Delegation to visit China (June 2018) for the U.S.-China Scientific Cooperation Exchange Program (SCEP) - #8 Maximum Residue Limits (MRL).
- Attended the Codex Committee on Pesticide Residues (CCPR) conferences (Beijing/other cities, China), AUPAC Conference, Global Minor Use Summit II (Rome, 2012), Global Minor Use Summit III (Montreal, 2017).
- Worked closely with China (Ministry of Agriculture, ICAMA) and visited ICAMA and Chinese Academy of Agricultural Sciences' institutions and universities for collaborations.
- Taught a toxicology class as a guest lecturer at Michigan State University; taught General Chemistry course at Oakland Community College; Supervised undergraduate and graduate students; and directed the visiting scholars and postdocs who worked in IR-4 lab.
- Studied toxicology of pesticides in soil and water, and dissipation/degradation and environmental fate of pesticides.
- Computer skills: Proficient in Microsoft Office (Word, Excel, Access, PowerPoint), Visual Basic for Applications (VBA Excel), Web programming: including html, asp, php with Access and MySQL databases; networking and system administration.
- Grant Panel Reviewer – for PEER grant proposals for the National Academies of Sciences, Engineering, and Medicine (NASEM), Washington DC (May 2017 and May 2018).
- Manuscript/Book Reviewer
  - Book Reviewing: Reviewed "Pesticide Protocols", Edited by J.L.M. Vidal and A.G. French, Humana Press, Totowa, New Jersey (2006). Book Published in 2006;
  - Served as a senior editor on the board of Bulletin of Environmental Contamination and Toxicology (BECT); generally reviewing annually 12~24 manuscripts from BECT and other peer-reviewed journals; and making the decisions.
- Selected Peer-Reviewed Publications as examples (20+ Papers)
  - Soliman AS, Helmy RMA, Nasr IN, Abbas MS, Mahmoud HA, Jiang W (2017) Behavior of Thiophanate Methyl and Propiconazole in Grape and Mango Fruits under the Egyptian Field Conditions. Bull Environ Contamin Tox 98(5) 720-725;
  - Abdelraheem E, Arief M, Mohammad SG, **Jiang W** (2017) Safety assessment of chromafenozide residue level with decline study on tomato in Egypt. Environ Monit Assess 189 (4) 180;
  - Feng F, Li Y, Ge J, Chen J, **Jiang W**, He S, Liu X, Yu X (2017) Degradation of chlorpyrifos by an endophytic bacterium of the Sphingomonas genus isolated from Chinese chives (Allium tuberosum). J Environ Sci Health B. 52(10):736-744.

- Selected Analytical Summary Reports (ASRs) Submitted to EPA as Examples (100+ reports)
  - S. Erhardt and **W. Jiang**, IR-4 Project PR 11307, Penthiopyrad Magnitude of the Residue on Banana (ASR signed in 2017);
  - S. Erhardt and **W. Jiang**, IR-4 Project PR 11146, Paraquat Magnitude of the Residue on Sesame (ASR signed in 2016);
  - S. Erhardt, **W. Jiang**, and E. Abdelraheem. IR-4 Project PR 11139, Mandipropamid Magnitude of the Residue on Lemon (ASR signed in 2016);
  - S. Erhardt and **W. Jiang**, and R. Chinnery, IR-4 Project PR 11263, Tolfenpyrad Magnitude of the Residue on Caneberry (ASR signed in 2016).
- Selected Invited Presentations/Trainings as Examples (50+)
  - **W. Jiang**\* "GLP Training for Residue Studies", Kenya Plan Health Inspectorate Service, Nairobi, Kenya, September 2018;
  - E.R. Bennett\*, R. Schulz, **W. Jiang**, M.T. Moore, "Pesticide Mitigation in Agricultural Research", Athens, Greece (May 2018);
  - **W. Jiang**\* "GLP Training for Residue Studies and Environmental behavior Studies", hosted by Tianjin Academy of Agricultural Services, Tianjin, China (Nov 2017);
  - **W. Jiang**\*, Training for Good Laboratory Practices in Residue Analytical Laboratories, Laboratory of Analysis and Research (LOARC), Casablanca, Morocco (March 2016).

**CV: Ramadhan Ally Kilewa**  
Research and Biosafety Officer  
Tropical Pesticides Research Institute, Arusha, Tanzania.

### **Education**

**2014:** Master of Biotechnology (Plant Biotechnology), The University of Adelaide, Waite Campus, Southern Australia, Australia.

**2009:** Bachelor of Science (Zoology and Botany) with Education, The Open University of Tanzania, Dar es Salaam, Tanzania.

### **Professional Experience**

I have experience on the following areas related to pesticides and biopesticides:

**June-September, 2019:** Assistant team leader on the Development of EAC harmonized Biopesticides registration data requirement guidelines

**October-November, 2019:** Trainer and team Leader in Training Spray Service Providers on safe use of pesticides, proper use of sprayers and Pesticides Application Techniques for the control of pests and diseases on Cotton growing areas in Tanzania.

**2017 to date:** member of Technical working group for EAC Harmonized Bioefficacy trial and Biopesticide registration data requirements guidelines

**2014 to date:** Team leader of conducting Bio-efficacy Evaluation of pesticides under screen houses and open fields in Tanzania.

**2019:** Team leader on the Training of the stakeholders (Researchers engaging in Bioefficacy trials of pesticides) in Tanzania on the familiarization of adopted EAC Harmonized Guidelines for the registration of pesticides

**2017 to date:** Training of the stakeholders in Tanzania on the safe use of pesticides and techniques of pesticide application, and impacts of pesticides on human health and the environment.

**January, 2020:** Training of stakeholders on the use of Biopesticides for the control of late season pests in horticultural crops to mitigate pesticides residues in agricultural produces.

**2019-2020:** Participation as team leader in carrying out pilot testing of EAC Harmonized Pesticides Guidelines for Bioefficacy trials of Pesticides on Fall armyworms in Tanzania.

**CV: Bakari Kaoeneka****EDUCATION**

<b>COLLEGE</b>	<b>CERTIFICATE</b>	<b>YEAR</b>
Dar es Salaam College of Education	Diploma	1974 – 75
University of Dar es Salaam	BSc. (Ed.)	1980 –83
University of Dar es Salaam	MSc. (Chem.)	1986 – 89
Moi University	PhD (Chem.)	1993–1998

**SELECT SPECIALIZED COURSES ATTENDED**

1. Karl Max University, Germany, Pesticide formulation and analysis. Certificate of Attendance 1986.
2. Certificate of Training in Pesticide Residue Standards and Assessment awarded by United States Department of Agriculture, Accra, Ghana, 2011
3. Certificate of Participation in Good Laboratory Practice in Field Residue Studies conducted by IR-4 Project, Rutgers University, Arusha, 2016

**SELECT CONFERENCES AND WORKSHOPS ATTENDED**

1. Codex Committee on Pesticide Residues, Beijing, China, 2007
2. Codex Committee on Pesticide Residues, Hangzhou, China, 2008
3. Conferences on Stockholm, Basel and Bamako conventions, Dar-es-Salaam, 2006.
4. Harmonization of MRLs Workshop, Bibiotheca, Alexandria, Egypt, 29<sup>th</sup> March-2<sup>nd</sup> April, 2009
5. Codex Committee on Pesticide Residues (41<sup>st</sup> Session) Beijing, China, 20<sup>th</sup>-25<sup>th</sup> April, 2009
6. Codex Committee on Pesticide Residues (42<sup>nd</sup> Session) Xi'an, China, 19<sup>th</sup>- 24<sup>th</sup> April, 2010
7. Pre-CCPR Symposium: Update of Global Pesticide Harmonization Efforts and Minor Use/Specialty Crops Initiatives, Renmin Square Hotel, Xi'an, China, 18<sup>th</sup>, April, 2010.
8. 29) PANAFRICAN meeting for experts to discuss Codex issues in the Codex Committee on Pesticide Residues interest to Africa, Nairobi, Kenya, 6-8<sup>th</sup> April, 2010.
9. Workshop on Pesticide Residue GLP, Nairobi, 8<sup>th</sup>-11<sup>th</sup> June, 2010
10. Workshop on Pesticide Residue Standards and Assessment, Accra, Ghana, 6-10<sup>th</sup> June, 2011
11. Codex Committee on Pesticide Residues (45<sup>th</sup> Session) Beijing, China, 6<sup>th</sup>- 11<sup>th</sup> May, 2013
12. STDF/pg/359 – "African pesticide residue data generation project" first steering committee meeting and field trial preparation trainings, Accra, 17-20<sup>th</sup> Feb. 2014
13. African Experts Meeting on Pesticide Residues, AU-IBAR, Nairobi, Kenya, 2-4<sup>th</sup> April, 2014
14. Codex Committee on Pesticide Residues (46<sup>th</sup> Session) Nanjing, China, 6<sup>th</sup>- 11<sup>th</sup> May, 2014
15. Codex Committee on Pesticide Residues (47<sup>th</sup> Session) Beijing, China, from 13<sup>th</sup> to 18<sup>th</sup> April 2015.
16. Codex Committee on Pesticide Residues (47<sup>th</sup> Session) Beijing, China, from 13<sup>th</sup> to 18<sup>th</sup> April 2017. Specialized MRL training organized and supported by USDA under the Cochran Fellowship Program (CFP) held from September 19<sup>th</sup> to October 3<sup>rd</sup>, 2015, The United States of America
17. Third Global Minor Use Summit (GMUS-3), October 1-4, 2017, Montreal, Quebec, Canada H3B 4A5

**PARTICIPATION IN MEETINGS AS AN INVITED EXPERT ON PESTICIDES**

1. First Working Session for Technical Working Groups on Regional Collaboration for Pesticide Registration in the EAC, Nairobi, Kenya in Sept. 2016
2. Second Working Session for Technical Working Groups on Regional Collaboration for Pesticide Registration in the EAC, 28<sup>th</sup> Feb-3<sup>rd</sup> March, 2017, Kampala, Uganda
3. East African Community Harmonized Pesticides Management Guidelines Regional Multi-stakeholder Consultation held in Kigali, Rwanda on 19<sup>th</sup> -21<sup>st</sup>, March, 2018,

**COMMITTEES AT NATIONAL AND INTERNATIONAL LEVEL (formerly)**

1. Environmental Management Divisional Standards Committee-Tanzania Bureau of Standards
2. Pesticides Approval and Registration Technical Sub Committee- Ministry of Agriculture, Food Security and Cooperatives
3. Pesticide Residue Monitoring- Ministry of Agriculture, Food Security and Cooperatives
4. Codex Committee on Pesticide Residues- Codex Alimentarius

**RECENT PROJECTS UNDERTAKEN**

1. Development of Maximum Residue Levels (MRLs) compliance and traceability for the tea sub-sector in Tanzania.
2. Toxicological Survey of Pesticides Residues in Vegetables grown in Dar-es -Salaam for the protection of consumers
3. Toxicological surveys for the presence of pesticide residues at Kihansi Gorge and its catchment areas It was sponsored by World Bank through Kihansi Environmental Management Project. 2005 and 2009
4. Pesticide residue generation project. It was sponsored by STDF through the African Union.

**EMPLOYMENT HISTORY**

Head, Chemical and Physical Division, TPRI (1998-2003)  
 Deputy Director General (2003-2006)  
 Chief Research Officer  
 Registrar of Pesticides, Tanzania (2011-2013)

**PUBLICATIONS**

22 Peer review publications, 9 technical reports and 3 books

**CV: Joseph Huesing**  
**2102 Chesterfield Place**  
**Chesterfield MO 63017**  
**Email: huesingaged@gmail.com**

**PROFESSIONAL EXPERIENCE**

**Huesing Agricultural and Educational Consulting LLC**

**2010 – present**

•Owner & Director

•Services focusing on Project Management, Product Development, Regulatory & Quality Affairs and Educational Services focusing on GAP/IPM and biotechnology crops.

•**USDA FAS Contract - Lead Scientist Technical Guidance on Pesticide Regulations and Registration to Control Fall Army Worm. Award 12FPC219P0097**

•**AATF EAC Pesticide Guidelines Domestication Process Gaps Analysis**

•Country level GAP/IPM assessment contracts: Kenya, Madagascar, Malawi, South Sudan.

**USAID BFS/ USDA ARS FAS - Independent USAID Contractor**

**2013 – Present**

•**Appointed Lead USG Scientist in response to the Fall Armyworm (FAW) invasion in Africa & Asia.**

-Served as the USG FAW Feed The Future Technical Lead on the USAID FAW Task Force to develop FAW control strategies to mitigate \$1-6 billion in crop losses & widespread food insecurity.

-Codeveloped the USG response strategy & implementation plan including research strategy, dissemination and pest management guide entitled: "*Fall Armyworm in Africa: A Guide for Integrated Pest Management*", which focused on Training of Trainers (ToT), pesticide risk assessment, and control measures.

-Codeveloped the CABI/USAID Extension *Pest Management Decision Guides (PMDG)* to aid small holder farmers in FAW control and pesticide risk reduction.

-Codeveloped The Scientific Animations Without Borders (SAWBO) FAW video series for scouting of FAW. Currently available in 31 languages for 21 countries.

-Planned & lead Regional Dissemination Events in Africa (3) and Asia (2) to address FAW at country & regional levels to mitigate short term effects of FAW.

-Co-founded the "*Research for Development Consortium (R4D)*" in Addis Ababa, Ethiopia in November 2018 which represents research, private sector and development partners seeking to validate & disseminate effective FAW pest management technologies.

•**Program Area Lead & Senior Biotechnology Advisor**

-I lead the USAID Biotechnology Portfolio comprised of 18 projects spanning GM Crop & Animal Vaccine product development & Global Regulatory Policy.

-The portfolio was comprised of the largest public sector array of product development projects resourced at over \$90 Million in Combined Total Estimated Awards and \$70 million in partner cost share and donor co-funding.

-I Implemented a program wide design change to biotech Project Management & Regulatory Affairs resulting in the first public sector regulatory approvals with U.S. EPA & FDA, FSANZ (Australia & New Zealand), & Health Canada.

-I served in a variety of leadership roles from project design and inception in 2004 to commercial launch in 2018 of the first public sector GM crop - Bt-cowpea – which was deregulated in Nigeria in 2019. This public sector project met the private sector standard of 14 years for development and commercial release of a GM crop.

-Established a Community of Practice around public sector product development focusing on aligning & expediting product development, regulatory approvals and deployment.

-USAID Program Lead for CGIAR: Research Program for Roots, Tubers & Bananas.

•**USGOVT Security Clearance (SECRET) - Foreign Affairs Counter Threat (FACT) Trained.**

**Purdue University**

Technical Project Manager, PICS2 (Bill & Melinda Gates Foundation)

**2012 – 2013**

Provided team guidance in project management

**Huesing Agricultural and Educational Consulting LLC**

**2010 – 2013**

•Owner & Director

•Services focusing on Project Management, Product Development, and Regulatory & Quality Affairs for GM Crops

**WEBSTER UNIVERSITY, St. Louis, MO**

**2008 – 2013**

•Director, Masters Degree Program in Science Management and Leadership

•Adjunct Assistant Professor

• Principal Instructor in i) PMI-based Project Management and ii) Regulatory and Quality Affairs

**PURDUE UNIVERSITY, West Lafayette, IN**

**2005 – 2016**

•Adjunct Associate Professor of Entomology (competitively awarded)

**MONSANTO CO., St. Louis, MO**

**1997 - 2010**

Manager, Scientific Affairs

2008 - 2010

Senior Entomologist Team Lead, NTO testing, Regulatory Sciences

2005 - 2008

Patent Scientist, Intellectual Property, Biotechnology Nutrition Portfolio

2003 - 2005

Project Leader, Insect Control Discovery Entomology and Automation

1998 - 2002

Technical Team Leader, Insect Control Rice

1999 - 1999

Entomologist, Corn Insect Research

1997 - 1998

- Co-authored harmonization of international biotechnology environmental risk assessment framework publication. Published in Nature Biotechnology 2008. Follow on publications in 2010-2013.
  - Conducted environmental and endangered species risk assessments for biotech products.
  - U.S. Patents (U.S. Patent. 7,612,194 & 8,614,370) awarded in the area of gene silencing technologies.
  - Conceived, designed and supervised construction of ARES, Automated Robotic Entomology Screen, the first fully automated robotics insect bioassay system.
  - Co-designed multi-million data point Insect Control Bioassay Data System for use by wide array of company scientists. (see Curtis, Huesing, *et al.*, 2004).
  - Established research initiative on digestive physiology of Lygus bug including assay development and biochemical target identification.
  - Co-developed enhanced western corn rootworm artificial diet to conduct baseline efficacy studies in support of YieldGard Plus™ corn rootworm product launch.
  - Co-established design criteria for biotech crop initiative in cowpea for African farmers.
  - Awarded several internal and external competitive grants for basic research initiatives.
- SANDOZ** (Novartis/Syngenta), Stanton, MN **1994 – 1996**

#### **Team Leader, Discovery Screening**

- Co-authored insect resistance management plan (EPA) for registration of NK Bt11 insect resistant corn.
  - Co-authored and awarded \$3M Sandoz Research Advisory Board Competitive Grant for research into novel insect resistance genes for transgenic crops.
  - Developed western and northern corn rootworm screening project.
- PURDUE UNIVERSITY**, West Lafayette, IN **1986 – 1994**

#### **Research Associate, David Ross Research Fellowship**

1991 – 1994

- Wrote and awarded Crossroads Initiative grant to support research into the molecular relatedness of cowpea weevil cysteine proteinases to mammalian cysteine proteinases.
  - Co-authored and awarded USDA Competitive Research Grant entitled: Lectins as Plant Defenses Against Insects, Structure-Activity Relationship and Mode of Action
- 1991 – 1993.
- UNIVERSITY OF KENTUCKY**, Lexington, KY **1984 – 1986**

#### **John Phillip Morris Research Fellowship**

- Field, greenhouse and laboratory assessment of insect resistance in wild *Nicotiana* species.
  - First cited conception of genetic engineering of plants for secondary metabolite toxin production to control insect pests.
- UNITED STATES ARMY**, 101st Airborne Division (AASLT), Ft. Campbell, KY **1975-1979**

#### **EDUCATION**

**PhD**, Entomology, Insect Physiology, Purdue University, West Lafayette, IN, 1991

**MS**, Entomology, John Phillip Morris Research Fellowship, University of Kentucky, Lexington, KY, 1986

**BS**, Entomology, Integrated Pest Management, University of Kentucky, Lexington, KY, 1984

#### **PATENTS**

U.S. Patents 7,612,194 (2009) and 8,614,370 (2013). Andersen; S., Hicks, G., Huesing, J., Romano, C., and C. Vetsch. 2009. Nucleic acid sequences from *Diabrotica virgifera virgifera* LeConte and uses thereof. U.S. Patent 8,440,880 (2013). *Xenorhabdus* sp. genome sequences and uses thereof. Corbin DR, Goldman; BS, Hinkle GJ, Huesing JE, Malvar TM, Krasomil-Osterfeld KC, Slater SC, Spiridonov S.

#### **SELECT AWARDS AND GRANTS**

- Recipient of the 2013 Entomological Society Of America Integrated Pest Management (IPM) Team Award for work on *The Risk Assessment of Bt Plants on Beneficial Non-target Arthropods (NTA)*, which significantly enhanced the environmental risk assessment of GM *Bt* crops. Sponsored by Dow AgroSciences.
- USDA 2012 *Norman E. Borlaug International Agricultural Science and Technology Fellowship Program* (Borlaug Fellowship Program) for Environmental Risk Assessment, Burkina Faso, West Africa.
- Nominated for the 2003 BioIT World best practice award
- Sandoz Research Advisory Board Competitive Grant 1995 – 1998 entitled: Novel Insect Resistance Genes for Transgenic Crops
- First place, Masters of Science research competition, Ohio Valley Chapter of the American Registry of Professional Entomologists. 1986
- Semifinalist Graduate Student Scholarship of the NCB of the Entomological Society of America. 1985
- Second place, Masters of Science research competition, NCB of the Entomological Society of America, 1985

#### **PUBLICATIONS (REFEREED)**

40 publications

## CV: Stella Nambuswa Simiyu

E-mail: snsimiyu03@gmail.com(p) [stella@croplifeafrica.org](mailto:stella@croplifeafrica.org) (o)  
+254 722446124 (P)

### PERSONAL CORE COMPETENCIES

I am Multi skilled with 20 year's cumulative experience in public policy analysis, biosafety in agriculture, regulatory compliance for crop and animal protection products; agriculture policy harmonisation, agricultural development, programme management, scenario-planning and entrepreneurship development.

Additionally, I have;

- **Cross-cultural** experience gained from working on projects and programs implemented in many countries in Africa, Middle East and interaction with partners from all over Africa, Middle East, Asia, Europe, USA, South America, India and Australia.
- **Leadership** experience having worked in senior positions for more than twelve years in multi ethnic and multi-cultural Africa as well as Europe and well-equipped in team leadership, mentoring for performance and training.
- **Experience**
  - In **agricultural inputs sector planning, regulatory compliance training, audits and dossier compilation**
  - In **Social policy, Policy formulation, Strategy formulation, Monitoring and Evaluation** and overall project management, implementation of strategic plans largely in regulatory environment focused mainly on Agricultural development.
  - In **public policy analysis, advocacy** and application / dissemination of science and technology for sustainable development.
- Skilled in **networking, mobilization, lobbying, advocacy and negotiation** with government officials, governmental and international organizations, local communities and donors on development matters, and environmental sustainability.
- **I am computer literate** with high proficiency in Microsoft Office suite (MS Word, MS Excel, MS Project, and MS PowerPoint etc), as well as Data Analysis software.

### WORK EXPERIENCE

- 2014 – to date Consultant – Director, Regulatory Affairs and Stakeholder Relations; CropLife Africa Middle East(CLAME)  
My role:
- Leading and managing regulatory and advocacy activities of **CropLife AME**,
  - Engaging with international, regional and national organizations on emerging policy issues including Highly Hazardous Pesticides (HHPs), Endocrine Disrupting Chemicals (EDCs), International Agency for Research in Cancer (IARC) assessments, Pollinator health, Protection of Regulatory Data (PRD), Confidential Business Information (CBI), challenges associated with MRLs, implementation of the Global Harmonized System for Classification and labelling of chemicals(GHS),
  - Engaging with Regional Economic Communities (RECs) on ongoing efforts in regulatory policy harmonization in the sub regions,
  - Representing CropLife in global, regional and national issue teams and externally in global meetings such as United Nations Environment Assembly (UNEA) and Strategic Approach in Chemicals Management (SAICM), and International Conference for Chemicals Management
  - Organisation and management of regulatory meetings at sub regional hubs, contributing to capacity building in regulatory topics
- 2007- to 2014 Program Officer, Regulatory Affairs African Agricultural Technology Foundation (AATF); Nairobi, Kenya  
**African Agricultural Technology Foundation (AATF)** seeks to facilitate the access and uptake of appropriate agricultural technologies by resource - poor smallholder farmers in Sub Saharan Africa through forging and managing working Public- Private Partnerships.  
My particular brief included implementation of project activities that ensure compliance with regulatory requirements of target African countries including studying and influencing the development of regulatory landscapes of respective countries (for technology crops, bio-fertilizers and bio-pesticides respectively) and drafting regulatory strategies, action plans, development of tools for training of national partners in regulatory compliance management and preparation of regular technical reports on achievements. Instrumental in technology scouting, management of field trials to enhance technology uptake in a sustainable way; preparation of concept notes, and proposals, project monitoring and evaluation among other activities
- 2001 to 2006 Trade Officer (Bilingual Position); **Embassy of Belgium**; Nairobi, Kenya  
Other than promoting bilateral relations between Belgium and East Africa, The Belgian Embassy was also involved in enhancing trade between Belgium and Eastern Africa's the private sector. Under the Trade commissioner, I was responsible for the day today implementation of the annual programme of activities including market research for entrepreneurs, lobbying, and organisation of trade missions.
- 2000 to 2001 Dissemination Officer ; International Committee of the Red Cross (ICRC); Nairobi, Kenya  
The **International Committee of the Red Cross (ICRC)** regional delegation in Nairobi promotes international humanitarian law (IHL) and carries out humanitarian activities in Kenya, Djibouti and Tanzania. It is an important logistical centre for ICRC operations in the horn of Africa and the Great Lakes region. From there, the ICRC protects and assists people displaced or affected by armed conflicts. Under the Cooperation Delegate, I was responsible for administering, planning and directing dissemination activities of Kenya Red Cross and Tanzania Red Cross Societies. This included training of volunteers and staff of the national societies in promoting respect for the law and other Red Cross activities, budget tracking and monitoring of activities.
- 1999 to 2000 Assistant Project Coordinator – Kenya Scenarios Project, Institute of Economic Affairs (IEA – Kenya); Nairobi

The **Institute of Economic Affairs** (IEA -Kenya) is a Public Policy think tank and a civic forum that seeks to promote pluralism of ideas through open, active and informed public debates on key policy issues, both economic and political and to propose feasible policy alternatives in these areas.

My specific brief involved administering and coordinating project activities; organising and participating in Research Workshops for 6 thematic areas; Social cultural (including gender); Social Capital development; Global and regional forces with an impact on Kenya; Management of public sector and political processes; Local forces driving the economy and Natural Resource utilisation. I also coordinated the dissemination of the scenario findings by unwrapping the compendium into a simple booklet for ease of uptake by policy makers and the political leadership.

1996 to  
1997

Programme Officer; **Feed the Children** Kenya Nairobi, Kenya

Founded in 1979 and headquartered in Oklahoma City, Oklahoma, Feed The Children is one of the largest international charities based in the U.S. With the mission of providing hope and resources for those without life's essentials by combating hunger and poverty. Feed The Children addresses four basic needs: food and nutrition, water and sanitation, education and health, and livelihood community development. Internationally, Feed The Children serves in more than 15 countries, including Kenya, where I served. My responsibilities included evaluation of the impact of the programme sites in the entire country including less developed areas of northern Kenya.

#### **WRITTEN / PUBLISHED WORK**

- 8 peer reviewed publications

## **Profile: David K. Wafula**

David is a high-achieving and motivated professional possessing excellent communication, organizational and analytical capabilities. He has over 18 years of working experience in international, continental and regional integration initiatives, agricultural policy development and implementation, food and nutrition security programming and biotechnology and biosafety agenda. He is a prolific writer and has published widely on these issues.

He holds a Bachelor's degree in Environmental Studies from Kenyatta University and a Masters degree in Development Studies (Major in Agriculture and Rural Development) from the International Institute of Social Studies (ISS), Erasmus University, the Netherlands.

David is currently working for the East African Community (EAC) Secretariat as an Agricultural Specialist responsible for coordination of EAC-USAID East Africa funded interventions. He provides technical leadership and supports EAC Partner States in the design and implementation of regional policies, strategies, plans and programmes focusing on agricultural development and deepening of regional integration.

During his stint at EAC, he has spearheaded the development and adoption of various EAC instruments on Sanitary and Phytosanitary Measures including harmonized regional guidelines for testing and registration of conventional pesticides and biopesticides. He is also coordinating the EAC Technical Working Group on pesticides in the pilot testing and implementation of the guidelines. David has also led EAC efforts in the development and adoption of EAC Food and Nutrition Security Strategy and Action Plan, Aflatoxin prevention and control strategy, CAADP Regional Agriculture Investment Plan, SPS Bill, regulations and standard operating procedures, and Seed and Plant Varieties Bill.

David has successfully catalyzed strategic partnerships between the EAC Secretariat and several international and regional bodies including the Food and Agriculture Organization of the United Nations, United States Agency for International Development, United States Department of Agriculture, the African Union Commission, the NEPAD Planning and Coordinating Agency, the Common Market for Eastern and Southern Africa (COMESA), the Alliance for a Green Revolution in Africa, the Association for Strengthening Agricultural Research in Eastern and Central Africa, the African Agricultural Technology Foundation, the United Nations Economic Commission for Africa (UNECA) and CropLife Africa Middle East.

**CV: Akile Sunday Igu Rocks**

P.O. Box 36530, Kampala, Uganda  
Telephone contacts: +256 784262469/+254713434844  
Email: [sunday.akile@nepadbiosafety.net](mailto:sunday.akile@nepadbiosafety.net)

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**PERSONAL DETAILS**

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Date of birth : **1<sup>st</sup> September 1974**  
Age : **46 years of age**  
Nationality : **Ugandan**

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**EDUCATIONAL PROFILE (Profession)**

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<b>PERIOD</b>	<b>INSTITUTION</b>	<b>AWARD</b>
2004-2005	Law Development Centre	Post Graduate Dip. in Legal Practice
1999-2004	Makerere University, Kampala	Degree in Bachelor of Laws (Honors)

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**CURRENT EMPLOYMENT from September 1, 2014 - To Date**

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**Senior Program officer on Legal/ Policy on Biosafety Issues with African Union Development Agency-NEPAD Nairobi-Uganda.**

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**PROFESSIONAL PRACTICE**

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Practiced law as an Attorney at law for 10 years under the name and style of; **M/s Akile, Olok & Co. Advocates in Uganda**

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**PROFESSIONAL SKILLS as a legal Practitioner**

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- He is a seasoned legal practitioner before joining AUDA-NEPAD with excellent trial procedure skills, negotiation skills, and draftsmanship with several successful legal cases to his name in the High Court of Uganda and all courts subordinate thereto. Refer to [www.ulii.org/ug/judgment/high-court/2013/227](http://www.ulii.org/ug/judgment/high-court/2013/227) - [www.ulii.org/ug/judgment/court-appeal/2013/13-0](http://www.ulii.org/ug/judgment/court-appeal/2013/13-0) among others which can be uploaded easily through a Google search.
  - Some of these cases have become *locus clasicus* (precedent) in the jurisprudence of Uganda.
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• **PROFESSIONAL SKILLS**

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- Facilitated dozens and dozens of trainings on Biotechnology & Biosafety Regulation widely **Locally, Regionally** and **Internationally** while at AUDA-NEPAD/ABNE
  - Key resource person in the development of e-Learning modules in Biosafety regulation under the auspices of **ICGEB**
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**ACADEMIC WORKS In the Field of Biotechnology & Biosafety**

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- Thesis in the area of ***Biotech & Biosafety entitled " An Analysis of Uganda's Biosafety Legal Regime,*** 2004.
  - Numerous loose Articles in the print media on ***Biotech and its Utilisation for Sustainable Environment & Development.***
  - Articles on the ***Emerging relationship Between Biotechnology & Intellectual Property Rights visa vie the Ugandan Intellectual Property Laws.***
  - One of the team member of ICGEB in the Development of the ***Guidance For Fit- For Purpose Regulatory Framework For GMOs, 2011***
-

CV: Chifundo Michael Chinyama  
Environmental Affairs Department  
Private Bag 394  
Lilongwe 3  
MALAWI  
Cell.: +265 998 968 499  
Date of Birth:10/12/83  
E-mail: [chifundochinyama@gmail.com](mailto:chifundochinyama@gmail.com)

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## **CAREER SUMMARY**

### **Environmental Affairs Department**

Lilongwe|Malawi

*Senior Environmental Officer (Legal)*

(2017-Present)

Key Duties:

- Giving legal advice on environmental law matters to governmental and non-governmental organizations in and outside Malawi;
- Drafting, amending and reviewing environmental legislation on atomic energy, waste, chemicals management, biosafety and biodiversity and other general environmental issues;
- Negotiating and drafting Mutual Agreed Terms (ABS Contracts) for Access and Benefit Sharing (ABS) under the Nagoya Protocol;
- Reviewing and processing Environmental licenses;
- Monitoring and enforcing the provisions of the Environment Management Act; and
- Ensuring compliance of Malawi commitments as a party to Basel, Rotterdam and Stockholm Conventions.

### **Ministry Of Justice And Constitutional Affairs** Lilongwe|Malawi

*Senior State Advocate*

(2015-2017)

Key Duties:

- represent the government at court and in alternative dispute forums;
- provide legal advice to all government ministries, departments and agencies;
- Organize and conduct workshops relating to good governance and rule of law; and
- Conducting legal research and preparing court documents.

## **EDUCATIONAL QUALIFICATIONS**

### **Master of Environmental and Energy Law**

Georgetown University | Washington D.C., USA

(2019)

### **Bachelor of Laws (Honours)**

University of Malawi | Zomba, Malawi

(2013)

### **Bachelor of Arts (Education)**

Mzuzu University | Mzuzu, Malawi

(2006)

CV: Dorothy Kyampaire  
P.O Box 7183  
**KAMPALA, UGANDA**  
Tel: +256772508222, 0702354560  
**E-mail Address:** *doramuhanguzi@gmail.com*

## 1. PERSONAL DATA

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**Gender:** Female  
**Nationality:** Ugandan  
**Date of Birth:** 23<sup>rd</sup> February 1978

## 2. ACADEMIC QUALIFICATIONS

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Ms. Kyampaire is a holder of a Masters in Business Administration, Eastern and Southern African Management Institute (ESAMI BUSINESS SCHOOL) from Arusha, Tanzania, Diploma in Legal Practice, Law Development Centre, P.O. Box 7117, Kampala, Uganda, and a Bachelor of Laws Degree (Honors) from Makerere University, P.O. Box 7062 Kampala, Uganda

Ms. Kyampaire has undertaken training at both national and International level in legislative drafting. Kyampaire is also an advocate of the High Court of Uganda and all subordinate Courts.

## 3. PROFESSIONAL SKILLS/EXPERTISE

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**Ms. Kyampaire** has worked as a State Attorney since 2007 in the Directorate of First Parliamentary Counsel, Ministry of Justice and Constitutional Affairs/Attorney General's Chambers. She has over time developed capacity to communicate efficiently and effectively on legal matters. She has very strong administrative, organization and excellent writing and communication skills and the ability to work in a multi-cultural and diverse environment besides working under pressure.

Lastly, **Ms. Kyampaire** is a results-oriented, team player, articulate analyst with attention to details. She has learnt to cope with heavy workload and take short time frames, take initiative, analyze situations, manage and plan her own work and take effective action in a timely manner.

## 4. RELEVANT WORK EXPERIENCE

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Ms. Kyampaire is responsible for drafting national and regional laws. This involves national laws, East African Community and Common Market for Eastern and Southern Africa laws and model laws for the African region; providing technical advice on matters of law and statutory interpretation to the Government of Uganda and its allied Institutions; liaising with Ministries and Departments of the Government in the formulation of policy proposed for implementation; providing advice and opinion on regional and international treaties and Conventions which are pertinent to national interest; assisting the legislators throughout the legislative process; vetting Ordinances and Byelaws from local governments; conducting research on proposed legislation and other pertinent matters; drafting and analyzing bilateral and multilateral legal texts; and reviewing current legislation for possible amendment and advice on national and international issues.

As an experienced Legal Expert, **Ms. Kyampaire** has worked closely with COMESA in drafting the COMESA Seed Trade Harmonised Regulations, 2015 that were later aligned to national laws of the member states. Ms. Kyampaire has worked with the Ministry of Agriculture, Animal Industry and Fisheries of Uganda as a Lead Consultant to review and revise pesticide registration and control; and the pesticides applications equipment regulations to meet the legal requirements acceptable by the Government of Uganda.

Ms. Kyampaire has worked closely with the East African Community in drafting various legal instruments for instance the East African Community pesticides regulations and guidelines, East African Community seed regulations, the East African Community Statistics Bureau Act, 2017, East African Community sanitary and phytosanitary regulations and standard operating procedures, East African Community fertilizer regulations and standard operating procedures. As such, she has excellent skills and experience in drafting laws, with the ability to prepare and finalize various legislation and documents for signature of the responsible Minister /Accounting Officer.

## 6. MEMBERSHIP TO PROFESSIONAL BODIES

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1. Uganda Law Society
2. East Africa Law Society
3. Commonwealth Association of Legislative Counsel (CALC)

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## BIOGRAPHICAL SKETCH

ERECK CHAKAUYA, PhD

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**POSITION TITLE:** Manager, AU/NEPAD Southern Africa Network for Biosciences (SANBio); CSIR Biosciences, CSIR, South Africa

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### EDUCATION/TRAINING

INSTITUTION AND LOCATION	DEGREE	Completion Date	FIELD OF STUDY
University of South Africa (UNISA)	LLB	Current	Law
University of Cambridge (UK)	PhD	05/2005	Plant Sciences
University of Pretoria	MSc	04/2011	Project Management
University of Zimbabwe	MPhil	06/2004	Crop Science, Agriculture
University of Zimbabwe	BSc	06/1999	Crop Science, Agriculture
University of Cape town	Postdoctoral	07/2006	Molecular & Cell Biology
APMG International (UK)	PRINCE2™	7/2011	Project Management practitioner

### Positions and Employment NAME:

2014 – Present Network manager, AUDA NEPAD SANBio, Pretoria  
2014 – 2014 Part-Time lecturer, Tshwane University of Technology, Pretoria  
2011 – 2014 Business Area Leader (Veterinary Biologics), CSIR Biosciences, Pretoria  
2010 – 2011 Plant Biotechnology Research group Leader, CSIR Biosciences, Pretoria  
2008 – 2010 Senior Project Manager, CSIR Biosciences, Pretoria  
2006 – 2008 Senior Research Scientist, CSIR Biosciences, Pretoria, South Africa  
2005 – 2006 Postdoctoral fellow, SAAVI, University of Cape Town, South Africa  
2002 – 2004 Postgraduate Industrial PhD attachment, Biogemma UK (Cambridge Science Park)  
1997 – 1997 Postgraduate Internship, CIMMYT-Zimbabwe,

### Honors and Awards

2018 CSIR Biosciences Excellence Award – Outstanding Contribution by a Team  
2015 CSIR Biosciences Excellence Awards – Business Development Award  
2012 CSIR Biosciences Excellence Awards – Best Publication Award  
2008 SA Bio Plan Competition 1<sup>st</sup> Prize winner (Innovation Fund-Emory University): R15.1m Investment money for GreenPharm Start-up Company  
2007 Royal Society International visiting scientist, University of Cambridge, UK  
2005 South African AIDS Vaccine Initiative (SAAVI) Post-doctoral fellowship, UCT  
2001 Frank Smart Studentship, Plant Science Department, Cambridge University  
2001 Cambridge Commonwealth Scholarship  
2001 Cambridge Philosophical Society Studentship  
2001 Sidney Sussex College Southern Africa Grant  
2001 Sidney Sussex College Research Grant  
1999 International Plant Genetic Resources Institute (IPGRI) Post-graduate Scholarship  
2001 BSc Honours (*with distinction*)  
1999 University Book Prize  
1999 Seed Company (Seed-Co) Prize for Plant Breeding and Genetics  
1996 University Book Prize

### Other Experience and Professional Memberships

South African Council for Natural Scientists (Agriculture Sciences, Reg No 400199/07)  
Fellow Cambridge Commonwealth Trust  
Fellow Sidney Sussex College, Cambridge  
Scientific Advisory Committee (AC) GMO Act (1997), DAFF,  
Proposals Panel Reviewer (Agriculture, Animal Science, Plant Sciences and Ecology) NRF – for 5 years

### **C. Contribution to Science**

Dr Chakauya works in multidisciplinary teams in Biotechnology and widely published in the area of Plant Biotechnology (Metabolic engineering, GMOs, Germplasm management), Human and Animal Health and Science Management. The **Complete List of Published Work can be found in MyBibliography:** <https://scholar.google.co.za/citations?user=9q2YmsQAAAAJ&hl=en>

### **Book Chapters**

Chakauya, E., Tangawamira, Z. & Bareetseng, S. (2019). 'How research Funding can drive the Commercialization of IK-based Technologies. The Case of SANBio', In Katerere, D.R. et al. (ed.) *Traditional & Indigenous Knowledge Systems in Modern Era*. CRC Press, pp. 17

### **Mentorship of undergraduate, graduate and medical students, and research fellows:**

Dr. Chakauya directly supervised 2 Postdoctoral fellows, 5 PhD students, 1 MSc, 4 Hons and 4 Btech interns who have all graduated. Ereck is an active external examiner with 5 Universities both in South Africa and SADC region. He continues to offer training on innovation in different capacities and train at Master-Level recruits from Universities and research institutions across Africa for one month and continues to support them in their research projects through conference presentations and publications.

### **D. Selected Research Funding**

1. **€330 000** Southern Africa Innovation Support Program (SAIS) – Tech Tribe Accelerator Project, (2019-2020)
2. **R9,5 million** DST-NRF Centers of Excellence Support Grant, (2017-2019)
3. **£40 000** – EPSRC (Oxford University), 2018 Zimbabwe Lab Hackathon. 2018
4. **€7.2 million** (~R116.5 million) as Interim NEPAD-SANBio Secretariat towards BioFISA Phase 2 (Health and Nutrition) Program of SANBio Business Plan, Dec 2014-2019
5. **R12.5 million** (Awarded) – RSA Department of Science and Technology SANBio Support
6. **R70 000 (Awarded)** - NRF KIC Scientific Grants/Travel Grants – to Conduct SANBio Business Plan Validation Workshop, 14&15 Nov 2013
7. **R80 000 (Awarded)** – DST contribution towards SANBio Business Plan Validation Workshop, 14 Nov 2013

### **D. Research Consortia & networks**

- a) SANBio has initiated study of the Boston Science Ecosystem (MIT, Harvard etc) to catalyse the transitioning research results from African Science networks to impact quicker and faster
- b) SLUSH Helsinki – SANBio has supported more than 30 scientific visits to the world's biggest entrepreneurial fair in Finland and established long-term relationships
- c) Spark Global (translational scientists without borders) – SPARK is a grassroots volunteer and not-for-profit organization focusing on improving the flow of biomedical innovation from academe to patients; it is an organization in flux, rapidly moving from a loose collection of local programs to a professionally-managed global organization. <https://med.stanford.edu/sparkmed/spark-global.html>.
- d) Science Granting Councils initiative (SGCI) – Project of 18 science granting institutions from the African continent working on improving science research programme design and impact. This is funded by NRF (RSA), DFID and IDRC
- e) Southern Africa Innovation Summit (SAIS)
- f) SANBio has initiated and grown the Student Ambassador scheme to help communicate science to youth

## APPENDIX 6: LETTERS OF COOPERATION/SUPPORT

Letter of cooperation/support from the following institutions are attached:

- CropLife Africa and Middle East
- Department of Agriculture, Land Reform and Rural Development, South Africa
- The African Agricultural Technology Foundation
- The Agricultural Association of Kenya
- The Asia Pacific Association of Agricultural Research Institutions
- The Citrus Growers Association of South Africa
- The Council for Scientific and Industrial Research, South Africa
- The Economic Community of West African States
- The IITA Aflasafe project
- The International Centre for Genetic Engineering and Biotechnology (*implementing partner*)
- The IR-4 project, Rutgers University
- The Kenya Plant Health Inspectorate Service, Kenya
- The Ministry of Agriculture and Food Security, Mozambique
- The Ministry of Lands, Agriculture, Water and Rural Settlement, Zimbabwe
- The South Africa Bioproducts Organisation
- The South African Network for Biosciences
- The Southern Africa Pesticides Regulators Forum<sup>47</sup>
- The ToothPick project, University of Kwazulu-Natal, South Africa
- The Tropical Pesticides Research Institute,<sup>48</sup> Tanzania
- The United States Department of Agriculture
- The Zambia Environmental Management Agency, Zambia

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<sup>47</sup> Botswana is the Chair of SAPReF and no separate country letter has been provided.

<sup>48</sup> TPRI is the government entity responsible for the regulation of (bio)pesticides in Tanzania.