STDF | STANDARDS *and* TRADE DEVELOPMENT FACILITY

STDF PROJECT GRANT APPLICATION FORM

Project Title	**Reducing Latin American pesticide residue through biopesticides and other integrated pest control options to boost agricultural trade**
Objective	Promote the use of biopesticides and other integrated pest control options on export crops in Latin America and the Caribbean to improve compliance with pesticide MRLs and facilitate agricultural trade.
Budget requested from STDF	USD $900,473
Total project budget	Total project budget with partners in-kind contributions = USD $ $1,839,373
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I. BACKGROUND & RATIONALE

1. Relevance for the STDF

Latin American (LATAM) countries account for about a quarter of global exports in agricultural and fisheries products, especially for fruit and vegetable crops (OECD-FAO, Agricultural Outlook, 2019-2028). In addition to food security, the exports of agricultural crops in LATAM countries provide significant rural economic opportunities, especially to small and medium farmers. To maintain or increase the economic sustainability of agricultural production, LATAM farmers must protect their crops from agricultural pest damage by implementing integrated pest management (IPM) strategies and using pesticide chemicals judiciously. However, the use of pesticides in crop protection programs can leave residues on food crops and increasing international restrictions on pesticide residue standards are becoming a serious challenge to LATAM farmers and creating potential barriers to market access and agricultural trade.

A Project entitled "Strengthening Capacity in Latin America to meet Pesticide Export Requirements" (STDF/PG/436) was completed in November 2016. It was implemented by USDA and IR-4 in collaboration with the IICA Secretariat in 2010 with the aim to enhance capacity of some LATAM countries to meet pesticide-related export requirements based on international (Codex) standards in order to improve market access of their agricultural commodities. As a result, several countries increased their capacities, showed leadership and ended up establishing Codex standards for selected pesticides in tropical crops. A follow up of that initiative is being supported by the Minor Use Foundation (MUF), with new countries participating in magnitude of residues being trained by participants that were prepared and excelled in the STDF/PG/436 project.

This new proposed project as a complement aims to build on the results in capacity building and advance with new countries looking for strategies to further mitigate residue pesticides based on the lessons learned. This current proposal allows to take advantage of the knowledge acquired in the STDF/PG/436 project and adapts the present needs and conditions of looking for biological alternatives for pest control in order to overcome commercial barriers linked to maximum residue limits. The project will strengthen capacities in more countries and promote horizontal cooperation to improve the productive and commercial conditions of producers. Since it works with minor crops, the project focuses its benefits a lot on small and medium producers, which improves the living conditions of the vulnerable rural population.

From the evaluation done in the PG/436 we made sure to include their recommendations
Strengthening capacity to meet pesticide export requirements | Standards and Trade Development Facility (standardsfacility.org)
including to scale up partnerships to add more countries and enable new participants to benefit from studies, allow countries' greater involvement in pesticide and crop selection, increase the budget in order to be able to visit remote experimental stations or plots for research, work towards harmonized

registration and if the project is approved, we will make sure to carefully select the team and work toward establish regional technical group through the minor use foundation.

The proposed project was formulated through STDF/PPG/753 under which the following activities have been conducted:

- Identification of priority crop export concerns for the participating LATAM countries and the conventional pesticides causing trade irritants.
- Identification of the key target pests in the last control application that have been the source of trade irritants for the priority export crops.
- Consultations with international experts, agricultural research organizations, and industry on the commercial availability of biopesticides and other IPM control tools to manage the selected late season pests.
- Literature search on IPM mitigation strategies, decline curves/persistence of residues, pre-harvest intervals (PHIs), retreatment intervals, and extrapolation from pesticide products with residue trial data.
- Co-participation and technical exchanges with comparable STDF projects being implemented in Southern Africa and Southeast Asia.

The main purpose of this project will be to mitigate pesticide residues on export food crops and facilitate agricultural trade through compliance with trade standards, and by identifying and promoting the use of non-residue-generating biopesticides and other integrated pest management strategies to control key pests especially at the end of the crop growing period (the period when pesticides mostly contribute to residues at the time of harvest).

It is in line with STDF'S strategy to increase and sustain SPS capacity in developing countries based on countries synergies and collaboration, with training and development of good practices at regional level. This project will apply a similar cross-cutting approach that is being implemented in STDF projects conducted in Southeast Asia and Southern Africa with similar agricultural pest control challenges and conditions as in Latin America.

This approach will be based on a scientific rationale towards meeting Sanitary and Phytosanitary (SPS) standards in export destination markets, implementation of effective and problem-solving integrated pest management options, and development of technical regulatory capacity in the LATAM region.

This project will draw upon cooperation by participating countries, pest control expertise and experience from international experts, international and national agricultural research institutions, and other stakeholder organizations.

The SPS standards that will be addressed include the regulations established in export markets (MRLs) and compliance with internationally accepted MRLs in the Codex Alimentarius, in addition, the generation of regulations that facilitate the use of biological alternatives for pest control will be promoted. Therefore, work will be done on compliance with existing regulations, on the promotion of new standards based on science and trade facilitators, and on the improvement of national and regional regulatory frameworks.

In this project, IPM will be the standard practice for reducing the reliance on conventional chemical pesticides for pest control prior to harvesting selected crops. Biopesticides will be the main tool for mitigating residue problems caused by chemical pesticide on exported LATAM crops. Economically damaging pests at the end of the crop season are the target of conventional chemical pesticide

applications. Therefore, the selection of priority crop/pest/pesticide combinations in the LATAM region will be based on the chemical residues that mostly impact international trade.

As one of its first steps, the project will develop decline residue data and better understand how the timing of IPM control practices and end of season pesticide applications will impact the expected residues. Additionally, all available IPM strategies will be utilized to determine how to best avoid pesticide residue trade issues, including data generation, testing of less toxic pesticides available, literature review and validation and efficacy trials to support registration of both biopesticides and new pesticides to be available for growers of the LATAM region.

As part of the sustainability strategy for technical capacity within the LATAM region, the project will also develop and jointly establish with partners a regional training Regional Training Center to increase knowledge and experience working on pesticide residue trials under international standards for Good Laboratory Practices (GLP). This Center that is being established, through an agreement between IICA and USDA and financial support by the MUF, will be located in a strategic spot in Latin America and will develop both theoretical and practical learning opportunities to be accessed by all LATAM countries and will offer training during the implementation of the project. The center will continue to conduct training activities through support by MUF and others.

In addition to pesticide residue mitigation and building regulatory capacity in MRLs, the project will coordinate efforts with other regional projects being implemented in the Central American and Andean regions, including projects led by IICA with the Foreign Agricultural Service of the U.S. Department of Agriculture (USDA/FAS). This IICA-USDA/FAS project is advancing the modernization of the regulatory frameworks for the registration of conventional pesticides and biopesticides and its harmonization and with the regional projects being executed in Africa and Asia with the STDF. See appendix 8: Summary of the IICA / USDA project.

The evaluator of the PG/436 (Strengthening capacity to meet pesticide export requirements / https://www.standardsfacility.org/es/PG-436), Erica Spears, provided a series of recommendations that are pertinent to take into account in the implementation of this Project.

Visualize at an early stage the expansion of alliances to add more countries and allow new countries to benefit from the studies, the participation of countries in the selection of pesticides and crops, increase the budget in order to be able to visit remote experimental stations or plots for research, work towards harmonized registration and if the project is approved. We will make sure to carefully select the team and work toward establish regional technical group through the minor use foundation.

Other projects such as “INNOVA” https://cordis.europa.eu/project/id/324416/ reporting and “From microbial interactions to new-concept biopesticides and biofertilizers” https://cordis.europa.eu/project/id/722642 funded by the EU were found to have similar goals and objectives, and the project is interested to have access to experiences exchange and activate synergies in areas of research and adapt new technologies using biopesticides for pest control for that, representatives for each of the projects mentioned were contacted, and a response is awaited that allows the start of a fluid interaction that allows identifying good practices, successful experiences or other elements that can be considered or adapted to this project.

The main aim of this proposal (INNOVA) was to reach a better integration between public research and private sector by a close collaboration specifically oriented to industrial and social needs. Their strategy was to select biopesticides from scratch and start doing different evaluations until registration. Our strategy started with already developed biopesticides.

Main objectives of the INTERFUTURE project are i) to bridge the gap between the most recent discoveries of science and the industrial development of products by the creation of multidisciplinary and inter-sectoral doctorate programs, ii) to train early stage researchers through an industrial doctoral program that integrates academic research with product development in EU companies with a strong curriculum in development and innovation and iii) to explore new approaches and to identify new cutting edge solutions for pathogen and insect control and for crop fertilization based on natural tools that will be developed by a strict collaboration of academic and industrial partners. Main focus is to understand interactions between microorganisms and plants.

Project representatives may be invited to selected workshops and to share their experiences with the steering committee to make presentations of the results obtained, share good practices and receive comments on the plans and proposals of this project.

2. SPS context and specific issue/problem to be addressed

Under the World Trade Organization/Sanitary and PhytoSanitary (WHO/SPS) Agreement, Codex Alimentarius is the globally recognized body responsible for setting food safety standards to facilitate international trade in foods. WTO Members are encouraged to harmonize or base their national food safety standards on international standards, guidelines and recommendations developed by Codex. As an outstanding agenda item in the Codex Committee on Pesticides Residues (CCPR), specialty or minor use crops have been a major priority to most LATAM countries because of the high value and niche export markets in North America, Asia and the European Union. Among the specialty or minor use crops considered by the CCPR, tropical fruit and vegetable crops dominate LATAM exports, and a survey of farming practices across the region shows that the rural farming communities rely on tropical fruits and vegetable crops as their primary source of income. If producers are unable to meet export market requirements, market access is impeded, resulting in losses in farm income and rural development. Hence, ensuring market access and building capacity are critical to achieving poverty alleviation in rural regions. In terms of international standards, there are still no Codex MRLs for many of the tropical fruits and specialty or minor use crops[1] exported from LATAM. This is largely because of lack of economic incentives by pesticide registrants to generate the residue data needed to establish Codex MRLs. As a result, governments are establishing "specialty or minor use" programs to help fill these data gaps and take a more active role in identifying, registering, and setting pesticide MRL trade standards to support their agricultural sectors; however, this initiative has not materialized in the majority of LATAM countries. Building the capacity of developing countries to actively generate mitigation strategies such as residue data generation, adoption of biopesticides use and access to newer lower toxicity pest control tools are important priorities for the region.

Over the past several years, some LATAM countries have participated in pesticide-related training programs led by the USDA, IICA, the U.S. Environmental Protection Agency, the United Nations Food and Agricultural Organization (FAO), CropLife Latin America, the International Agency for Atomic Energy (IAEA), and other international organizations. Many LATAM countries are now demonstrating a better understanding of the process of pesticide MRL establishment and assessment of the potential risk from dietary intake of pesticide residues. The project will now support LATAM countries in working towards implementing concrete actions to address specific barriers to expanding agricultural trade.

The project will address and resolve specific trade problems caused by missing or restrictive low MRLs in LATAM priority specialty or minor use crops by implementing an alternative approach to pesticide

[1] Crops grown on a small scale (minor crops) and often are high value specialty crops. OECD https://www.oecd.org/chemicalsafety/pesticides-biocides/minoruses.htm.

residue mitigation. Agricultural economies in Latin America face increasing challenges in conforming to pesticide MRLs, either because these MRLs are not established ('missing') or because these MRLs are too low to reasonably comply with real-world pest control needs and use patterns by farmers. There are several reasons why pesticide MRLs may be missing in a destination export market. For example, the destination export market for a crop may not have established a pesticide MRL or may not have adopted the existing Codex MRL for the particular export crop. Agricultural producers may also consider the pesticide MRLs to be too low or restrictive in destination markets affecting their ability to control pests in their crops.

Trade obstacles and calls for collaborative action have been highlighted at the 3rd Global Minor Use Summit (2017) https://www.gmup.org/, the WTO/SPS Committee (2018) https://www.wto.org/english/tratop_e/sps_e/sps_major_decisions18_e.pdf, the 11th Session of the WTO Ministerial Conference (2017) https://www.wto.org/english/thewto_e/minist_e/mc11_e/mc11_e.htm#:~:text=The%20Eleventh%20Ministerial%20Conference%20(MC11,Minister%20Susana%20Malcorra%20of%20Argentina, and most recently at the Conference of Ministers of Agriculture of the Americas Inter-American Board of Agriculture (2019) https://iica.int/en/press/news/western-hemisphere-ag-leaders-unite-support-science-based-standards. These international conferences recognized that the foundation of working toward aligned pesticide MRLs and providing critical pest control tools for farmers originate with strong and coordinated national pesticide registration systems. Furthermore, these coordinated programs are most effective if conducted through existing economic and technical mechanisms on a regional level.

SPS priorities or issues identified

The globalization of the food supply affords vast trade opportunities to many countries that rely on imports for their food security and food diversity. Increasingly, governments worldwide are moving toward implementing risk-based approaches to food safety management that requires all operators in the supply chain to share responsibility for food safety and apply measures to reduce food safety hazards. In addition, importing countries are setting increasingly restrictive pesticide MRLs, or removing pesticide MRLs, including those for many of the tropical and sub-tropical fruits and vegetables produced in Latin America. This represents a significant barrier to market access for LATAM farmers of these minor or specialty crops.

The impacts from missing or too low pesticide MRLs plus the policies to minimize food safety hazards can vary by country and may be particularly problematic to LATAM farmers of specialty and minor use crops. LATAM farmers in tropical and sub-tropical countries typically face greater pest pressure and may have fewer resources available for addressing these challenges. In addition, the shifting climate patterns are also changing pest pressure and allowing agricultural pests to increase its incidence and affect new growing areas.

Most biopesticides by their nature are not subject to pesticide MRLs, and the potential residues are therefore not subject to regulatory enforcement by importing countries. It is anticipated that the primary type of biopesticide to be utilized in residue mitigation would be microbial products used as the last control application before harvest and allow residues of many conventional pesticides a longer period for degradation. In addition to developing a framework for conducting coordinated studies, the project will facilitate the integration of biopesticides and other integrated pest management options as a good agricultural practice on tropical crops.

To avoid the risk of transporting pests through trade, scouting would be done weekly and the research that show presence of pests even after combination of chemical and biological pesticides would not be recommended to growers.

The project will address the aforementioned challenges through the following activities:

- Facilitate the registration, access, and use of biopesticides and IPM strategies to mitigate residues of conventional chemical pesticides which is a unique way to facilitate compliance with MRL requirements in export market destinations.
- Overcome obstacles to export (and regulated domestic) markets access due to the absence or very low corresponding pesticide trade standards for specialty crops (fruits and vegetables) and other tropical crops of importance to Latin America.
- Increase technical expertise concerning residue analysis and monitoring in laboratories as well as a better understanding of residue decline over time.
- Build a sustainable and harmonized process for regional data generation required for the registration of biopesticides for LATAM priority and minor use crops in order to comply with Good Agricultural Practices.
- Develop a grower outreach program to promote the use of biopesticides in export promotion programs and domestic markets, based on scientific generated data.
- Create a regional network for data generation and IPM applied to crops of common interests.
- Reduce gaps between countries in the same region, in the regulatory field, institutional procedures and commercial opportunities by promoting regional collaboration and cooperation.
- Establish a Regional training Center for increasing technical knowledge and expertise in planning and conducting pesticide field and lab residue trials.

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

The use of biopesticides is expanding rapidly worldwide. According to the report by Dunham-Trimmer and Markets 2019, the global biocontrol market is estimated at US$3.0 billion in 2018 and will continue growing to over US$11 billion in 2025. Latin America is growing at a fast rate (about 18%) and will overtake Asia as third largest region in the world market by 2025. Bautista et al 2018[2] showed that in Latin America the production of Bt, a toxin produced by *Bacillus thuringiensis* that has been widely used in biocontrol, and other fungal biopesticides constitute the majority of biopesticide marketed with 40% and 48% respectively. However, production is made with low technology and high manual labor and most of the time by the very same producers. The same review shows that most publications concentrate in biopesticides selection and low technology development.

The United Nations has estimated a one-third increase in the world's population by the year 2050; therefore, food production will have to be increased by 70 percent requiring the need to improve agricultural production systems in an efficient, sustainable and productive way. The intensification of agriculture to achieve greater food production must be aligned with IPM practices, in which it becomes key to learn to use pesticides in an astute and responsible way. This trend generates a series of challenges for the LATAM region, and this can lead to the implementation of mitigation plans for pesticide residues under IPM control options to achieve an intelligent use of pesticides.

The project also addresses a second sustainable development objective to ensure access to safe and nutritious food for all to alleviate hunger and promote an agricultural production that respects nature.

[2] http://wrir4.ucdavis.edu/events/2017_SLR_Meeting/Presentations/GeneralPresentations/1%20Trimmer%20-%20Global%20Biocontrol%20Market%202017.pdf

In turn, it responds to the strategic development policies and plans of the participating countries, as summarized in the Annex 7.

4. Past, ongoing or planned programs and projects

A Project titled "Strengthening Capacity in Latin America to meet Pesticide Export Requirements" (STDF/PG/436) was completed in November 2016. It was implemented by USDA in collaboration with the IICA Secretariat in 2010 with the aim to enhance capacity of some LATAM countries to meet pesticide-related export requirements based on international (Codex) standards in order to improve market access of their agricultural commodities.

Under this project led by the U.S. Inter-Regional Program No. 4 (IR-4), pesticide residue studies were carried out on avocado, pineapple and banana after conducting a series of trainings and planning sessions. Field trials and laboratory analysis work was completed for all studies under the project. The project helped LATAM countries by providing theoretical and practical experiences in conducting field trials, laboratory analysis by exposure to practice, techniques and expertise of Good Laboratory Practices (GLP) studies. It improved the capability of Latin American countries to generate quality data for establishing an MRL based on international guidelines (e.g., OECD-GLP, EPA-GLP, FAO Manual (2009). LATAM scientists networked to learn and share experiences on the coordination of work and capacity building efforts, between government regulatory officials, laboratory, and field technicians, as well as pesticides industries. Most importantly, the Joint Meeting on Pesticide Residues (JMPR) reviewed and recommended establishment of new Codex MRLs based on the data generated from this project, and Codex MRLs for spinetoram/avocado and pyriproxyfen/banana were established in 2018 and 2019, respectively.

There is growing investment of major multinational companies in biopesticide research. CropLife Latin America and national pesticide industry organizations have the infrastructure needed to facilitate outreach within the farmer community and to advocate for good regulatory principles among the government co-operators that will be involved in this project. The status of biocontrol registration has been reviewed by Ceballos in 2016[3]. Almost all LATAM countries have legislation with different levels of development as well as with different objectives and scope. A need for harmonization is recommended to stay aligned with Good Regulatory Practices.

The countries of the Central American region have two technical regulations: RTCA 65.05.62.11 Botanical Pesticides for Agricultural Use. Requirements for Registration and RTCA 65.05.61.11 Microbial Pesticides for Agricultural Use. Requirements for, both regulations constitute the normative base and mandatory compliance for countries, however, their characteristics are very close to the requirements of chemical pesticides, which constitutes a disincentive for their manufacture, registration and eventual marketability. All Andean countries have national regulations on biopesticides, however there is still no harmonized regional regulation in this field. The two countries with the most advanced biopesticide regulations are Colombia and Argentina.

There are several initiatives in the LATAM region that are promoting the use of biopesticide use and safer pest control strategies. An IICA-USDA/FAS Project started in 2019 for the Central American region and in 2020 for the Andean region that is promoting modern, harmonized and scientifically supported regulatory frameworks for biopesticides by the end of 2024. This joint project is currently laying the foundation for biopesticides to have adequate regulatory requirements to promote the production, use and commercialization of these products, thus becoming environmentally and

[3] https://www.researchgate.net/publication/309348281_ARTIULO_RE}SENA_Registro_sanitario_de_bioplaguicidas_microbianos_en_America_Latina_y_Cuba_Caso_de_estudio_bionematicida_cubano_KlamiCR

economically viable phytosanitary solutions for producers. In both regions, this project works with regional integration forums (the Central American Agricultural and Regional Integration Councils and the Andean Community of Nations), and once the regulatory process is completed, it will be mandatory for the countries to its adoption.

During the Global Minor Use Summit 3 in Canada, there was agreement on the need for Harmonization of Exemptions from MRL, focused on biopesticides. IR-4 in cooperation with the European Union Minor Uses Coordination Facility, part of the EPPO secretariat, is leading the effort to extend the recognition of exemptions from MRLs. This project is learning from and cooperated with the existing STDF project PG/634 in Asia and PG/694 in Southern Africa that have shown significant advances, where members from this proposal are attending virtual meetings and field and laboratory trainings. From these experiences and based on the many changes done due to Covid-19, aspects from organization, prioritization, strategy, and objectives learned from the other projects will be followed.

A strategy for expanding the acceptance or recognition of MRL exemptions for biopesticides was recommended by the United States and Chile on international biopesticide regulatory harmonization that is being done through the Codex Committee on Pesticide Residues (CCPR). IICA, through its project on capacity building for the Codex Committee for Latin America (CCLAC) in Codex Alimentarius, will be able to support the link between the countries and the result of the Codex-CCPR process in bio-pesticides. Additionally, it will be able to support the coordination between the project countries and the coordination of the CCLAC (Ecuador) to establish training processes, implementation and follow-up of the project results in CCPR. This was identified as one of the priorities to promote international harmonization of products that are of extremely low toxicity, where many countries do not set MRL standards.

In addition, OECD and Chile is continuing efforts with IR-4 involved. This focuses on recognizing existing biopesticides and to develop a method for recognizing the exemption from MRLs across multiple regulatory authorities to avoid residue issues. We will be sure that the biopesticides we utilize in this project are ones that fit the criteria for mutual recognition of exemptions from MRLs. Participating countries will meet the quarantine requirements and phytosanitary measures of the exporting countries. Additionally, in response to the concern about the possibility or risks that crops treated with biopesticides accidentally introduce plant pests through trade, during all project implementation activities, the Standards for Phytosanitary Measures #11 will be taken into account, #3 and #40, and any others that may be related.

5. Public-public or public-private cooperation

Based on the previous STDF-funded project (Latin America Pesticide Residue Data Generation), industry through CropLife Latin America provided technical expertise, products, and analytical standards used for the analysis of the residues. Similar contributions will be available for this project as well. National agricultural institutions also contributed with funding in the studies. Wherever possible, this project will explore all opportunities to join other meetings organized by supporters of this PG such as CropLife or Biopesticide manufacturers to increase interaction and decrease meeting costs.

Regarding how to ensure the participation of the different actors involved in the project, the first thing that is recognized is that each country has its own characteristics, which lead us to think that developing "National Public-Private Coordination Committees" in each country may be more efficient. What this means is that the country's own actors are the ones who must maintain permanent communication and provide feedback to the central management of the project with strategic inputs necessary for decision-making.

Recognizing that each country has its own characteristics, the project will ensure that:

i) National Public-Private Coordination Committees in each country will conduct internal coordination to be done in person or resort to virtual or hybrid coordination.
ii) Organized groups from the private sector, both agricultural producers and producers of phytosanitary solutions, will participate in the internal teams.
iii) National Public-Private Coordination Committees will be part of the Steering Committee that will manage and coordinate all aspects of the project.

These aspects, among others, lead us to think about the need to have a simple but efficient mechanism that provides feedback to the central coordination of the project and for this purpose the creation of an internal project management group is proposed.

The National Public-Private Coordination Committees. will be coordinated by the country's focal point(s) for the project and a delegate from the IICA office in the country. They will keep the central coordination of the project informed about the management of the project in the country. More detailed information about this committee can be found in annex #9.

Local registrants (manufacturers of biopesticides) were consulted during the preparation of this proposal so that the selected biopesticides are utilized appropriately in terms of application and economics. Local registrants have pledged to provide biopesticide standards to test, as in-kind contributions (see letters of support).

USDA, IR-4 and the Minor Use Foundation are committed to give in-kind support for this project by providing time to help design and direct the plans and give guidance along with FAO experts. Several partners were approached to support the project grant either in-kind or financially, including National authorities and private sector including biopesticide manufacturers. Guidelines set forth by STDF were followed for obtaining matching funds depending on the degree of development of the countries involved in the full proposal. FAO contributed to ensure that that the resulting project complements existing efforts of FAO. CropLife Latin America was also be consulted about the need to harmonize pesticide registration and biopesticides, across LATAM countries to support regional and world trade.

Learning from the STDF/PG/436 and following the recommendations to scale up partnerships, new countries were added in this project (Nicaragua, El Salvador, Honduras, Ecuador, Perú, Argentina, Paraguay, Dominican Republic) where the study teams will be carefully selected to ensure commitment and trust working towards establishing a regional technical discussion group.

A larger, primary goal of this project would be to ensure its sustainability by securing long-term financial commitments from these various organizations. This in turn, would continually establish crop/pesticide priority lists and assist local registrations and data generation to establish trade standards, in coordination of the work by the Minor Use Foundation’s Global Priorities Workshops. The success of this project may provide significant incentives for a long-term program to be established through partnerships between the public and private sectors.

6. Ownership and stakeholder commitment

As part of South-South cooperation, four representative areas including Central America, Andean region, the South Cone and the Caribbean will participate in the implementation of this project. In each of the mainland regions there would be a leading country (Costa Rica, Colombia and Argentina) that will help plan and guide. Nicaragua, Guatemala, Honduras and El Salvador (lower middle income)

in Central America and Bolivia (lower middle income), Ecuador and Peru (upper middle income) in the Andean region and Paraguay (upper middle income) in the south region. Dominican Republic (upper middle income) will be included and could be supported by any of the leading countries. This aims to develop a framework for conducting coordinated studies to mitigate conventional pesticide residues through the incorporation of biopesticides into national IPM programs. As leading countries may be progressed in policy fields (such as biopesticide registration), advances in the development and use of biopesticides, and experiences within the framework of associativity, they will be able to be incorporated into training and transferring processes, such as virtual experience-sharing events, specific virtual trainings, or participation as experts in the training to be developed at the academy. Universities from leading countries were identified, University of Costa Rica, University of Buenos Aires and National University in Costa Rica, Argentina and Colombia respectively. Different colleges and departments within each one will participate in the project and attend preparation in a way to maintain sustainability with new students and participants in their own countries when they replicate the training and include the topic in courses.

Some of these countries previously participated in the STDF residue project (STDF/PG/436) that helped establish national study teams in selected LATAM countries. They will be utilized to further this work on pesticide residue mitigation[4]. These national study teams along with others were invited to be part of this project grant proposal and also participated during preparations for the global minor use foundation workshop https://minorusefoundation.org/events/gmup-workshop-2020/, which helped established a base in terms of countries' communications, platforms for meetings, countries and regional needs and biopesticides research, availability and products. Additionally, several Latin American countries are currently implementing another round of trials with priorities identified in the Minor Crops Foundation.

Considering that the four participating regions have different crops that could result in different or overlapping priorities, during the PPG implementation two virtual meetings were held to discuss and select priorities where regional leaders and IR-4, IICA and MUF consultants participated. Results from these meetings were collected and processed and presented to biopesticide producers to get possible solutions from them. As a result, a list of priorities of crop/pest/pesticide/biopesticide were selected. These results were presented to potential partners, private sector, national and international organizations, donors to get interest and support. Before drafting the final document, a final workshop was held with participants for its validation and final discussion.

The PPG's Steering Committee was comprised by IR-4, IICA, MUF, and representatives from the leading countries in each of sub regions, FAO (Regional Office for Latin America and the Caribbean). In addition, representatives of the STDF Southeast and South African Projects on residue mitigation and regulatory harmonization were invited to participate to ensure cross fertilization and learn from each other's success and challenges. This was also an opportunity to understand trade in a cross-cultural forum. The Steering Committee helped incorporate good practices of coordination, prospecting, and strategy throughout the entire process since it is seen as the managing and coordinating body.

It is expected that the combination of the strengths of each organization that participates in the Project's Steering Committee will generate a tangible benefit to the project. IR-4's and MUF´s experience in field and laboratory work, institutional presence and participation in regional forums that IICA has, and FAO's experience in Integrated Pest Management will help to comprehensively recommend a set of good practices for the implementation of the project grant proposal.

[4] Colombia, Guatemala, Costa Rica, Panama and Bolivia participated.

FAO's participation with its regional offices in Chile will allow consultations with its experts on what they have determined to be the best IPM practices for Latin America. Using IPM as standard practice, we selected with FAO which crop residue situations we intend to focus on.

The project will call upon expert knowledge of minor use research by IR-4, USDA, MUF and technical country experts. This will involve the selection of field trial locations, crops/pesticides/biopesticides, development of trial protocols to demonstrate biopesticide efficacy, and coordinating efforts for data reports and utilization. The project will aim to demonstrate efficacy of biopesticides and to promote their use through increased commercialization and registration and thus availability to producers.

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

7. Project Goal / Impact

Improved compliance in participating LATAM countries with pesticide MRLs of Codex and ensuring growers access to important export markets is the main impact expected from this project. This project will develop a process for identifying and prioritizing pesticide residue trade barriers, then establishing a methodology for mitigating those barriers, coordinated regionally and globally for twelve countries in Latin America. The overall impact also includes improved human and environmental health (reducing risk to consumers, pesticide applicators, and the environment). In summary, this project will contribute to the higher development goals of poverty reduction and economic growth, with technical capacity building delivery as a means to achieve these higher-level development goals.

8. Target Beneficiaries

Four sub-regions within LATAM will participate, as follows:

Caribbean:	**Dominican Republic**
Central America:	**Costa Rica, Nicaragua, Guatemala, Honduras, El Salvador**
Andean:	**Colombia, Bolivia, Ecuador, Peru**
South Cone:	**Argentina, Paraguay**

The primary beneficiaries of the project will be national pesticide regulatory authorities, farmers, industry associations, agri-food export companies, and domestic consumers in all countries participating especially in the lower middle-income countries according to the OECD DAC list of ODA Recipients (Bolivia, Nicaragua, El Salvador and Honduras) https://www.oecd.org/dac/financing-sustainable-development/development-finance-standards/daclist.htm. Specific benefits include increased availability of IPM tools for farmers to better protect crops and mitigate pest resistance; increased worker, environmental, and consumer safety by reducing residues and increased economic output by accessing lucrative international markets.

A risk and cost-benefits analysis will be determined to quantify the benefits of this project on trade. For the residue data that is generated, the relationship between time and the decline in residues will be calculated.

Therefore, it will be possible to calculate how this project is impacting the percent of the 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 increase crop damage from pests will also be considered based on the ability of the biopesticide to maintain effective pest management.

(a) Gender-related issues

The project seeks alternative phytosanitary solutions to help farmers improve access to international markets and implement strategies that allow achieving gender equity and empowerment. Addressing gender inequalities and reducing the gaps that rural women face through policies, programs or projects requires knowledge of the daily experience rural women face as producers, members of peasant or union organizations or as members of a family farm. This gender situation will not be ignored by the project and it will implement can apply certain actions to ensure the transfer of the benefits of the project towards gender equality.

According to IICA, Latin America and the Caribbean (LAC) has 58 million rural women, 17 million are registered as economically active and only 4.5 million are considered as agricultural producers. Despite the fact that many rural women are agricultural producers, exporters and leaders of mixed organizations, still they may be considered as “the producer's wife” or an “assistant”; in other words, they continue to be placed in a subordinate role. Important efforts have been made to improve the participation, visibility and highlight the contribution of rural women in agricultural production.
In a farm setting, rural women play a fundamental role in the home, but also have a high level of involvement in productive tasks. According to ECLAC, the food security of many rural households in Central America and Mexico depends on them. The project will ensure that these efforts will be implemented towards enhancing gender equality.

The project will address many crops that have very diverse productive characteristics and, therefore, the opportunities presented to the project are also diverse. For example, the production of snow peas in the Guatemalan highlands is concentrated in small indigenous producers, in many cases with high participation of women in some agricultural tasks, but this is also the case of bananas, where we find a significant concentration of large-scale companies and entrepreneurs. Each crop that is addressed in the project will have particular conditions to be approached from a gender point of view.

Another facet of the project working in gender equality will involve the participation of women as scientists as trainers and the generation of field and analytical tests. The gender approach is not simply about adding a female or gender equity component to project activities, or about increasing women's participation, but about incorporating the experience, knowledge, interests and needs of women in the project. In the project implementation, gender will be tackled in the productive and technical-scientific field.

In order to achieve this objective of a gendered approach, the project will not carry out specific or special activities aimed at women (there is no specific financial resource for this), but it will work to reach two specific areas of intervention: i) rural women and producers of the crops in which it will intervene, and, ii) scientific/technical women who will be able to actively participate in training, field trials or studies and extension processes .

In chapter 5 of the project, the extension actions will include those producer´s organizations that include women producers among their associates, in order to ensure that the transfer or extension of the knowledge developed reaches rural women.

For them, it will be investigated if the extension institutions with which they will work have mapped the organizational profile of the producers with whom they will have to work, and it will be

investigated if in the countries that participate in the project, their ministries of agriculture have offices, or responsible of the gender issue, so that they can contribute or complement the process. This does not require specific actions, since the work to be carried out with these organizations can include this topic as an additional element of discussion and analysis.
The project will also monitor and quantify the relationship of the scientific/technical woman who will participate in the implementation of the project, and will make it possible to estimate the gender relationship in the research and extension processes.

Through the measurement of participation in all the forums and extension processes, it will be possible to measure the relationship generated in both fields of intervention.

IICA's Directorate for Gender and Youth will advise the project in order to implement appropriate measurement and follow-up strategies for the gender issue.

Measurement indicators will be implemented such as:
i) Assessment of the gender relationship in all the activities carried out by the project.
ii) Assessment of the gender relationship of the associations or organized groups of farmers with whom they work and interact.
iii) Assessment of the gender relationship in the national technical-scientific work teams that participate in the implementation of the project.

The increase in the participation of women in the labor market could increase the productivity of countries, which would increase the diversification of the economy, innovation and fight against poverty. Trade can fuel this economic growth by supporting the empowerment of women and promoting gender equality. This expanded objective is supported by the project's gender objectives, in the sense of involving women in the project's intervention spaces and providing women producers with more and better production tools.

Intervention modalities:

In the productive sphere, women in rural areas have the worst rates of employment and access to basic services, and they predominate in low-quality and low-paid informal jobs. If they had the same access to productive resources as rural men, their crop yields would increase between 20% and 30%, with a reduction in hunger of between 12% and 17%. The project will generate a greater quantity of phytosanitary, efficient and environmentally more suitable solutions. Getting these new options to the right places and promoting them in the right way could help bring these new technological options closer to both male and female agricultural producers in an equitable way.

From a global point of view, the World Economic Forum estimates that, if the gender gap closes, the world's gross domestic product (GDP) could rise by 25%, which is equivalent to about USD 5.3 billion, so improving an economy with equity of opportunity ensures growth and greater equity. In the technical-scientific field, the project will promote the reduction of the gender gap with respect to the knowledge transferred.

9. Project objectives, priority crop/pest/pesticide cases, outputs and activities (including logical framework and work plan)

Project Objectives

Consistent with the logical framework of this project (Appendix 1), the objective of this project will be "Increased regional collaboration and capacity to generate and evaluate pesticide residue data that combines conventional pesticides with biopesticides and alternative pesticides to resolve trade concerns due to MRLs in the Latin-American region."

The problem to be addressed by the project is the hindered access to export markets due to a lack of strategies to comply with existing MRL trade standards. A purely biopesticide program would result in lower residues but may not be sufficient alone to control the pest or be financially viable. This project aims to balance the advantages of conventional pesticides (generally lower cost and generally greater efficacy) with the advantages of a biopesticide at the end of the season (to result in lower residues while providing sufficient extension of pest control caused by extending the PHI of the conventional product). The innovative approaches that are included in this project, besides the use of conventional pesticides with biopesticides, are the capacity building through of the regional training center and the creation of the minor use foundation chapter to further integrate cooperation in the region.

Under this project, a process will be implemented, under the guidance of FAO, to determine the best approaches for incorporating biopesticides to agricultural production that reduce residues to a level meeting Codex and importing countries MRLs.

To achieve its objectives, the project will deliver technical and functional capacity development, including a series of trainings through the regional training center of the National University located in Colombia, as long as workshops, and consultations, each building upon the other, which will culminate in the conduct of actual field trials, data generation, sample analysis and registration of new products.

Table 1: Below is a matrix showing how the countries will be involved in the project.

Country	GLP field training	GLP lab training	Functional capacities	Pesticide residue mitigation studies	Final result disemination	Regional cooperation guides
Argentina	A	A	A	D/S	P	P
Bolivia	A	A	A	D/V	P	P
Colombia	T	T	T	D/S	P	P
Costa Rica	T	T	A	D/S	P	P
Ecuador	A	A	A	D/V	P	P
Perú	A	T	A	D/V	P	P
Guatemala	A	A	A	D/V/O	P	P
Paraguay	A	A	A	D/V/O	P	P

Salvador	A	A	A	D/V/O	P	P
Honduras	A	A	A	D/V/O	P	P
Nicaragua	A	A	A	D/V/O	P	P
Dominican Republic	A	A	A	O	O	O

A Will attend training
T Could participate as trainer
V Will validate (repeat)
D Will do mitigation study
P Will participate (dissemination and regional collaboration)
O Will participate as observer
S Support lagging countries

In case D/V/O the country could participate in at least one of the options

PRIORITY CROP/PEST/PESTICIDE CASES

The project will conduct field experiments for two priority crop/pest/pesticide cases where:

- There is an existing pesticide MRL in destination markets, but the MRL has been exceeded causing trade disruptions.
- There is no pesticide MRL in destination markets causing trade disruptions.

The project will also research mitigation measures on selected crops and pests based on available IPM strategies, but that will not lead to implementation of field trials.

In developing the list of the priority crop/pest/pesticide cases, the project sought input from the participating countries based on a virtual coordination workshop and follow-up communications. After receiving key information from the participating countries, the project also reviewed cases where crop shipments have been rejected due to pesticide MRL violations in key destination markets. The following tables describe the priority crop/pest/pesticides cases. (See Appendix 8 for more information).

Table 2: Priority crop/pest/pesticide where there is an existing pesticide MRL in destination markets, but the MRL has been exceeded causing trade disruptions.

Crop	Pest(s)	Chemical pesticide(s)	Potential biopesticide or IPM control tool
Banana	*Fusarium oxysporum f.sp. cubense*	Imazalil, diflubenzuron, tebuconazole	Project will consult with industry. India has published information on the use of a biopesticide based on Trichoderma (EC). There are also reports of a Natsure, Musacare as a preventative measure. Biottol (Malaleluca and clove).
Banana	Antracnose (*Colletotrichum musae*)	Imazalil, diflubenzuron, tebuconazole	Project will consult with industry. India has published information on the use of a biopesticide based on Trichoderma (EC).
Banana	Thrips (*Frankliniella parvula*(*Chaetanaphothrips signipennis*)	Chlorpyrifos, imidacloprid, pyrethroids	Spinosad, spirotetramat, insecticidal nets, Pyganic (chrysanthemum extract)

Avocado	Mites	Spiromesifen, abamectin	Biolife (citric extract), *Euseius hibisci, Glendromus helveolus, Neoseiulus californicus*
Avocado	Whiteflies	Spiromefesin, abamectin	*Encarsia*
Avocado	Leafminers	Spiromefesin, abamectin	Project will consult with industry.
Passion fruit	Cladosporium (Roña) (*Cladosporium cladosporioides*) Botrytis (*Botrytis cinerea*) Anthracnose (*Colletotrichum gloesporioides*)	Difenoconazole	Project will consult with industry.
Snow peas	Several insects	Profenofos, thiamethoxam, abamectin, emamectin benzoate	Project will consult with industry.
Citrus fruits	Several pathogens (spots, fungi)	carbendazim, imazalil, mancozeb	Project will consult with industry.

Table 3: Priority crop/pest/pesticide where there is no existing pesticide MRL in destination markets causing trade disruptions.

Crop	Pest(s)	Chemical pesticide(s)	Potential biopesticide or IPM control tool
Banana	Black sigatoka (*Mycosphaerella fijiensis*)	Mancozeb, thiophanate methyl, carbendazim, triazoles	There are new safer fungicides being developed (Penthiopyrad, Corteva) and there is one company STK Bio-Ag Technologies that claims efficacy for a product Timorex Gold (melaluca (a tree) extract) for black sigatoka. The company claims to have conducted efficacy studies in several countries, but it is uncertain whether the studies were large scale and involve aerial applications. There is a need to conduct more research with industry.
Banana	Banana weevil (*Cosmopolites sordidus*)	Chlorpyrifos	Pyroproxyfen
Coffee	Coffee borer beetle (Hypothenums campei)	Chlorpyrifos	Guarda (Biosafe Systems)
Passion fruit	Insect pests	methomyl, fipronil, cypermetrin, dimethoate, omethoate	Project will consult with industry.
Snow peas	Fungal pathogens	Chlorotalonil	Project will consult with industry.
Cilantro	Insect pests	Acephate, diazinon, dimethoate, fipronil, indoxacarb, omethoate	Project will consult with industry.
Sweet potato	Insect pests	Flonicamid	Project will consult with industry.
Sesame	Cutter ants, locusts, caterpillars, aphids, thrips	Chlorpyrifos, fipronil, carbaryl, imidacloprid, ethropos	Project will consult with industry.
Avocado	Fungal pathogens	Flutrialfol	Project will consult with industry.

Table 4: Priority crop/pest/pesticide where the project will research mitigation measures based on available IPM strategies, but that will not require the implementation of field trials.

Crop	Pest(s)	Chemical pesticide(s)	Potential biopesticide or IPM control tool
Coffee	Anthracnose	Copper oxychloride	Project will consult with industry.

Cilantro	Fungal pathogens	Tebuconazole, triadimenol	Project will consult with industry.
Cacao	Phytophtphora sp.	Mancozeb, ethaboxam, fluopicolide, proparmocarb, amectoctradin, dimethomorph, metalaxyl	Project will consult with industry.
Dragon fruit	Insect pests	Dimethoate, emmamectin benzoate, lambda cyhalothrin, profenofos	Project will consult with industry.
Pineapple	Phytophtphora sp.	Mancozeb, ethaboxam, fluopicolide, proparmocarb, amectoctradin, dimethomorph, metalaxyl	Project will consult with industry.
Sweet potato	Fungal pathogens	Carbendazim. Thiophanate-methyl, procloraz	Project will consult with industry.

Outputs

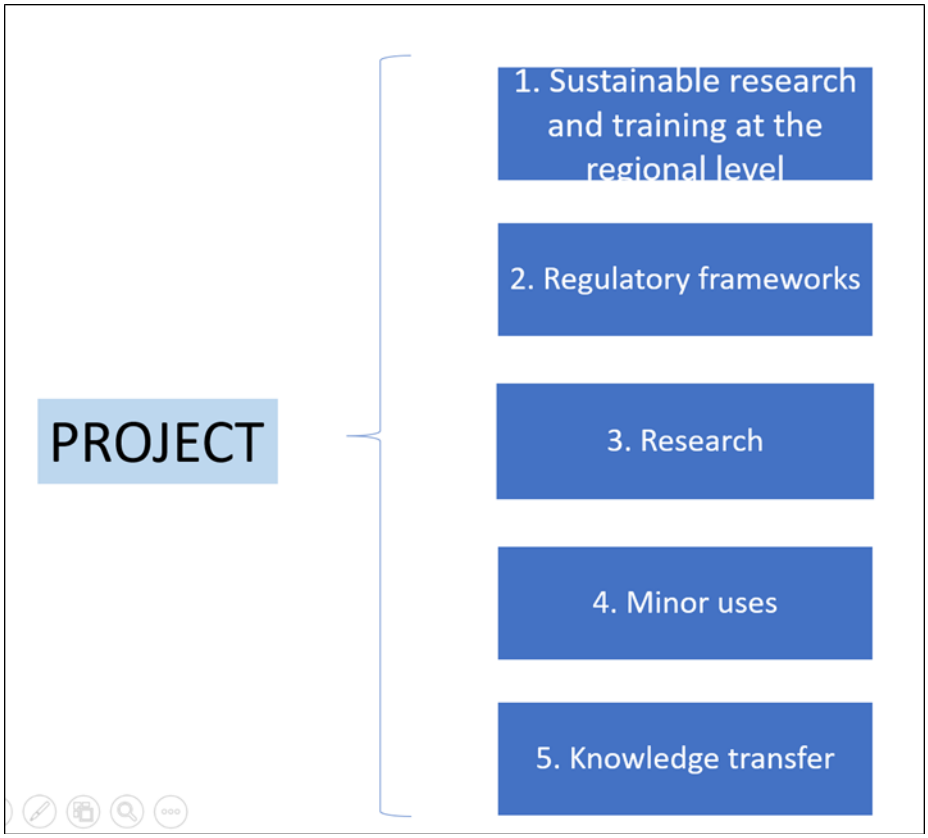
The Project contemplates 5 outputs, focused on different areas, which together manage to achieve the objective of the project and give it sustainability.

The first output is aimed at support and assist the recently created a research and training structure that should provide sustainable capacities over time so that it is the LAC region itself that can generate its own research in the future.

The second output is aimed at promoting the use of science-based and harmonized regulatory frameworks as a basis for facilitating trade and regulatory administration.

The third output is considered the heart of the project and represents science and technology, reflected in the waste mitigation studies.

The fourth output represents the strategic alliance with the minor uses foundation and the interest in sustainably positioning the participation of the countries in their work agenda, and finally, the fifth output represents the strategy to transfer knowledge to the field.



<u>Output 1:</u> Regional Research and Training Center on pesticides residues and biopesticides is operational in the region

Activity 1.1. Building Regional Research Capacity

This activity will bolster current efforts by IICA and USDA to establish a regional research "Center of Excellence" at the National University of Colombia (NUC). The vision for this regional Center is to provide a hub for continual education for pesticide researchers and regulators across the continent to conduct internationally-recognized residue field trials, laboratory analyses, and efficacy studies, with an emphasis on incorporating biopesticides into national Integrated Pesticide Management programs. The IICA/USDA program will focus on magnitude of residue studies for establishing Codex MRLs and entering into the formal agreements with NUC departments and the Minor Use Foundation while the STDF portion of this activity will emphasize research related to residue decline studies, biopesticide efficacy studies, and "soft-skill" development to bridge technical data and concepts to policy adoption. The project will target NUC's Department of Science and Agriculture.

Under this activity, the project's Expert Team (see composition under section IV. Project implementation and management) will collaborate with NUC's professors to gain technical skills to transmit knowledge to students, scientists, regulators and stakeholders in the region on GLP research for field, laboratory, and regulatory support. The Expert Team will 1) develop training course materials with NUC professors; 2) provide in-depth instruction and guidance to the NUC staff over the course materials; 3) assist the NUC staff in delivering the first courses to country participants included under in this project; 4) provide on-going, long-distance support to NCU's professors in later courses.

With this program as a foundation, other leading universities in the region will have access to this work, with additional faculty trained to expand teaching on the subject to students, increasing participation and knowledge throughout the region. The broader objective is to build regional capacity

of university researchers in the areas of regulatory science, training skills, leadership skills and teamwork, management of relationships between science and politics, execution of studies to establish MRLs (magnitude of the residue studies), and incorporation of agroecological management alternatives such as the use of biopesticides, behavioral control (attract-and-kill and trap cropping), and biological control within IPM programs.

The technical characteristics of the project suggest the convenience and relevance of working on the project's own economic pest thresholds, in order not to "borrow" these thresholds from other countries or areas with different characteristics, however, developing precise thresholds requires several years of multi-location field testing and data analysis. Therefore, there is currently no alternative option and the project does not have the resources available (time, personnel, financing) to carry out these activities. Although the ideal would be to have local thresholds, it is believed that the current thresholds will be effective because agricultural commodities and insect species are the same in each region. In addition, it will be possible to quantify the abundance of insects and the damage throughout the field tests, which will serve to advance towards that goal.

The project will be able to establish the necessary institutional and technical conditions to ensure an effective coordination with CABI (https://www.cabi.org) and to be able to use the databases they have to promote the results of the investigations. Likewise, the appropriate contacts can be established with Dunhan and Trimmer (https://dunhamtrimmer.com) for the same purposes. This suggests the possibility of generating a network of organizations that can benefit from the project's research and serve as a source of dissemination and promotion. Within this network of interested organizations linked to the project's objectives, COLEACP is also included, which has a particular interest in the Dominican Republic and can help generate links with successful experiences carried out in the European Union.

Activities 1.2 and 1.3. Strengthening functional capacities through university faculty exchanges (NC State and UCR)**.** The project recognizes that the overall capacity development of project stakeholders should not only focus on the competencies needed to achieve technical results, but also on what is needed to build more effective and dynamic relationships between multiple actors. As such, both technical and functional capabilities (soft-skills) are essential for individuals and organizations to achieve the goals of this project.

Under this activity, UCR and NC State faculty will jointly develop soft-skills curricula to support the technical component of the IICA-USDA Center of Excellence for research at the NUC. UCR and NC State will develop curricula centering on leadership skills and knowledge transfer directed at effecting policy and decision makers. First, NC State faculty will travel to Costa Rica to align course content and begin to develop joint on-line curricula. NC State faculty will provide a seminar to UCR staff and faculty on NC State's current program with its Center of Excellence for Regulatory Sciences in Agriculture (CERSA), and how CERSA hopes to expand with international collaborations with Latin American partners. Later, UCR faculty will travel to NC State to finalize curricula, hold joint seminars with CERSA staff and NC State students, and plan roll-out of the on-line content.

Activity 1.4: Courses (in-person and on-line) Offered to Beneficiary Groups (IR4/MUF-UCR; CICAP-UCR)

This activity aims to develop soft skills in beneficiaries to achieve three objectives:

1. Develop the skills, knowledge, attitudes, and behavior necessary to apply, organize and coordinate technical capabilities so that individuals and organizations can work effectively. To

this end, workshops will be held to cover topics such as “effective assertiveness”, team leadership, and science communication techniques.

2. Develop skills to formulate and implement relevant policies and standards and strategic planning, ability to leverage and manage knowledge, ability to build and maintain partnerships, strong leadership skills, and the ability to navigate the political dimensions of organizations.
3. Develop teaching skills that passes meaningful knowledge to those trained.

Four training groups have been identified among the beneficiaries of this output **1)** ***a technical group,*** involved in the experimental/research phase of the project, that is divided into field and laboratory technicians, **2)** a ***public officials*** group that is in charge of applying the regulation related to pesticide residues, and **3)** a ***farmers*** group that advocates for new science-based pest control needs, and 4) a ***university*** group with the responsibility to convey and bridge knowledge between farmers, technicians and regulators.

The first objective of soft skills, related to being assertive and teamwork will target all four groups; the second objective will target the group of public officials that seeks bridge science and policy; and the third objective will target the university group which seeks to enhance teaching and outreach competencies to technicians and farmers, and agricultural extension to public officials.

This area will be developed with the leadership of the Center of Excellence for Regulatory Science in Agriculture (CERSA) of North Carolina State University, with the support of the Center for Research and Training in Public Administration (CIPAC) of the University of Costa Rica and EPOPEYA of Colombia.

In order to achieve a long-term benefit for the region, CIPAC in conjunction with CERSA, will develop a virtual course covering Objective 2 above, so that it is available to the region and the benefit can be extended.

Output 2: Countries take national measures in support of regional biopesticide regulatory harmonization

Activity 2.1. Biopesticide regulatory strengthening at the national and regional levels
This activity will provide biopesticide regulatory strengthening at the national level and alignment (harmonization) at the regional level in coordination with the current IICA/USDA LATAM regulatory program.

Activity 2.2: Biopesticide registrations for residue mitigation
This activity will support regulators in the participating countries in implementing concrete measures for the registration and use adoption of biopesticides identified as mitigating measures under this project

Activity 2.3: Harmonized evaluation criteria
This activity will promote the use of harmonized criteria for evaluating and recording the efficacy of these biopesticides

These three activities will be carried out in close coordination, and in parallel with each other, with the current IICA/USDA pesticide regulatory program in Latin America and will include activities aimed at biopesticide regulatory strengthening at the national level and alignment (harmonization) at the regional level. As a priority, the Expert Team will support regulators in the participating countries in implementing concrete measures for the registration and use adoption of biopesticides identified as mitigating measures under this project. This will include promoting the use of harmonized criteria for

evaluating and recording the efficacy of these biopesticides. While the project activities are expected to register biopesticides within the participating countries, these activities working with industry will also facilitate regional trade in biopesticides and promote the adoption and use of safer pest control tools in the agricultural sector. In addition, given that many LATAM countries face similar pest control issues, the project will promote greater coordination and exchange of technical information between the respective pesticide regulators and address any current registration challenges. Therefore, the Technical Team in coordination with the current IICA/USDA regulatory program will develop a detailed strategy to facilitate greater regulatory coordination among the participating countries.

In close coordination with the current IICA/USDA pesticide regulatory program in Latin America, the project will support the following ongoing regulatory efforts:

- The development of an updated and harmonized regulatory guidelines (Central American Technical Regulation or RTCA) for the registration of biopesticides in the Central American region. As of December 31, 2021, a Central American Technical Workgroup has already developed a draft RTCA and it is expected that a formal RTCA will be finalized in 2022 in coordination with the Technical Committee of the Central American Council of Agricultural Ministers. The Dominican Republic will require additional consultations, under this project, to engage them in this process.
- Close coordination with the Technical SPS Committee (COTASA) of the Andean Community to address biopesticide regulatory harmonization in the countries of the Andean Community. The COTASA has identified the regulatory harmonization of biopesticide regulations as apriority in its 2022 workplan.
- For the southern region, Argentina is one of the countries with the most advanced biopesticide regulatory framework in the region. The project will work closely with Argentinian officials to support Paraguay in regulatory harmonization and strengthening.

To accomplish this output, the Expert Team will conduct a series of workshops with regulatory officials of the participating countries, and consultation travel to Argentina, Paraguay and the Dominican Republic. These workshops will also include the participation of key policymakers in order to ensure adequate acceptance, ownership and adoption of project outcomes.

<u>Output 3:</u> Residue data and improved knowledge to interpret it on the use of biopesticides (Residue Mitigation Studies)

This output will support Honduras, Guatemala, Nicaragua, El Salvador, Ecuador, Perú, Bolivia, Paraguay and Dominican Republic to strengthen research capacity and conduct residue mitigation studies. With support of Costa Rica, Colombia and Argentina (experienced residue programs in place already), these countries will provide regional leadership by also conducting residue mitigation studies and sharing their expertise, promoting South-South and regional cooperation.

It is anticipated that up to 15 residue trade irritant situations can be resolved through studies for the commodities selected for the project. These somewhat follow crop grouping strategies, but unlike new MRLs, compliance with MRLs does not require JMPR review and Codex approval. This project will therefore provide and test a process, which could be replicated for other crops/products and/or in other regions in the future.

Residue mitigation studies will be conducted based on two different scenarios:

1. Situations where there is an MRL, but the MRL is exceeded, causing trade problems. In these cases, the residue will be mitigated by extending the PHI and supplement it with biopesticides.

2. Situations where there is no MRL for the pesticide causing trade problems. In these cases, a different conventional pesticide that does have an MRL will be needed as an intermediary, and it will be determined if the intermediary product also needs to be mitigated.

In all cases, proper IPM practices will be used, in line with FAO's guidance and recommendations. These include sanitation, utilizing pest free transplants, pest scouting, preservation of beneficial insects, utilizing pesticides only when the pest is present, following economic thresholds when known and crop specific practices to avoid or manage pests. The possible mitigation studies under consideration are listed in Tables 2-4 above.

Activity 3.1. Group training on field and laboratory research (12)
During the first year, field and laboratory preparations will be made: Standard Operating Procedures (SOPs), establishment of Quality Assurance and Quality Control (QA/QC) system, documentation, data management, facilities, etc. A series of group trainings/workshops will be conducted by the Expert team of consultants for laboratory staff, field staff, and national Principal Investigators to develop protocols, field research notebooks, learn calibration techniques, and field experimental design, etc. The Technical Director and Project Manager will follow up with each of the countries and provide assistance throughout the year to monitor progress and ensure that the countries are adequately prepared to initiate the studies.

In addition to the regional group training provided by the Expert Team and NCU, UCR and NC State will link here to provide the soft-skill development for the technical country team members.

Activity 3.2. Individual training on field and laboratory research (12)
For countries with little or no experience conducting residue research, individual trainings will be held through site visits and in-person team consultations. Field residue trials will not be initiated until the Technical Director is confident that the countries are prepared. More tailored and in-depth assistance will include designing experimental protocols specific to the country's crop/pesticide/biopesticide selections, field work related to conducting pesticide residue decline trials, method development for the analytical laboratories, experimental design for biopesticide and bioprotectant efficacy studies, report writing and data package submissions, and consultations/coordination with national registration officials.

Activity 3.3. Countries conduct residue decline studies and bioefficacy studies (12)
Field residue mitigation studies: Once all preparations are in order, the Technical Director will initiate the first series of trials with national Principal Investigators, increasingly handing over responsibilities. The Study Director consultant will provide assistance in-country. Those countries that are less advanced in their technical capacity will have access to additional guidance through the regional lead countries (train the trainer type model) on an as-needed basis.

To accomplish this activity, the following tasks will be performed:

Sample analysis: Upon completion of the fieldwork, samples will be prepared and analyzed under supervision of the Study Director. Again, a mentor from the leading countries will oversee the first series of analyses and will increasingly transfer responsibilities and oversight to national Principal Investigators. Those countries that are less advanced in their technical capacity will have Costa Rica, Colombia or Argentina as resources (Trainers as mentioned above) of analytical assistance, as needed.

Efficacy studies with biopesticides: After the initial series of residue decline data are developed, the incorporation of biopesticides into the system will be included to determine the ability of different products to maintain pest control while allowing for residue decline.

Report writing: Once a study is complete, the Study Director will assist in the preparation of a final report. National Principal Investigators will increasingly assume responsibilities of the report preparations and complete them in their own countries.

<u>Output 4</u>: Regional strategy to improve the supply of phytosanitary solutions for minor crops established (Minor Use Foundation Chapter Latin America)

The project will develop regional strategies to support minor crops (crops that are missing important pest control tools due to their low-area production), considering improved food safety, trade facilitation, and the environment. The Minor Use Foundation (MUF) has established processes for assisting countries to collaborate in identifying and prioritizing research and policy to address minor crop needs. The Latin America and the Caribbean region can benefit by strategically, and more effectively, engaging with the MUF to adopt technical procedures and incorporate them into national institutions.

The work of the MUF complements the objectives of this project, since it provides chemical and biological phytosanitary solutions for minor uses in order to comply with the regulations established by international markets regarding MRLs.

Linking national and regional interests requires substantial coordination with the regional integration organizations (CAC, OIRSA, COTASA, CAN, COSAVE), national institutions of the Latin American and the Caribbean countries, IICA, and MUF. Coordination will be achieved by focusing the project's work on four main areas through instruments and tools that favor institutional changes in the countries and the adoption of strategies aimed at developing this issue.

Outputs of this engagement include:

- **Positioning the MUF before the countries**
- **Political positioning of the MUF at the regional level**
- **Developing methodologies for the institutional incorporation of minor uses**
- **Regional communication and information strategy on minor uses and MUF**

The success and sustainability of these components strongly depend on influencing decision-makers at regional forums, rather than on the technicians responsible for leading the issue of minor uses. Output 4 will be carried out by a Multimedia Manager consultant, who will support all the activities below.

Activity 4.1 Positioning the MUF before the countries. Two virtual workshops and one in-person workshop. One virtual and one in-person workshop (in addition to engagement with other opportunities outside this project as they arise) will be held to publicize, position, and recognize the importance of active participation in MUF strategies and activities. These workshops will strengthen understanding of the Foundation's work and support the regional crop prioritization process, while providing a platform for regulators, pesticide industry, crop associations, and researchers to share regulatory updates and crop protection technologies. Sharing experiences from countries that have already participated in MUF work will be an important modality to transmit positive experiences and past successes.

Activity 4.2 Political positioning of the MUF at the regional level. Six virtual dialogues with regional organizations. This activity will situate the MUF with the regional integration or regional regulatory organizations, such as the CAC, OIRSA, COTASA, CAN, and COSAVE. The intention is to position the Foundation's strategies at the regional political level. Two virtual dialogues will be held with each

organization, including partner dialogs at the inception of the project and at the conclusion of the project (seven total dialog activities).

Activity 4.3 Developing methodologies for the institutional incorporation of minor uses. One consultancy, two virtual events. In order to support and adopt minor use agendas locally, the project will develop two instruments to incorporate management tools to guide the countries in establishing sustainable minor use programs and a regional strategy for the participation of LAC in the work plans of the MUF. These tools will serve any country that lacks experience in working with minor uses. This activity will require a consultancy to generate, validate and inform processes at the country level, achieved by holding two virtual events.

Activity 4.4 Regional communication and information strategy on minor uses and MUF. This activity will develop multimedia tools to help disseminate and communicate the work of the MUF and promotion of minor uses, through the optimization of social networks, press offices of the participating institutions and other multimedia.

Output 5: Grower outreach program to promote biopesticides established and linked to export promotion programs domestic markets

The extension program represents the mechanism that makes it easier for producers to adopt the new agronomic technologies generated by the project. The initial stage will consist of making an inventory of private sector associations and produces associations and agricultural extension agencies, and establishing the appropriate links to initiate a dialogue on the positioning of the project, its results and the benefits for the producers. Activities included to this first stage will include:

5.1 Inventory of distribution channels of the knowledge generated in the project (includes public and private extension programs, international organizations (such as CABI) and inventory of private sector associations and producer´s associations. In charge of IICA and the central administration of the project.
5.2 Develop a plan of approach to the extension programs identified to achieve their involvement in the dissemination of the knowledge developed. In charge of the consultant, the multimedia manager and the central management of the project.
5.3 Develop IPM documents for the phytosanitary solutions identified in the project. In charge of the consultant, the multimedia manager and the central management of the project. These dissemination and training products will include, in addition to integrated pest management, the positive effects for the environment and trade, the use of biological tools or other modern alternatives for pest control.
5.4 Develop a virtual training program for trainers and / or extension workers of the public and private sector. In charge of the consultant
5.5 Develop a package of informational products to be delivered to the different extension instances for their use and dissemination. In charge of the consultant, the multimedia manager and the central management of the project.
5.6 Incorporate into the multimedia and communication program what is related to the scientific results obtained in the project. In charge of the consultant, the multimedia manager and the central management of the project.

Special attention will be paid on how to optimize the information and knowledge transfer to women leaders of farms or estates linked to the organizations contacted.

The activities of this output are characterized by being easy to implement in all the participating countries. In fact, all countries should benefit from the activities contemplated here.

Through the IICA offices in each of the countries, plus the support that the National Committee for Public-Private Coordination can provide, it will be possible to compile the inventory and contact database of all the institutions linked to this output, without no cost.

The training and dissemination events are virtual, and will allow 100% coverage of the participating countries. Similarly, the materials developed are public goods that everyone will have access to.

10. Environmental-related issues

The project anticipates that the substitution of the last application of a conventional chemical pesticide with a biopesticide or a safer IPM control tool will have a positive environmental impact through a reduction of chemical pesticide usage. Biopesticides typically have reduced non-target effects on beneficial insects compared with conventional insecticides. We will quantify non-target effects using bee bowls for pollinators and yellow stick cards for predators. Bee bowls and yellow sticky traps will be deployed in both treatment plots two weeks prior to biopesticide applications and will be survey each week for five weeks. Pollinator and predators will be identified by participating institutions and Universities. The residue mitigation of this project will lead to the enhancement of technical capacities, contributing to reduced chemical pesticide use and the promotion of non-toxic biopesticide use as well as the adoption of IPM systems contributing to environmental protection. In addition, this project will ensure that no project activities have a negative environmental impact.

The substitution of the last application of a conventional chemical pesticide with a biopesticide or a safer IPM control tool will decrease the chance of exceeding the MRL, thus a greater percentage of the crop will become 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.

11. Risks

Risk	Impact	Probability	Prevention/Mitigation
Even with mitigation, the residues do not fall below MRLs.	High	Low	The project team is working with a large number of active ingredients and spans of time. It is expected that in a majority of cases, the active ingredients selected are likely to diminish sufficiently with an extended decline period.
Uptake/adoption of project outputs by the national authorities due to lack of political will or proper compliance by project partners.	High	Low	This will be overcome by bringing various stakeholders of the countries at one platform, bringing awareness on the importance of work for IPM and for trade, and getting their commitments. There will be knowledge management and dissemination on the activities and the practical utility of the scientific rationale in promoting biopesticides. Development of both technical and functional skills will also facilitate the uptake/adoption of the outputs.
The biopesticides are not effective in controlling the pest at the end of the season.	Medium	Low	a. The mitigation-based pest management is not only dependent on biopesticides alone. It is expected that the conventional pesticides will provide a high level of control during the season and the residual activity of the last conventional application will cover part of the period until harvest. Therefore, it

			will not be necessary for the biopesticide to control an intense population and the period of time will be brief. b. As in the IPM philosophy, the goal is not perfect control, but below an economic threshold. It also varies by pest. For example, an aphid or thrips infestation is critical during crop development and flowering, but very close to harvest there is not so much of an impact. On the other hand, an infestation of leaf chewing insects such as diamondback moth larvae on leafy vegetables is serious. However, Bt is widely known as an effective Biopesticide product for controlling caterpillars.
Biopesticides are too expensive and growers will not want to use them.	Medium	Medium	a. Even if the biopesticides are more expensive, this will be partially offset by using less of a conventional pesticide and increasing the value of the crops by making them eligible for export markets. b. Harmonization of regulations that would result with the complementing USDA-IICA project will result in greater ease and speed of registration, which should also increase competition and reduced costs. c. All trends point to a large increase in this market. One of the keys is developing an effective model program to demonstrate the utility of biopesticides coupled with an economic incentive, which is the basis of this project.
Growers do not want to use biopesticides.	Medium	Medium	The work resulting from this project, that would be based on scientific work under international standards, will prove that the use of biopesticides is effective in controlling diseases. Also, with the increase of requirements from importing countries in terms of chemical pesticide use, would encourage growers on the use of biological products.
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, IICA and National Institutions. Social media platforms as Instagram and Twitter will be used to have results and advances in real time with exponential dissemination.
The COVID-19 pandemic making it impossible to travel and organize face to face meetings/workshops/ training programs.	High	High	Many project activities will be conducted virtually. 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. Working in labs under biosafety conditions and traveling to the field individually will decrease the risk of transmitting the virus or other pathogens that could appear.

12. Sustainability

The project is not only based on national demand and priorities, but is actively supported by relevant Latin American 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. IICA, which is working towards the promotion of biopesticide use and regulation harmonization in Latin America, further strengthens the technical capability and sustainability prospects of the project and its outputs. Also, the creation of the LATAM/MUF chapter, would allow the countries to meet, interact and participate in relevant projects for the region. Finally, with the strengthening of the regional training center in the National University in Colombia, participating countries and other actors from the region will be able to participate and interact for years to come.

IICA envisaged role throughout and subsequent to project conclusion brings to bear a substantial network of technical experts and longstanding relationships with participating and invited countries, serving to enhance the strength of project partnerships, its ability to monitor the appropriate utilization 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 programs 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 LATAM 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. In this project, a similar approach and sustainability plan is expected and planned for in this project.

The residue mitigation strategy supplements the conventional magnitude of residue studies and utilizes 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 MUF, 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 manager 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, the training would be key to give sustainability of the project training new generation of agronomists and chemists. 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 prioritization of partnerships, to enhance synergies and resource and knowledge maximization.

This project will be supported by among others the IR-4 Program, USDA, FAO and MUF all of which will provide technical guidance and share information. The FAO Pest and Pesticide Management team could be invited through FAO Regional LAC office in Chile to project training activities and meetings (with virtual communication in the intervening periods) and have committed to provide advice on IPM practices and regulatory harmonization guidance. Bioprotection global 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 utilized for other purposes, such as requests in respect of import tolerance in other countries/regions. The existent biopesticide organizations in the region (Asobiocol and Cabio), as well as Croplife which includes

producers in several of the participating countries as well as Bioprotection global will help disseminate the project results and will incorporate its findings into strategies integrating biopesticides into conventional systems.

The project's sustainability strategy will be supported by the dissemination plan (see point 19) and by the future work plans of the participating organizations (USDA, MUF, IICA, IR4, Private Sector). The dissemination plan will help position the results of the project before the international community and decision makers, which is vital for government institutions to adopt and appropriate the new technologies and institutional strategies that the project will recommend. The results, including how to use the information, will be published on the IR-4 and Minor Use portals and the website of each country's residue mitigation results extension and national institutions as part of the GAP guidance.
With respect to the future work plans of the participating organizations, it is the other promoter of sustainability, since through the cooperation and assistance of these organizations, the need to continue working in topics related to the project. Special mention should be made of the support for the work plan of the MUF, through output 4, which will help strengthen the link between the countries and their work agenda.

For the last semester of project implementation, a sustainability strategy must be developed, involving the participating organizations and the necessary mechanisms to ensure the continuity of the capacities developed.

III. BUDGET

13. Estimated budget

IICA as the implementing partner will engage USDA, IR-4 and MUF technical expertise through in-kind support, and technical experts through professional services contracts. IICA will ensure arrangements for project implementation. All partners will ensure that the project links to similar and related efforts in the target countries including FAO, CropLife Latin America, pesticide manufacturers, exporter organizations, etc.

The project will call upon expert knowledge of minor use research by the USDA, IR-4, MUF and local technical experts. This will involve the selection of field trial locations, crops/biopesticides, development of trial protocols to demonstrate biopesticide efficacy, and coordinating efforts for data reports and utilization. The project will demonstrate efficacy of biopesticides and promote their use through increased commercialization and, thus, availability to producers. Learning from STDF/PG/436, enough travel expenses were included to be able to cover all countries involved.

A detailed breakdown of the total project budget is included in Appendix 3. It has been prepared on the basis of the outputs identified above, and the resources needed to complete the specified activities. The budget includes expenditures for expertise, travel, training, workshops, minor equipment items, project management, general operating expenses, etc. The total amount requested from STDF is USD $ 900,473 out of the total project cost of USD $1,839,373 The matching funds include USD $ 938,900.00 of contributions from several sources.

14. Cost-effectiveness

There are eleven countries (potentially twelve) involved in this project, so the per-country cost of this project is actually very low. Several meetings will be virtual and some meetings will be organized to

coincide with the other meetings, like training at the National University and MUF/LATAM chapter. This was successfully accomplished during the PPG-planning meeting, and this pattern will continue during the full project

The aim of this project is to establish a process that promotes adherence to of MRL standards across the region. Some of the more widely grown crops such as banana will be conducted cooperatively across multiple countries. This will create a more robust data set without over taxing the capacity of any single country. This project seeks to coordinate work, harmonize practices and standards as much as possible, and ultimately conserving valuable resources.

Through this coordinated and strategic approach, it is estimated that a savings of over 90% can be achieved as compared to conducting individual field trials for each crop/pesticide combination that only result in a single MRL. In addition, by targeting the most restrictive exiting MRLs, not only will these meet Codex MRLs but also produce crops that are unrestricted for trade across a disharmonious set of different MRLs from different regulatory bodies. In addition, by aiming for 0.01 ppm or not detectable there may be an indirect benefit of meeting some secondary standards imposed by retailers.

In addition, while some country specific research on sesame in Paraguay will be conducted, the problems with residues on banana, café, pineapple, berries, passion fruit and mango are broader problems that exist and are therefore applicable across all the Latin American countries participating.

IV. PROJECT IMPLEMENTATION & MANAGEMENT

15. Implementing organization

IICA will be the implementing partner for this project and will collaborate closely with the U.S. Inter-regional Research Project 4 (IR-4) and the Minor Use Foundation (MUF) which will provide technical guidance and support. The USDA Foreign Agricultural Service (USDA/FAS) will also provide technical advice (in-kind) to the project at no expense to the project.

Written consent and CVs from implementing organizations are attached in Appendix 5.

16. Project management

IICA will hire a Project Manager who will look after the stakeholder's routine communications and all the operational matters. As STDF projects are three years long, there is always a possibility of disruption due to turnover of personnel, experts, and consultants. The project will build in resilience measures to ensure that the project can continue smoothly in the case of departures of key persons. To do this, two technical consultants (part of the expert team) will be hired as Co-Technical Leads who will take responsibility of the various components of the project to ensure continuity of work. The Capacity Coordinator will lead the development of technical, regulatory, and functional training; the Technical Team Leader will organize, plan, and ensure delivery of the research activities, identifying and on-boarding additional experts and consultants when needed.

The Project Manager will keep IR-4, MUF, USDA, STDF, and other key partners regularly informed about the progress and issues and will seek technical and managerial advice on regular basis. This will help the key technical players stay well informed and will allow them to play their technical and advisory roles in an efficient manner.

The logistical and financial aspects of the projects will be managed by IICA. A project staff will be tasked with daily operational activities and housed at IICA. The daily operational activities are not

limited to administration, but will also include signing of sub contracts with project partners, making preparation for trainings such as purchase of airline tickets, contracting with hotels, arranging local transportation, etc. For field trial work, the project staff will help make funding transfers to the relevant, participating country agencies or institutions. The project staff will work under the supervision of the Project Manager and will work closely with the Co-Technical Leads and other collaborators. The project staff will prepare quarterly, annual, and final financial reports with support from the Co-Technical Leads.

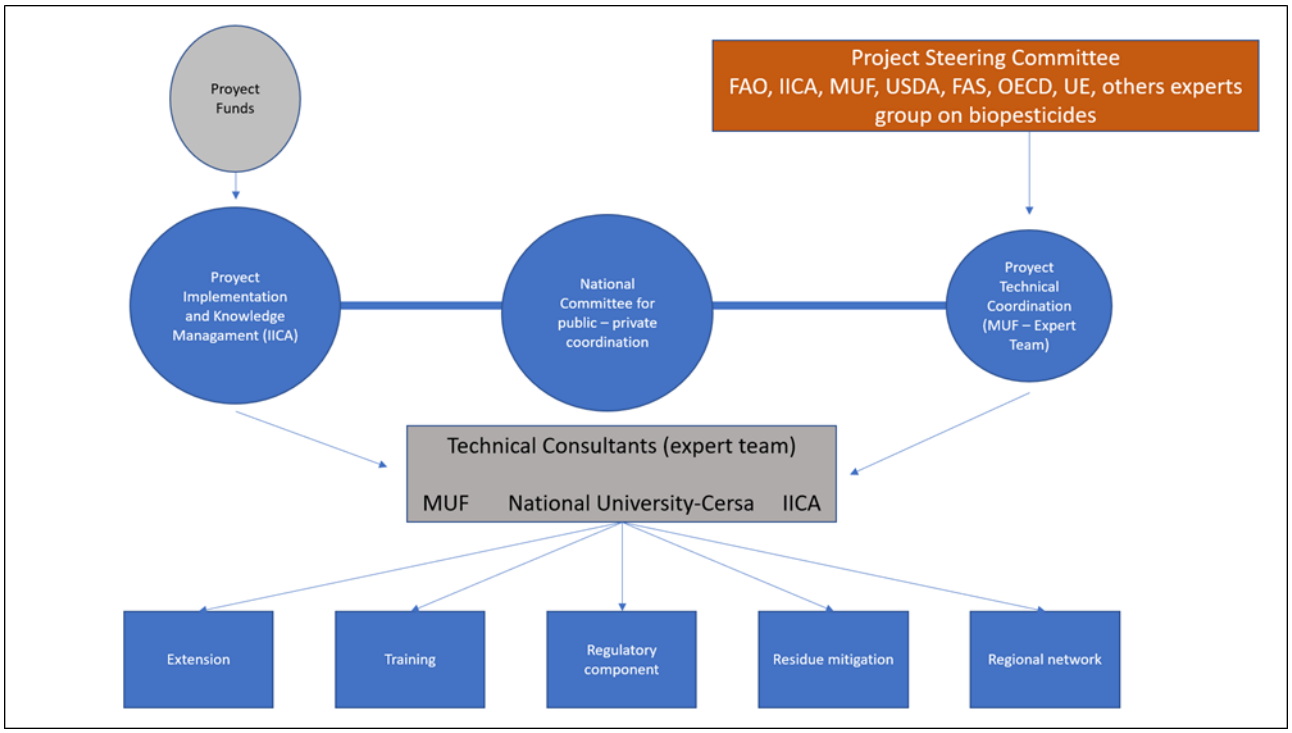
A **Project Steering Committee** (PSC) will be formed from a combination of each countries contact point, IR-4, MUF, IICA, USDA-FAS, FAO, OECD Expert Group on Biopesticides and other experts on biopesticides. The STDF will be invited to all PSC meetings. Additionally, the European Communities will be invited as observers to this committee through their representation of Peru. The characteristics of observers will be defined together with them in common agreement with IICA. Growers from inside the region and importers from outside the region could be invited if needed. The PSC shall meet at least twice annually as part of their regular meeting schedule and correspond electronically between scheduled meetings; the Project Coordinator will report on the progress of the project to the PSC. The Project Steering Committee will consider Progress Reports and will advise on any modification to the project plan, which will be discussed with STDF.

Logistics: Participating countries will help, as much as possible, to provide the logistical support for the project in cooperation with IICA.

Technical Consultants ("Expert team"):

- Co-Technical Leads: Ms. Veronica Picado; Dr. Jason Sandahl.
  - USDA-FAS will assign a program staff member to provide technical and regulatory input and guidance to the project as an in-kind contribution.
  - Dr. Grace Lennon, Minor Use Foundation, will lead field research.
  - Dr. Wayne Jiang, IR-4 chemist from Michigan State University, will lead laboratory analytical research.
  - Dr. Kevin Rice, entomologist from U. Missouri will provide guidance on biopesticides and efficacy research.
  - Dr. Danesha Seth Carly, North Carolina State University, will be collaborate in functional capacity building activities.
  - Mr. Luis Suguiyama, retired EPA, will lead regulatory capacity efforts both at national and regional levels.

Figure 1. Project Management Structure



V. REPORTING, MONITORING & EVALUATION

17. 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 and sent to the STDF, according to the instructions. The minutes and activity reports of workshops, meetings and related capacity building activities will be reported with the main conclusions incorporated into the narrative. Project performance will be monitored using the projects logical framework, including indicators (baseline and targets) and annual work plans and budgets.

An inception workshop is going to be held where the logical framework will be reviewed to finalize identification of: i) outputs ii) indicators; and iii) missing baseline information and targets and workplan. A baseline survey will be done to register the outcomes of the inception meeting. The results of the inception meeting and baseline survey is expected to be a set of defined activities, outputs and indicators (and updating of the logical framework) against which project progress will be measured. These will then be discussed and finalized at the PSC meeting, and also shared with the STDF Secretariat, and will form the basis for tracking and monitoring progress throughout the project duration.

The responsibility of tracking project progress will be by the Project Manager, with project partners and country focal points expected to provide relevant information to track the indicators. The Project Manager will work closely with the Technical Team 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.

Towards the end of the project, a progress assessment against all indicators and outputs will be done. A report will be developed for presentation and discussion at the final meeting at which an implementation program (involving the project multi - stakeholder network) of final project outputs will be finalized

18. Monitoring and evaluation, including performance indicators

IICA will ensure that project activities are monitored, and project outcomes and impacts are appropriately being assessed, based on the project's logical framework and following the STDF Monitoring, Evaluation and Learning Framework[5]. For this, the project will develop a M&E plan that will identify data sources, data collection methods, sources of quantitative and qualitative, to establish a baseline for monitoring the project indicators. Special attention will be given to monitor gender for each activity.

Among others, we will use the STDF's new LogAlto tool for MEL https://www.logalto.com/en/ Link to program indicators, STDF results framework where relevant. The participant countries, institutions and the rest of stakeholders will provide information in regular basis and by request of the expert team or project management. At least once every six months indicators will be measured from the log frame and the MEL matrix and an internal evaluation of indicators will be done during the biannual steering committee meeting and actions will be taken if needed.

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.

According to STDF's rules, the Project will undergo an independent end-of-project assessment, carried out by an external evaluator, and whose report will be attached to the final Project report. The budget for such an assessment is included in the budget. The development of the terms of reference, selection of the evaluator and contracting of this assessment is the responsibility of IICA.

In addition, after project's completion, the project could be subjected to an ex-post evaluation, drawing on the OECD-DAC Principles for the Evaluation of Development Assistance. The development of the terms of reference, selection of the evaluator and contracting of this assessment is the responsibility of the STDF. IICA will collaborate closely with the selected consultant in due time.

19. Dissemination of the projects results to the International Community

The communication plan of the project is designed to maintain close contact and communication with all the actors involved and serve as a means of disseminating the progress and results obtained.

Due to the nature and characteristics of the project, there are many sectors and actors involved, such as:

[5] See: STDF_MEL_Framework_Final_English.pdf (standardsfacility.org)

- Institutions responsible for the implementation of the project and their scientists.
- Institutions responsible for agricultural extension and their technicians.
- International organizations linked directly or indirectly (WTO/STDF-CMSF, FAO, IICA, FUM)
- Private sector organizations (CABI, Croplife, Associations and Federations, etc.)
- Press and communication offices of all the organizations involved
- Regional organizations for standardization and integration (CAC, CAN, COSAVE)
- Agricultural and pesticide producers

Therefore, it is strategic to have a communication plan that ensures the effectiveness and efficiency of the information products and communication strategies that are implemented. For this, it is necessary to reach the actors at the right time and with the right products.

The Communication Plan (CP) will help manage the information and results that the project obtains internally and externally. It will help identify and facilitate the participation of key stakeholders.
The CP will identify the actors, the activities that must be carried out, and will establish indicators and expected products.

The following components will constitute the key pillars of the CP: i) Identification of key actors, partners and target audience; ii) Communication mechanisms and tools; iii) Definition of communication strategies; iv) Evaluation and impact.
These components define what and why, how, and will help measure the impact achieved with the project.

The project will have a multimedia manager responsible for developing a communications strategy and related calendar throughout the life of the project, including the target audience, media to be used, products to be developed and expected results. This CP must consider all the aspects contemplated in the STDF Communications Plan (https://www.standardsfacility.org/sites/default/files/STDF_Comms_plan_Final.pdf).

The communication strategy must include the development of information products, dissemination and positioning of information products about the project including results-focused, human-oriented content. Among these may be considered the development of multimedia (photos, videos, photographs, interviews, etc.), human-interest success stories, press releases, web updates, social media posts and technical information sheets. The products to be developed will have the purpose of keeping all the key actors informed and promoting the dissemination of the project, its progress and its results.

The use of currently existing platforms and social networks will be essential to try to massify the information that will be shared and for this the "multimedia manager" will be responsible for its administration and permanent management, working in collaboration with the STDF Secretariat during the life of the project. Platforms of dissemination can include YOUTUBE, FLICKR, LINKEDIN, Facebook, Instagram, twitter (using hashtags such as #STDF and #SafeTrade).

Furthermore, the project will appropriately use the STDF logo on all project-generated external communication materials, including social media, to ensure its prominence and visibility, as specified in the STDF Communications Plan. Project results will also feed into STDF's corporate publications and dissemination channels.

The multimedia manager must have efficient and regular contact with the press officers of IICA, STDF and the FUM, including through participation in the informal communications officers' group to be organized by the STDF Secretariat in order to maintain a coherent and efficient line on the

communication policies of both organizations and to participate in joint communications campaigns, where relevant.

The communication strategy is cross sectional in nature, this means that it will be used by all the other components of the project, in such a way that the strategy is part of the activities of each component, and makes each one of the products and actions available to them what to do.

ATTACHMENTS

Appendix 1: Logical Framework

Appendix 2: Work Plan

Appendix 3: Project Budget

Appendix 4: Letters of support from organizations that support the project request

Appendix 5: Written consent from an STDF partner that agrees to implement the project ***OR*** evidence of the technical and professional capacity of another organization proposed to implement the project.

Appendix 6: Key technical staff involved in project implementation.

Appendix 7: Countries' baseline

Appendix 8: Crop/Pest/Pesticide Priority Selection

(i) ***A logical framework*** *summarizing what the project intends to do and how, what the key risks and assumptions are, and how outputs and outcomes will be monitored and evaluated (Appendix 1). See Qn. 15 (l) of the Guidance Note and the template attached to this application form.*

(ii) ***A detailed work plan*** *indicating the start and completion date of the project, as well as sequence in which activities would be carried out (Appendix 2). See Qn. 15 (m) of the Guidance Note and the template attached to this application form.*

(iii) ***Terms of Reference*** *(TORs) for key national/international experts to be involved in implementation of activities included in the work plan. The TORs should include information on specific tasks and responsibilities, duration of assignments, number of missions (if appropriate), and required qualifications/experience (Appendix 6). See Qn. 15 (n) of the Guidance Note.*

APPENDIX 1: Logical Framework[6]

	Project description	Measurable indicators	Sources of verification	Assumptions and risks	STDF Programme Indicators1
Goal	Improved compliance in participating Latin American countries with pesticide MRLs of Codex and ensuring growers access to important export markets	Increase in exports of targeted crops from participating countries within five years of project completion Ten 10 (%) 10% increase in production under systems that help mitigate waste (GAP or MIP) according to the conditions and characteristics of each country (this means that each country will determine its own baseline).	Surveys with growers/associations participating in the project. National government bodies reports 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.	Target markets accept Codex or currently established MRL standards. Target biopesticide products are available in participating countries. There is pesticide with reduced toxicity and approved MRL to replace old technology Growers agree to incorporate mitigation measures developed New pests will not affect crop production and exports The monitoring of the indicators could be done by other organizations if the results are achieved outside the project execution period. Additional pesticides used in the crop will not be prohibited	# of STDF initiatives and PPGs/PGs contributing to changes in SPS legislation, regulation, policies, strategies, structures and/or processes, including attention to cross-cutting issues (climate change, environment, gender, inclusion). x US$ value of exports for target HS code products and target markets (i.e. regional, intra-regional, global, etc.) Value (US$) of new investments Leveraged #, type of collaborative networks, relationships, initiatives at global, regional and/or national level that support the delivery of change in SPS systems, including attention to partnerships addressing climate change, environment, gender, and inclusion Evidence of market access and exports/imports directly facilitated through STDF support, with particular attention to climate change, environment, gender, and inclusion

[6] See the CIDT Handbook on Project Identification, Formulation and Design, available on the STDF website, for guidance on the preparation of logical frameworks.

Immediate objective / Result	Increased regional collaboration and capacity to generate and evaluate pesticide residue data that combines conventional pesticides with biopesticides and alternative pesticides to resolve trade concerns due to MRLs in the Latin-American region.	Increased understanding among regulatory authorities and growers of how time, IPM production practices and end of season mitigation impact residues Regional work-sharing framework for the identification of regional pesticide residue concerns for key export crops developed Decrease in number of rejections (%) Trade limitations reduced (%) Proportion of producers trained that implement mitigations measures using biopesticides (disaggregated by gender)	Reports written by participants Certificates by trainers List of participants that attended meetings, workshop, work sessions	Countries willing to participate Participating institutions continue	Evidence of improved implementation and/or enforcement of food safety, animal and/or plant health measures for trade, with attention to climate change, environment, gender and inclusion# and type of STDF knowledge products completed/published # Knowledge products that address climate change, environment, inclusion or gender equality # of people reached (disaggregated by gender and geography/region) with STDF good practices, knowledge products
Output 1:	Regional Research and Training Center on pesticides residues and biopesticides is operational in the region	# of people trained by the Center (disaggregated by gender) capable of (i) ensuring strict adherence to the study protocol and (ii) demonstrating technical knowledge in data generation competencies; Number of laboratories implementing (or in process to implement) ISO Certification and/or GLP recognition Number of Biopesticides efficacy experimental protocols designed	National University records and registration Reports from expert team Social media publications	Some meetings will be held virtually Participating institutions continue	

Activities	1.1. Building regional research capacity 1.2. NC State to UCR to develop and deliver soft-skill curricula 1.3. UCR to NC State for staff exchanges and further development of soft-skill curricula 1.4. Courses (in-person and on-line) Offered to Beneficiary Groups (IR4/MUF-UCR; CICAP-UCR)				
Output 2	Countries take national measures in support of regional biopesticide regulatory harmonization	- Number of registered biopesticide products identified as mitigation measures. - Number of participating countries registering biopesticides. - Development of regional harmonized guidelines for the registration of biopesticides in coordination with the IICA/USDA Regulatory programs.	- Close communication/coordination with pesticide regulators in the participating countries. - Close communication/coordination with industry.	- High level commitment by key policymakers and regulators in the participating countries. - Industry cooperation. - The development of regional regulatory harmonization guidelines may take time and may be subject to national legal domestication challenges.	
Activities	2.1 Biopesticide regulatory strengthening at the national and regional levels 2.2 Biopesticide registrations for residue mitigation 2.3 Harmonized evaluation criteria				
Output 3:	Residue Data and Improved Knowledge to Interpret it on the use of Biopesticides (Residue Mitigation Studies)	Number of field residue mitigation studies on specific pesticides / commodities (Target =12) Number of protocols generated for pesticide mitigation.	Published reports CABI website Laboratory data	In-kind and financial contributions provided by relevant stakeholders Normal growing season devoid of significant inclement weather or any other factors that would render the field trial data unacceptable Scientists available to attend trainings and apply knowledge gained in follow-	

		Number of commercial biopesticides of participating countries listed in CABI Bioprotection portal		up	
Activities	3.1 Group training on field and laboratory research (12) 3.2 Individual training on field and laboratory research (12) 3.3 Countries conduct residue decline studies and bioefficacy studies (12)				
Output 4	National and regional strategy to improve the supply of phytosanitary solutions for minor crops established through collaborative work between the STDF 753 project and the MUF.	Two regional priority proposals, with at least 50 prioritized crop/chemical combinations, submitted by Latin America and the Caribbean in MUF consultative processes. Two proposals developed for the institutional incorporation of minor uses at the country level and methodological proposal for the development of a regional strategy for minor uses. Developed a communication and dissemination strategy on minor uses.	MUF Database and products prioritized. Reports webpage and social media sites. Institutional decisions at the country level and in regional forums (CAC and CAN). Official documents on meetings of regional forums.	The MUF continues with its work plan in the coming years, as it is established today and has adequate financing to operate in the LATAM region. Reception and openness by the decision makers of the countries and regional forums to adopt minor uses as part of their priorities. Decision-making or the implementation of actions at the institutional level can exceed the lifetime of the project. The regional organizations give opening for the presentation, the dialogue and the positioning of the themes linked to the project.	
Activities	Activity 4.1 Positioning the MUF before the countries. Two virtual workshops and one in-person workshop. Activity 4.2 Political positioning of the MUF at the regional level. Six virtual dialogues with regional organizations. Activity 4.3 Developing methodologies for the institutional incorporation of minor uses. One consultancy, two virtual events. Activity 4.4 Regional communication and information strategy on minor uses and MUF.				

Output 5	Grower outreach program to promote the use of biopesticides established and linked to export promotion programs and domestic markets	Number of producers targeted with information (including step down training by master trainers) (disaggregated by gender and medium of communication) Number of existing extension agencies incorporating into their work plans related to the new phytosanitary solutions identified in the project.	Annual work programs of public and / or private institutions that have incorporated the results of the project.	The extension programs of the ministries of agriculture, research institutes and private sector organizations are willing to incorporate the results of the project into their agricultural extension programs.	
Activities	5.1 Inventory of distribution channels of the knowledge generated in the project (includes public and private extension programs, international organizations (such as CABI) and inventory of private sector associations and producer´s associations. In charge of IICA and the central administration of the project. 5.2 Develop a plan of approach to the extension programs identified to achieve their involvement in the dissemination of the knowledge developed. In charge of the consultant, the multimedia manager and the central management of the project. 5.3 Develop IPM documents for the phytosanitary solutions identified in the project. In charge of the consultant, the multimedia manager and the central management of the project. 5.4 Develop a virtual training program for trainers and / or extension workers of the public and private sector. In charge of the consultant 5.5 Develop a package of informational products to be delivered to the different extension instances for their use and dissemination. In charge of the consultant, the multimedia manager and the central management of the project. 5.6 Incorporate into the multimedia and communication program what is related to the scientific results obtained in the project. In charge of the consultant, the multimedia manager and the central management of the project.				

APPENDIX 2: Work Plan[7]

Activity	Responsibility	Year 1				Year 2				Year 3			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Program Management													
I. Inception Meeting: project goals, plans, outputs shared with partners, input provided and project guidance	Eric Bolaños EB Adriana Castañeda AC Nigel Hunter NH Michael Braverman MB Dirk Drost DD Veronica Picado VP Jason Sandahl JS Danesha Seth Carley DC Luis Suguiyama LS Kevin Rice KR												
II. Steering/Advisory Committee Meeting: annual meetings for guidance and progress	EB AC												
III. Reports to STDF: quarterly reports and final report	EB AC												
IV. Closing Meeting: review results, final evaluation, recommended follow up	EB AC												

Activity	Responsibility	Year 1				Year 2				Year 3			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4

Output 1: Regional Research and Training Center on pesticides residues and biopesticides is operational in the region

[7] Please shade or otherwise indicate when the activity will take place.

1.1. Building regional research capacity 1.2. NC State to UCR to develop and deliver soft-skill curricula 1.3. UCR to NC State for staff exchanges and further development of soft-skill curricula 1.4: Courses (in-person and on-line) Offered to Beneficiary Groups (IR4/MUF-UCR; CICAP-UCR)	VP JS LS GL Danesha Carley DC Wayne Jiang WJ Kevin Rice KR												

Activity	Responsibility	Year 1				Year 2				Year 3			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Output 2: Countries take national measures in support of regional biopesticide regulatory harmonization													
2.1 Biopesticide regulatory strengthening at the national and regional levels	JS EB LS												
2.2 Biopesticide registrations for residue mitigation													
2.3 Harmonized evaluation criteria													

Activity	Responsibility	Year 1				Year 2				Year 3			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Output 3: Residue data and improved knowledge to interpret this data on the use of biopesticides (Residue Mitigation Studies)													
3.1 Group training on field and laboratory research (12)	JS KR WJ Grace Lennon GL MB DD												
3.2 Individual training on field and laboratory research (12)													
3.3 Countries conduct residue decline studies and bioefficacy studies (12)													

Activity	Responsibility	Year 1				Year 2				Year 3			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Output 4: Regional strategies to improve the supply of phytosanitary solutions for minor crops established (Minor Use Foundation Chapter Latin America)													
4.1 Positioning the MUF before the countries. Two virtual workshops and one in-person workshop.	EB AC VP LS JS MB DD												
4.2 Political positioning of the MUF at the regional level. Six virtual dialogues with regional organizations													
4.3 Developing methodologies for the institutional incorporation of minor uses. One consultancy, two virtual events.													

4.4 Regional communication and information strategy on minor uses and MUF.													

Activity	Responsibility	Year 1				Year 2				Year 3			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Output 5: Grower outreach program to promote the use of biopesticides established and linked to export promotion programs and domestic markets													
5.1 Inventory of distribution channels of the knowledge generated in the project (includes public and private extension programs, international organizations (such as CABI) and inventory of private sector associations and producer´s associations. In charge of IICA and the central administration of the project.	EB JS LS VP KR												
5.2 Develop a plan of approach to the extension programs identified to achieve their involvement in the dissemination of the knowledge developed. In charge of the consultant, the multimedia manager and the central management of the project.													
5.3 Develop IPM documents for the phytosanitary solutions identified in the project. In charge of the consultant, the multimedia manager and the central management of the project.													
5.4 Develop a virtual training program for trainers and / or extension workers of the public and private sector. In charge of the consultant													
5.5 Develop a package of informational products to be delivered to the different extension instances for their use and dissemination. In charge of the consultant, the multimedia manager and the													

central management of the project. 5.6 Incorporate into the multimedia and communication program what is related to the scientific results obtained in the project. In charge of the consultant, the multimedia manager and the central management of the project.														

APPENDIX 3: BUDGET

		IN-KIND	
STDF LATAM Project Budget	**STDF**	**Beneficiary Countries**	**Partners**
Inception workshop			
Consultancy fees	$3,900		
Interpretation services	$1,000		
Subtotal Inception workshop	**$4,900**		
Output 1: Regional Research and Training Center on pesticides residues and biopesticides is operational in the region			
Activity 1.1: Building Regional Research Capacity			
Consultancy fees	$6,500		
1.2. NC State to UCR to develop and deliver functional capacities curricula			
Consultancy fees	$6,500		
Air travel to Costa Rica	$7,000		
DSA (5 days)	$3,750		
Miscellaneous (visas, vaccinations, PCR test, travel insurance)	$1,000		
Local transportation	$625		
Venue conference space		$2,500	
NC State and UCR staff salary in-kind		$5,000	$10,000
1.3. UCR to NC State for staff exchanges and further development of functional capacities curricula			
Consultancy fees	$6,500		
Air travel to Costa Rica	$7,000		
DSA (5 days)	$4,675		
Miscellaneous (visas, vaccinations, PCR test, travel insurance)	$1,000		
Local transportation	$1,000		
Venue conference space		$2,500	
NC State and UCR staff salary in-kind		$5,000	$10,000
Activity 1.4: Courses (in-person and on-line) Offered to Beneficiary Groups (IR4/MUF-UCR; CICAP-UCR)			
Consultancy fees	$19,000		
Training of Trainers (Communication Skills)			$4,000
Training of Trainers (Technical Skills)			$161,000
On-Line courses of soft skills	$7,000		
Sub-total	**$71,550**	**$15,000**	**$185,000**
Output 2: Countries take national measures in support of regional biopesticide regulatory harmonization			
Activity 2.1: Biopesticide regulatory strengthening at the national and regional levels			
Consultancy fees	$4,000		
Activity 2.2: Biopesticide registrations for residue mitigation			
Consultancy fees	$4,000		
Activity 2.3: Harmonized evaluation criteria			
Consultancy fees	$11,000		

Air travel to Argentina, Paraguay, Dominican Republic (to support Activities 2.1, 2.2, and 2.3)	$8,000		
DSA (4 days x 3 trips)	$5,000		
Miscellaneous (visas, vaccinations)	$600		
Venue conference space		$3 000,00	
Local transportation	$600		
Sub-total	**$41,200**	**$3,000**	
Output 3: Residue Data and Improved Knowledge to Interpret it on the use of Biopesticides (Residue Mitigation Studies)			
Activity 3.1: Group training on field and laboratory research. (12)			
Consultancy fees	7,800	0	
IR4, MUF in-kind staff salary		0	2,500
Interpretation services	3,000	**0**	
Activity 3.2: Individual training on field and laboratory research. (12)			
Consultancy fees	27,300	0	
IR4, MUF in-kind staff salary			5,000
Air travel to 7 project countries	39,500	**0**	
DSA (3 days per country visit)	18,480	**0**	
Venue conference space		3,500	
Local transportation	3,200	**0**	
Miscellaneous (visas, vaccinations, PCR test, travel insurance)	5,000	**0**	
Interpretation services	17,000	**0**	
Activity 3.3: Countries conduct residue decline studies and bioefficacy studies (12)			
Consultancy fees	58,500	0	
IR4, MUF in-kind staff salary		0	10,000
Budget for each country x 12 countries		**0**	
Field multi-residue decline studies (Field)	72,000	**0**	
Field multi-residue decline studies-analysis (Lab)	54,000	**0**	
Field bipesticide efficacy studies	72,000	**0**	
Small equipment - grinders and dry ice generators	42,000	**0**	
Personnel, field and Laboratory equipment use fees and maintenance contracts, use of hoods and physical space and scientific personnel (In-kind by hosting institutions)		480,000	
Analytical, field test substances and biopesticides contributed by industry		0	42,000
Sub-total	**419,780**	**483,500**	**59,500**
OUTPUT 4 Regional strategy to improve the supply of phytosanitary solutions for minor crops established (Minor Use Foundation Chapter Latin America)			
Activity 4.1 Positioning the MUF before the countries. Two virtual workshops and one in-person workshop.			
Consultancy fees	6000		
IR4, MUF in-kind staff salary and support			41500
Air travel to Colombia	25000		
DSA (3 days)	15600		
Miscellaneous (visas, vaccinations, PCR test, travel ensurance)	5200		
Venue conference space	12000		
Local transportation	1300		
Interpretation services	7500		

Activity 4.2 Political positioning of the MUF at the regional level. Six virtual dialogues with regional organizations			
Consultancy fees	6000		
MUF in-kind staff salary			2500
Activity 4.3 Developing methodologies for the institutional incorporation of minor uses. One consultancy, two virtual events.			
Consultancy fees	6000		
MUF in-kind staff salary			2500
Activity 4.4 Regional communication and information strategy on minor uses and MUF.	Develop multimedia tools to help disseminate and communicate the work of the MUF and promotion of minor uses		
Consultancy fees	8250		
MUF in-kind staff salary			2500
Sub-total	**92850**		**49000**
Output 5: **Grower outreach program to promote the use of biopesticides established and linked to export promotion programs and domestic markets**			
5.1 Inventory of distribution channels of the knowledge generated in the project (includes public and private extension programs, international organizations (such as CABI) and inventory of private sector associations and producer´s associations. In charge of IICA and the central administration of the project.			
IICA In-Kind activity	**0**	**0**	**$10,000**
5.2 Develop a plan of approach to the extension programs identified to achieve their involvement in the dissemination of the knowledge developed. In charge of the consultant, the multimedia manager and the central management of the project.			
Consultancy fees	$5,000		
5.3 Develop IPM documents for the phytosanitary solutions identified in the project. In charge of the consultant, the multimedia manager and the central management of the project.			
Consultancy fees	10,000		
5.4 Develop a virtual training program for trainers and / or extension workers of the public and private sector. In charge of the consultant			
Consultancy fees	14,000		
Translation services	2,000		**5,000**
5.5 Develop a package of informational products to be delivered to the different extension instances for their use and dissemination. In charge of the consultant, the multimedia manager and the central management of the project.			
Materials	10,000		
5.6 Incorporate into the multimedia and communication program what is related to the scientific results obtained in the project. In charge of the consultant, the multimedia manager and the central management of the project.			
Materials	10,000		
Sub-total	**51,000**		**15,000**
FINAL DISEMINATION MEETING (Virtual)			
Consultancy fees	$4,550		
Interpretation services	$1,000		
Subtotal	**$5,550**		
OTHERS			
End of project independent assessment	$15,000		
Subtotal Others	**$15,000**		
Program Management			

IICA's contribution in management, administration and administration. (Headquarters and 11 IICA Offices). Approximately 25 officials.			$116,400
Community manager	$14,000		
Program Assistant IICA	$10,800		
Consultant Project Manager	$53,000		
IR4, MUF, USDA in-kind staff salary			$12,500
Sub total PM	**$77,800**	**$0**	**$128,900**
PROJECT SUBTOTAL 1 (SUM of all outputs + PM + OTHERS)	**$779,630**	**$501,500**	**$437,400**
Contigency funds (5% of subtotal above)	**$38,982**		
PROJECT SUBTOTAL 2	**$818,612**		
IICA Overhead (10% of project subtotal 2)	**$81,861**		
TOTAL REQUESTED FROM STDF (Sum of subtotal 2 + overhead	**$900,473**		
GRAND TOTAL (REQUESTED STDF + beneficiary countries and partners)	**$1,839,373**		

APPENDIX 6: Key technical staff involved in project implementation

JASON SANDAHL (Technical Team Leader)

Education:

Ph.D. Environmental and Molecular Toxicology. Oregon State University, Corvallis, Oregon.
Work included research of agricultural pesticides runoff and impacts native fish; laboratory water quality testing; interpretation and analysis of quantitative data in relation to water quality standards; publication of technical reports in professional scientific journals; and public outreach to present technical findings at local and international meetings.

B.S. Chemistry. Oregon State University, Corvallis, Oregon.
Specialty areas included research on the chemistry of natural and agricultural products.

Work History

Current:

President. Ag Aligned Global, LLC: In 2021, I founded Ag Aligned Global, an international consulting organization focused on pesticide regulatory and scientific capacity building, as well as food safety and sanitary/phytosanitary rules and regulations. Ag Aligned is currently working on projects related to residue data generation for MRLs, biopesticides, regional regulatory alignment, and global cooperative programs.

Board of Directors (Volunteer). Minor Use Foundation: I am a founding member of the Minor Use Foundation, a non-profit organization with the aim of supporting U.S. specialty crop farmers by partnering with foreign researchers, regulators and private industry to identify and generate data for new registrations and MRLs to facilitate international trade.

International Program Manager. U.S. Department of Agriculture/Foreign Agricultural Service, Washington DC, 2005-20.

Planned, developed, and coordinated international agricultural trade capacity building programs in Africa, Asia, Central and South America, and Eastern Europe by providing senior level scientific guidance. This included the following; write and review proposals for program funding by identifying current agricultural trade and international regulatory SPS needs; plan long-term development strategies by corresponding with State Department and USDA foreign service officers, U.S. regulatory agencies, foreign governments, and U.S. industries and exporters; implement technical assistance training activities; prepare final program progress reports; manage financial agreements with U.S. funding agencies and contractor organizations; prepare briefing reports to senior staff; and ensure that programs support agency goals and objectives. Work required inter-agency cooperation and scientific exchanges between USDA Agricultural Affairs Officers, the Environmental Protection Agency, Food and Drug Administration, U.S. Agency for International Development, U.S. Trade Representatives, and the Department of State. I regularly participated in international outreach efforts to select highly qualified candidates for agricultural capacity building programs.

The technical assistance programs aim to strengthen international compliance with the rules and regulations of the World Trade Organization (WTO) and the international standard setting bodies, such as Codex Alimentarius. Conducting this level of work required an understanding of current international trade agreements, U.S. food safety trade policies and regulations, the roles of U.S. regulatory agencies and the U.S. Trade Representatives in international agricultural trade, and the Agency Strategic Pillars. Programs required negotiating and establishing cost-reimbursable agreements with U.S. Land Grant Universities Minority Serving Institutes, and international organizations.

Programs required frequent international travel, working with the various international economic organizations to better understand the science-based food safety regulations and policies used in the United States. This

required analysis of U.S. and foreign government food safety policies related to international trade, and responding to new developments in trade actions, such as following and helping to progress specific free trade agreements. This required presenting technical programs to supervisors and senior management, describing technical assistance strategies, and selecting appropriate training providers. It also requires representing USDA at meetings and conferences with foreign government representatives and U.S. industries. To accomplish these goals, I led project teams to implement science-based programs, developing strategic work plans and reporting results.

Assistant Professor. University of Swaziland, Swaziland, Africa (U.S. Fulbright Scholar), 2004-05.
Participated in a scientific exchange program where I taught courses ranging from introductory laboratory chemistry to upper-level special topics in environmental pollution and agricultural toxicology. Research projects included investigations of heavy metals, agricultural pesticides, and contaminants in local rivers, in collaboration with local agricultural industries, including the sugarcane growers. Biological research tested the efficacy and safety of pesticides and natural products on animals. Quantitative results and an analysis of the regulatory implications of the findings were presented to the agricultural industries, regulatory agencies, and U.S. Embassy staff, at both local meetings and in a final technical report, where I provided guidance to staff on scientific and agricultural exchange programs.

Fisheries Toxicologist. Hokkaido University, Field Science Center for the Northern Biosphere, Sapporo, Japan (Post-doctoral Researcher), 2004.

Participated in a scientific exchange program where I led a laboratory research project that investigated the efficacy and safety of copper, used as a chemical treatment for diseases in Japanese hatcheries, on salmon. Quantitative results and treatment options and recommendations were provided to local hatchery senior- level managers, a final technical report was published in a professional scientific journal, and the findings were presented at an international fisheries conference. The entire program involved negotiating scientific methods to be used in the study, resolving complex analytical procedures with Japanese Fisheries Agency counterparts, and resolving problems related to the interpretation of data with senior staff.

Aquatic Toxicology Consultant. Labat-Anderson Inc., McLean, VA, 2002-03.

Wrote technical sections of Risk Assessments, Proposed Actions and Alternatives, Environmental Impact Statements, and Biological Assessments that dealt with pesticides and endangered salmon. This involved a comprehensive review and analysis of technical data related to the impacts of agricultural pesticides and contaminants on endangered salmon species. I provided final report options and recommendations to the U.S. National Marine Service, the U.S. Environmental Protection Agency, and the Oregon Bureau of Land Management (BLM). As the technical expert on the issue, I also participated in public outreach and public hearings to present and defend the controversial conclusions. The entire program involved participating in highly contentious inter-agency negotiations between the BLM and the U.S. federal regulatory agencies on a very sensitive issue.

Toxicology Information Specialist. National Pesticide Information Center, Oregon State University (funded by U.S. Environmental Protection Agency), Corvallis, OR, 1988-94.

Developed and maintained a public database of pesticide toxicology information for the center. The data, which related to human and animal health and safety, was gathered from U.S. and international government publications, scientific journals, and non-government sources. The data was screened and analyzed for scientific quality and relevance, then presented in an electronic database for rapid access. The center's telephone hotline specialists used this database to communicate sensitive toxicological information to the concerned public.

Scientific publications:

Sandahl JF, Baldwin DH, Jenkins JJ, Scholz, NL. 2007. A Sensory System at the Interface Between Stormwater Runoff and Salmon Survival. *Environmental Science and Technology (web published 3-14-07)*.

Sandahl JF, Miyasaka G, Koide N, Ueda H. 2006. Inhibition and recovery of olfactory function in chum salmon (*Oncorhynchus keta*) following copper exposure. *Canadian Journal of Fisheries and Aquatic Scien*ce 63: 1840-1847.

Sandahl JF, Baldwin DH, Jenkins JJ, Scholz NL. 2004. Comparative thresholds for acetylcholinesterase inhibition and behavioral impairment in coho salmon exposed to chlorpyrifos. *Environmental Toxicology and Chemistry* 24: 169-178.

Buchwalter DB, Sandahl JF, Jenkins JJ, Curtis LR. 2004. Roles of uptake, biotransformation, and target site sensitivity in determining the differential toxicity of chlorpyrifos to second to fourth instar *Chironomous riparius* (Meigen). *Aquatic Toxicology* 66: 149-157.

Baldwin DH, Sandahl JF, Labenia J, Scholz NL. 2003. Sublethal effects of copper on coho salmon: impacts on non-overlapping receptor pathways in the peripheral olfactory nervous system. *Environmental Toxicology and Chemistry* 22: 2266-2274.

Sandahl JF, Baldwin DH, Jenkins JJ, Scholz, NL. 2003. Odor-evoked field potentials as indicators of sublethal neurotoxicity in juvenile coho salmon exposed to common agricultural pesticides. *Canadian Journal of Fisheries and Aquatic Scien*ce 61: 404-413.

Sandahl JF and Jenkins JJ. 2002. Pacific steelhead (*Oncorhynchus mykiss*) exposed to chlorpyrifos: benchmark concentration estimates for acetylcholinesterase inhibition. *Environmental Toxicology and Chemistry* 21: 2452-2458.

DANESHA SETH CARLEY

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EDUCATION

North Carolina State University, Raleigh, NC, Crop Science, Postdoctoral Fellow, 2007-2010
North Carolina State University, Raleigh, NC, Co-Major, Plant Pathology and Crop Science, Ph.D., 2006
The University of Tennessee, Knoxville, TN, Entomology and Plant Pathology, M.S., 2001
Earlham College, Richmond, IN, Biology, B.S., 1998

EMPLOYMENT

Director, Center for Integrated Pest Management (CIPM), 2021-present
Interim Co-Director, Center for Integrated Pest Management (CIPM), 2018-2020
Director, Center of Excellence for Regulatory Science in Agriculture, NC State, 2017-present
Director, Southern IPM Center, CIPM, NC State, 2015-2020
IPM Coordinator, State of NC, NC State, 2013-present
Associate Professor, Department of Horticultural Science, NC State University, 2016-present
Assistant Professor, Department of Horticultural Science, NC State University, 2015-2016
Assistant Professor, Department of Crop Science, NC State University, 2010-2015

BOOKS

Pollinator Gardening for the South: Creating Sustainable Habitats by Danesha Seth Carley and Anne Spafford. UNC Press, Chapel Hill, NC. 152pp. March 2021.

Community Gardening for the South: Building Community from the Ground Up by Danesha Seth Carley. UNC Press, Chapel Hill, NC (*proposal accepted* April, 2021)

PEER-REVIEWED PUBLICATIONS

Mata, M., D. Seth Carley, E. Youngstead, J-J. Dubois, T. W. Rufty. 2021. Bee Nutrition in a Changing Climate. PlosOne. *Submitted*.

Seth Carley, D., L. A. Gragg, M. J. Taggart, T. W. Rufty. 2021 Estimation of water stress tolerance of six woody plant species. Horticulture International Journal. 5(2): 64-72.

Seth Carley, D. and K. Armbrust. 2021. Making the Case for Regulatory Science in Agriculture. ACS Agricultural Science & Technology. Manuscript ID: as-2021-00011y.

Billeisen, T.L., L.D. Kilpatrick, D. Seth Carley, R. L. Brandenburg. 2021. Presence of Pollinator-Friendly Habitat on Pollinator Communities in Managed Turfgrass Systems. International Turfgrass Society Research Journal. doi: https://doi.org/10.1002/its2.56.

Levine, S.L., J. Giddings, T. Valenti, G.P. Cobb, D. Seth Carley, L.L. McConnell. 2019. Overcoming Challenges of Incorporating Higher-Tier Data in Ecological Risk Assessments and Risk Management of Pesticides in the United States: Findings and Recommendations from the 2017 Workshop on Regulation/Innovation in Agriculture. Integrated Environmental Assessment and Management (IEAM). 15(5): 714–725. doi: 10.1002/ieam.4173.

Mata, M., D. Seth Carley, A. Hamblin, and J-J Dubois. 2019. Community Outreach as a Tool for Bee Conservation Efforts. Journal of Extension. 57:5 https://joe.org/joe/2019october/tt5.php

Seth Carley, D., D.L. Jordan, C.L. Dharmasri, B.B. Shew, T.B. Sutton and R.L. Brandenburg. 2018. Examples of Differences in Red Edge Reflectance and Normalized Difference Vegetative Index caused by Stress in Peanut. Crop, Forage, & Turfgrass Management DOI: 10.2134/cftm2018.06.0042.

Riar, M. D.S. Carley, C. Zhang, M.S. Schroeder-Moreno, D.L. Jordan, T.M. Webster, and T.W. Rufty. 2016. Environmental influences on growth and reproduction of invasive *Commelina benghalensis*.

International Journal of Agronomy, vol. 2016, Article ID 5679249, 9 pages, 2016. doi:10.1155/2016/5679249. http://www.hindawi.com/journals/ija/2016/5679249/

Shekoofa, A., P. Rosas-Anderson, D. Seth Carley, T.R. Sinclair, T.W. Rufty. 2016. Limited transpiration under high vapor pressure deficits of creeping bentgrass by application of Daconil-Action®. Planta 243: 421-427.

Stalling, K.D., D. Seth Carley, and R. Richardson. 2015. Management of aquatic vegetation in the Southeastern United States. Journal of Integrated Pest Management 6:1-5.

Dell, E., D. Seth Carley, T. Rufty, and W. Shi. 2012. Heat stress and N fertilization affect soil microbial and enzyme activities in the creeping bentgrass (*Agrostis stolonifera* L.) rhizosphere. Applied Soil Ecology 56:19-26.

Seth Carley, D., D. Goodman, S. Sermons, D. Bowman, G. Miller, and T. Rufty. 2011. Organic matter accumulation in creeping bentgrass greens: A Chronosequence with implications for management and carbon sequestration. Agronomy Journal 103:604-610.

Seth Carley, D., S. Davis, D. Bowman, L. Tredway, T. Rufty and C. Peacock. 2009. Effluent application to creeping bentgrass in the transition zone: Effluent analysis and potential negative effects from salinity and low oxygen. International Turfgrass Society Research Journal. 11:1023-1031.

Seth Carley, D., D.L. Jordan, R.L. Brandenburg and C. Dharmasri. 2009. Factors influencing response of Virginia market type peanut (*Arachis hypogaea*) to paraquat under weed-free conditions. Peanut Science 36:180-189.

Seth Carley, D., D.L. Jordan, B.B. Shew, T.B. Sutton, L.C. Dharmasri and R.L. Brandenburg. 2009. Influence of digging date and fungicide program on canopy defoliation and pod yield of peanut (*Arachis hypogaea* L.). Peanut Science 36:77-84.

Seth Carley, D., S. Davis, D. Bowman, L. Tredway and T. Rufty. 2009. Physiological stress of bentgrass associated with effluent-application in the Southeastern U.S. International Turfgrass Society Research Journal 11:1023-1031.

Seth Carley, D., D.L. Jordan, L.C. Dharmasri, T.B. Sutton, R.L. Brandenburg, and M.G Burton. 2008. Peanut response to planting date and potential of canopy reflectance as an indicator of pod maturation. Agronomy Journal 100:376-380. 10.2134/agrojnl2006.0352

Rufty, T., D. Bowman, G. Miller, M. Jennette, L. Warren, D. Seth Carley, C. Peacock and F. Yelverton. 2008. Surface water quality adjacent to golf courses in the Southern Appalachia. Acta Horticulturae 783:229-238.

EXTENSION PUBLICATIONS

Seth Carley, D. and Billeisen, T. 2020. Creating a pollinator-friendly habitat in your home landscape. March/April Tennessee Nursery and Landscape Association Magazine

Seth Carley, D. and Billeisen, T. 2019. 5 Steps to creating a pollinator-friendly habitat on your golf course. January/February North Carolina Turfgrass Magazine

Seth Carley, D. and Adams, R. 2019. If weeds could talk: IPM Indicator weeds in home lawns. March/April North Carolina Turfgrass Magazine

Seth Carley, D. and S. Klein. 2016. Got Pollinators? Get the buzz on establishing pollinator habitat on your golf course, in your yard, or almost anywhere! May/June North Carolina Turfgrass Magazine

Seth Carley, D. 2016. Pollinator habitat for the bees, birds, and butterflies. Spring Issue, North Carolina Field and Family

Burgner, G., and Seth Carley, D. 2015. Alternative Turfgrass for Out of Play Areas on Golf Courses September/October North Carolina Turfgrass Magazine

Seth Carley, D. 2015. How to keep cockroaches out of your home using IPM. Southern IPM Center blog post. http://ipmsouth.com/2015/01/07/how-to-keep-cockroaches-out-of-your-home/

Seth Carley, D. and Stallings, K. 2014. Natives in, Turfgrass Out – Recovering from back-to-back US Opens November/December North Carolina Turfgrass Magazine

Seth Carley, D. and Stallings, K. 2014. Turfgrass out, Natives in! September/October North Carolina Turfgrass Magazine

Bass, K., Burchell, M., Evans, R., Hunt, W., Line, D., and Seth Carley, D. 2013. Stormwater Wetlands for Golf Courses. North Carolina Extension Publication AG-765

Seth Carley, D. and Hamon, L. 2012. Golf Courses as Good Environmental Stewards. January/February issue North Carolina Turfgrass Magazine

Rufty, T., Seth-Carley, D., Tredway, L.P. 2009. Problems surface with effluent use on turf in the Southeast. TurfGrass Trends

Rufty, T., Goodman, D., Seth-Carley, Bowman D. and Miller, G. 2008. Organic matter accumulation in bentgrass putting greens: How well can it be controlled? North Carolina Turfgrass Magazine

Ownley, B.H., Pereira, R., Seth, D., Hamilton, C. and Dee, M. 2001. Growth promotion and early flowering of tomatoes with beneficial bacteria. *In* 2000 Vegetable Initiative Progress Report, University of Tennessee Pub. No. E11-6515-01-001-01. pp 175-177.

Ownley, B.H., Pereira, R., Seth, D., Hamilton, C. and Dee, M. 2000. Growth promotion and early flowering of tomatoes with beneficial bacteria. *In* 1999 Vegetable Initiative Progress Report, University of Tennessee Pub. No. E11-6515-01-001-00. pp 256-260.

ABSTRACTS

McConnell, L.L., Seth Carley, D., Tang, J.X. Results of a multi-stakeholder workshop on incorporating the benefits of vegetative filter strips into aquatic risk assessment and risk management of pesticides. IUPAC International Congress of Crop Protection Chemistry. P1.4, p. 27. Ghent, Belgium. May 2019.

Seth Carley, D., Tang, J., Fox, G., Truman, C., and McConnell, L.L. Results of a Multi-Stakeholder Workshop on Incorporating the Benefits of Vegetative Filter Strips into Aquatic Risk Assessment & Risk Management. American Chemical Society Meeting. San Diego, CA. August 2019.

Seth Carley, D., Mata, M., and Spafford, A. Urban gardens as a platform for experiential learning: Pollinator conservation, citizen science, and sustainability. International IPM Symposium. Baltimore, MD. March 2018.

Kilpatrick, L., Seth Carley, D. and Billeisen, T. A Comparison of Pollinator Communities in Managed Turfgrass Systems in the Piedmont and Sandhills of North Carolina. Poster Presentation at the NC State Turfgrass Center's Education and Research Symposium. Raleigh, NC. December 2018.

Mata, M., Seth Carley, D., Youngsteadt, E, and Rufty, T. Environmental Effects on Pollen in Five Insect-Pollinated Herbaceous Annuals. Annual Conference of the American Society for Horticultural Science https://ashs.confex.com/ashs/2017/meetingapp.cgi/Paper/26798. Waikoloa, HI. September 2017.

Seth Carley, D., and Spafford, A. Experiential Learning for Students and the Community: Researching, Designing, and Building Pollinator Habitats. Green Cities International Symposium. Bologna, Italy. September 2017.

Seth Carley, D., and McConnell, L.L. Overcoming the Higher Tier Challenges in Risk Assessment and Risk Management of Pesticides. Workshop on Higher Tier Challenges in Risk Assessment. Raleigh, NC. October 2017.

Seth Carley, D., O'Brien, J., López-Uribe, M., Tarpy, D., McLaughlin, R. and Rufty, T. Converting Marginal Land along Roadsides to Pollinator Habitat: Does it Make a Difference? ESA Presentation #106639 - 2016 Southeastern Branch Meeting. Raleigh, NC. March 2016.

Seth Carley, D., O'Brien, J. Assessment of pollinator habitat along roadsides in the Piedmont of North Carolina. 2016. 6th International Conference on Landscape & Urban Horticulture. Athens, Greece. June 2016.

Gragg, L., Fair, B., Seth-Carley, D. Assessment of rootball planting treatments of two species of container grown trees. 2016. 6th International Conference on Landscape & Urban Horticulture. Athens, Greece. June 2016.

O'Brien, J., Seth Carley, D., Lopez-Uribe, M., McLaughlin, R., Tarpy, D. and Rufty, T. Survey of Anthophilous Insects in Wildflower Habitat and Wildflower-free Habitat Along Interstates in North Carolina. Entomological Society of America, Minneapolis, MN. November 2015.

O'Brien, J., Seth Carley, D., Lopez-Uribe, M., McLaughlin, R., Tarpy, D. and Rufty, T. Initial Research on Anthophilous Insects in Wildflower Habitat and Wildflower-free Habitat Along Interstates in North Carolina. Protecting Pollinators in Ornamental Landscapes Conference. Raleigh, NC. October 2015.

Lewis, J. O'Brien, D. Seth Carley, R. McLaughlin, D. Tarpy, J. Heitman and T. Rufty. Incorporating Multiple Ecosystem Services into the Design of Low Impact Development Strategies. 70th Soil and Water Conservation Society International Annual Conference, Greensboro, NC. July 2015.

Seth Carley, D., R.D. Hallberg, and H.Y. Fadamiro. The Southern IPM Center's 2015 Friends of IPM Awards. The 8th International IPM Symposium. March 2015.

Seth Carley D., R.D. Hallberg, and J.R. VanKirk. The IPM eAcademy: online presentations and webinars addressing important IPM-related issues. The 8th International IPM Symposium. March 2015.

Seth Carley, D., R.D. Hallberg, J.R. VanKirk, J. LaForest, H.Y. Fadamiro, R. Boudwin, and A. Belskis. The Southern IPM Center's Signature Programs. The 8th International IPM Symposium. March 2015.

Stallings, K, T. Rufty, R. Richardson, and D. Seth-Carley. 2013. Sustainable managed ecosystems: A case study. 2013 North Carolina State University Graduate Student Research Symposium, Raleigh, NC. March 2013.

Vance, L., W. Robarge, D. Carley, T. Rufty. Biotic and abiotic factors controlling nitrous oxide emissions from an agricultural soil. ASA Annual Meeting Abstracts 140-27. 2010.

Riar, M., J. Spears, J. Burns, T. Webster, D. Carley, T. Rufty. Benghal dayflower seed viability and impact on dispersal. ASA Annual Meeting Abstracts 194-3. 2010.

Carley D., T. Rufty, S. Sermons, L. Vance, D. Bowman and W. Shi. Carbon storage under bermudagrass fairways in the southeast. ASA Annual Meeting Abstracts 202-212. 2010.

Seth Carley, D., D. Goodman, L. Tredway and T. Rufty. Organic matter accumulation in bentgrass greens: Temporal and spatial characterizations. Agronomy Society Abstracts. Pittsburg, PA. 2009

Seth Carley, D., L. Tredway and T. Rufty. Warm-season grass diseases. 24th Australian Golf Course Superintendents Association Conference. v. 13 pp 30-33. Proceedings of 24th Australian Turfgrass Conference. Sydney, Australia. July 2008.

Seth Carley, D., L. Tredway, and T. Rufty. Summer decline in bentgrass. 24th Australian Golf Course Superintendents Association Conference. v. 13 pp 53-55. Proceedings of 24th Australian Turfgrass Conference. Sydney, Australia. July 2008.

Seth Carley, D., L. Tredway and T. Rufty. Impact of heat on shoot and root function in bentgrass. Agronomy Society Meeting Abstracts. Houston, TX. October 2008.

Seth Carley, D., J. Cappy, L. Tredway and T. Rufty. Heat and nutritional interactions in bentgrass. Agronomy Society Meeting Abstracts. New Orleans, LA. November 2007.

Seth Carley, D., D. Jordan, M. Burton, C. Dharmasri, T. Sutton and R. Brandenburg. Using hyper spectral imaging to predict peanut pod maturity. Proc. Am. Peanut Res. and Ed. Soc. 37:34-35. 2005.

Jordan, D., Seth Carley, D. and Johnson, D. Influence of planting date on peanut response to paraquat, 2,4-DB, and plant removal. Proc. Am. Peanut Res. and Educ. Soc. 37:62. 2005.

Pearce, J., Jordan, D., Johnson, P., Seth Carley, D. Alston, J., Callis, D. and Corbett, T. Accuracy of using heat units to predict peanut maturity during 2003 and 2004 in North Carolina. Proc. Am. Peanut Res. and Educ. Soc. 37:65. 2005.

Dharmasri, C., Seth Carley, D., Jordan, D., Burton, M., Sutton, T. and Brandenburg, R. Preliminary evaluation of diseased and non-diseased peanut leaves using hyper spectral imaging. Proc. Am. Peanut Res. and Educ. Soc. 37:92. 2005.

Seth Carley, D., Jordan, D.L., Burton, M.G., Sutton, T.B., Brandenburg, R.L., Johnson, P.D. and Dharmasri, C. Varying inputs to evaluate peanut maturity using hyperspectral imaging. Proc. South. Weed Sci. Soc. 58:3. 2005.

AWARDS

Team Award, CIPM "Excellence in Regulatory Affairs and Crop Security" Award from the American Phytopathological Society, 2016

Pathways Leadership Achievement Award, NC State, 2015

Excellence in Campus Sustainability "Green Brick" Award, NC State Office of Sustainability Programs, 2015

NC State's Student Government Outstanding Teaching Assistant Award, 2004 and 2005

"Phenomenal Teaching Assistant" Award, NC State, 2004

HIGHLIGHTED PROFESSIONAL SERVICE

American Chemical Society Editorial Board Member and Editor, 202-present

Journal of Integrated Pest Management Editorial Board Member, 2019-present

Grant Panel Manager Southern IPM Center Grants, 2016, 2017, 2018, 2019, 2020

Journal of Integrated Pest Management, Subject Editor 2010-present

Western IPM Center Director Interview Committee, February 2016

USAID Bureau for Food Security Jun 18, 2013 - June 19, 2013 Grant Panel Member

USAID MERC M31 Agricultural Grants Review Panel Member, 2010

OTHER PROFESSIONAL ACTIVITIES

NIFA's Tactical Sciences Coordination Network Executive Committee member, 2020-present

Committee for Lifelong Faculty Involvement, NC State, 2020-present

Council on the Status of Women, NC State, 2020-present

Journal of IPM Editor Mentor, 2020-present

Southern SARE Graduate Student Research Competition Grant Panel member, 2020

Grant Panel Member, Western IPM Center, 2017, 2018, 2019, 2020

Chancellor Appointed- NC State Sustainability Council – Academics, 2016 - 2018

Watson Fellowship Application Grant Panel – Environmental Institute for Golf, December 2015

Grant Panel Member - North Central IPM Center Regional Grant January, 2015

Coordination Lead – 2013 Earth Day at NCSU "From Barn to Brick", Sustainable Ag. at NCSU

CALS organizing committee for teaching activities on Centennial Campus Faculty Member, 2013-2014
Grant Panel Member - North Central IPM Center Regional Grant June, 2013
NC State University Lonnie Poole Golf Course Advisory Committee Member, 2013-2016
Historic Yates Mill Advisory Board Member, 2012-2019
CALS/Poole College of Management Coordinator for Executive Education, 2012-2015
NC State University's Office of Professional Development: How to Be a Highly Effective Project Manager, 2012
Visiting lecturer Centennial Middle School "How do Scientists Test Water Quality?", 2010 – 2013
Making Science Make Sense Panel Member and Teacher Resource, 2010-2012
Campus Environmental Sustainability Team (CEST) Advisory Council member for the Academics and Research and the Buildings and Land Use Working Groups, 2009-2012
Education and Outreach Coordinator for Environmental Activities and Research in Managed Ecologies, in conjunction with the Lonnie Poole Golf Course and the Centennial Campus Middle School, 2009-2015
EnvironMentor, 2009-2012
Ecology Advisor for the Lonnie Poole Golf Course, 2009-2017
"Expanding Your Horizons" workshop presenter and panelist, March 2007
"Scientist in the Classroom" annual guest lecturer in public schools, 2004-2009
NC State's Student Government Teaching Effectiveness Committee, 2005
Crop Science Graduate Student Representative to NC State's Student Government, 2004-2005
Crop Science Graduate Student Association President, 2004-2005
Crop Science Graduate Student Association Community Service Coordinator, 2004-2005

PROFESSIONAL ASSOCIATIONS AND MEMBERSHIPS

Agronomy Society Member (2003-2018)
American Horticultural Society (2015-present)
Carolinas Golf Course Superintendent Association (2007-present)
Crop Science Society Member (2003-2018)
Federal Pollinator Task Force (2015-2017)
Golf Course Superintendents Association of America (2007-present)
NC Pollinator Protection Task Force (2014-2016)
Multistate Technical Committee for Chemical Ecology for Pest Control and Pollinator Protection (2014-2019)
Multistate Technical Committee for South Eastern Turfgrass Research Association (2013-2017)
Soil Science Society Member (2008 - 2018)
W-4045 Multistate Technical Committee: Agrochemical Impacts On Human and Environmental Health: Mechanisms and Mitigation (2019-present)

ADRIANA CASTAÑEDA

Education:
Ph.D. Plant Pathology, University of de Florida. Gainesville, Florida. USA, 2005
M.Sc. Plant Pathology, University of de Florida. Gainesville, Florida. USA, 1999
B.Sc. Microbiology, Universidad de los Andes, Bogotá D.C., Colombia, 1990
Other Courses:
Specialization. Quality Assurance 17025.
Universidad Javeriana, Bogotá D.C., Colombia, 2008
Training workshop on JMPR procedures for evaluation of pesticide residue and estimation of MRLs, FAO. Ottawa, Canada, 2017

Professional experience:

International Consultant, Minor Use Foundation, 2020-present.

- PPG STDF approved project: Latin American Residue Mitigation through the Promotion of Biopesticides for Enhancement of Trade Opportunities
- Member of advisory committee of Asia Pesticide residue mitigation. Full STDF Project

Consultant, IR-4, 2018-20.

Technical Director Plant Laboratories, Colombian Agricultural Institute (ICA). In charge of 23 plant laboratories including LANIA, 2011-18.

Scientist in plant laboratories. Colombian Agricultural Institute (ICA). Seeds, plant diagnostics, plant quarantine, genetically modified organisms, 1991-2011.

Academic experience:

- Lecturer Universidad Nacional de Colombia in Master´s course in virus and bacterial plant pathogens. 2006-11.
- Lecturer Universidad Abierta y a Distancia (UNAD). Undergraduate courses, 1999-2002.

Publications and presentations:

- Castañeda, A. (2019). Estudios para establecimiento de límites máximos de residuos de plaguicidas (LMR) cómo las buenas prácticas de laboratorio (BPL) son necesarias en ensayos en campo. Ecuador es Calidad. Revista Científica Ecuatoriana. Pag. 8-9. 2019, vol. 6.
- Barbosa E., Rodríguez H., Soriano J., Ayala J., Castro R., Castañeda A., Brochado R., Lurvey E., Sandahl J. (2015).
- Technical studies in Colombia to stablish MRL for Spinetoram in avocado. LAPRW, Santiago de Chile, Chile.
- Keremane M., Ramagudu C., Castañeda A., Ángel J., Arévalo E., Lee R. (2015). “Candidatus Liberibacter caribbeanus” (Lca). Oral presentation. Ascolfi, Bogotá D.C., Colombia.
- Keremane M., Ramagudu C., Castañeda A., Diaz J., Arevalo E., Chen Y., Duan Y.P., Halbert S., Lee R. (2015). “Candidatus Liberibacter caribbeanus”. Poster. IRHLB, Orlando, Florida, US.
- Ferrucho R., González A. Ortiz H.E., Rodríguez V., López N., Rivero M., Alarcón J., Castañeda A. (2015). Pathogens associated with rice in Colombia. Poster. Ascolfi, Bogotá D.C., Colombia.
- Keremane, M.L., Ramadugu, C., Castañeda, A., Díaz, J.E.A., Peñaranda, E.A., Lee, R.F. (2014). Gene bank Candidatus Liberibacter sp. 'caribbeanus' clone 982 16S ribosomal RNA gene. Partial Sequence Gene Bank. http://www.ncbi.nlm.nih.gov/nuccore/KP012551.1

- Del Castillo J, Cárdenas M., Pinzón A., Castañeda A., Bernal A., Restrepo S. (2013). Desarrollando un sistema de identificación taxonómico de especies de Phytophthora basada en microsatellites. Revista Iberoamericana De Micologia ISSN: 1130-1406, 2013 vol:30 fasc: 2 págs: 88 – 95.
- Castañeda A. (2006). Mutagenesis of all eight avr de Xanthomonas campestris pv. campestris Oral presentation Ascolfi, APS Caribbean meeting. Cartagena, Colombia.
- Castañeda A., Reddy J., El Yacoubi B., Gabriel DW. (2005). Mutagenesis of all eight avr de Xanthomona s campestris pv. campestris. MPMI, ISSN 0894-0282.
- Duan Y., Castañeda A., Zhao G., Erdos G., Gabriel D.W. (1999). Expresion of a single gene. MPMI, ISSN 0894-0282.

WAYNE JIANG

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Tel: 517-336-4672, Email: jiangwa@msu.edu

AFFILIATED WITH College of Agriculture & Natural Resources, Department of Entomology, Environmental Science and Policy Program, and Center for PFAS and Emerging Contaminants.

PROFESSIONAL ACCOMPLISHMENTS AND ACTIVITIES:

- Principal Investigator (PI), of grants of USDA Foreign Agricultural Service to support international collaboration of Capacity Building on pesticide residue studies in Southeast Asia, Latin America and Africa. Projects are generally funded $250k-$500k/year.
- Expertise in EPA Good Laboratory Practices (GLP), especially in residue data generation.
- Co-PI of North Central Region IR-4 Program for the national pesticide clearance project, performed the residue studies in the regulatory environment of GLP, reviewed laboratory residue data for tolerance establishment, and generated residue data for international (Codex) MRLs. The NCR IR-4 Project is funded of $1,840,000/year by USDA NIFA.
- Trainer has trained lab chemists with EPA GLP standards in the US and foreign countries.
- Have worked on USDA Capacity Building projects in the past 10+ years.
- As a director of pesticide laboratories for 20 years, which the duties are: planning and budgeting, managing the lab, overseeing laboratory operations, equipment acquisition, staff recruitment, new staff training, managing student labors, work prioritization, instrument troubleshooting, coordinating laboratory inspection by EPA, method validation, controlling and reviewing SOPs, preparing and approving new SOPs, working with QA, reviewing data, QC, reporting residue results, and maintaining lab database.
- Analytical Chemist, performed LC-MS/MS analyses on pesticides; carried out research projects on pesticides and environmental contamination studies.
- Associate Editor: Bulletin of Environmental Contamination and Toxicology; Manuscript reviewer for peer-reviewed academic journals. Panel Reviewer: for PEER grant proposals for the National Academies of Sciences, Engineering, and Medicine (NASEM), Washington DC.

EDUCATION:

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

EMPLOYMENT HISTORY:

- Assistant and Associate Professor (2005-present), Department of Entomology, Michigan State University, East Lansing, Michigan.
- Associate Director and Director (2003-present), IR-4 Laboratory, Michigan State University.
- Laboratory Manager (2001-2003), University Laboratories Inc., Novi, Michigan.
- Senior Chemist and Supervisor (2000-2001), Caduceon Inc., Toronto, Ontario, Canada.

REPORTS SUBMITTED TO USEPA:

Jiang W, et. al. IR-4 National Pesticide Program, 100+ Analytical Summary Reports were included in IR-4 Final Reports submitted to the USEPA for pesticide tolerance establishment

SELECTED PUBLICATIONS:

Wang LK, Li F, **Jiang W**, Duan W-B, Abdelraheem, Peng Z-Q, Malhat F, Wu SY (2020) A preliminary toxicology study on eco-friendly control target of Spodoptera frugiperda. Bull Environm Contam Tox. https://doi.org/10.1007/s00128-020-03044-z

Theriault V, **Jiang W**, Diarra S, Haggblade S, Edmund J, Ipou Ipou J, Traore A (2020) Feed the Future Innovation Lab for Food Security Policy Mali Food Security Policy Research Program. Qualitative Assessment of Pesticide risks in West Africa. Paper 180, October 2020. (The U.S. Government Policy Research)

Haggblade S, Diarra A, **Jiang W** (2019) Feed the Future Innovation Lab for Food Security Policy Quality comparison of Fraudulent and registered Pesticide in Mali. (Policy Research Brief 76).

Haggblade S, Diarra A, **Jiang W**, Assima A, Keita N, Traore M (2019) Fraudulent pesticides in West Africa: a quality assessment of glyphosate products in Mali. Int J Pest Manage. DOI: 4134180/09670874.2019.16668076.

Wu S, Deng D, **Jiang W**, Zhang K, Guo J, Duan W, Wang H (2018) Genome Analysis of Cytochrome in Dinotefuran-Treated Apolygus lucorum (Meyer-Dür), Bull Environ Contam Tox, 103, 106-113.

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 (strain HJY) isolated from Chinese chives (Allium tuberosum). J Environ Sci Health B. 52(10):736-744

Zhang H, Li F, **Jiang W** (2016) Review on Data Requirements of Storage Stability for Pesticide Residue Experiment by US EPA. Pest Sci Admin. 36(3) 16-23

Zhang H, **Jiang W** (2015) The Recent Development of The Global Minor Use Workshop and Interregional Research Project No. 4 (IR-4) in the USA. Peste Sci Admin. 35(11) 1-5

Zhang ZY, **Jiang W**, Jian Q, Song QC, Zheng ZT, Wang DL, Liu XJ (2015) Changes of field incurred chlorpyrifos and its toxic metabolite residues in rice during food processing from-RAC-To-Consumption. PLoS ONE. DOI: 10.1371/journal.pone.0116467

Huan Z, Zhi Xu Z, **Jiang W**, Chen Z, Luo J (2015). Effect of Chinese traditional cooking on eight pesticides residue during cowpea processing. Food Chem. (170) 118-122. DOI:10.1016/j.foodchem.2014.08.052

Zhang Z, **Jiang W**, Jian Q, Song W, Zheng Z, Wang D, Liu X (2014) Residues and dissipation kinetics of triazole fungicides difenoconazole and propiconazole in wheat and soil in Chinese fields. Food Chem. 2015, (168) 396-403. DOI: 10.1016/j.foodchem.2014.07.087

Zheng ZT, Li FG, Jian Q, Zhu GY, **Jiang W**, Liu XJ (2015) The Guidance of Interregional Research Project No.4 (IR-4) in USA for the Establishment of GLP Lab in China. Agrochemicals 54:9 (2015) 625-627.

Lu MX, **Jiang W**, Wang JL, Jian Q, Shen Y, Liu XJ, Yu XY (2014) Persistence and Dissipation of Chlorpyrifos in Brassica Chinensis, Lettuce, Celery, Asparagus Lettuce, Eggplant, and Pepper in a Greenhouse. PLoS ONE, 2014, 9(6): e100556. doi:10.1371/journal.pone.0100556

Jiang W, Jian Q, Zheng Z, Liu X (2014) Introduction to IR-4 Project "Pesticide Minor Use Management on Specialty Crops". Pest Sci Admin. 35(5) 17-21

Zhang Z, **Jiang W**, Jian Q, Song W, Zheng Z, Ke C, Liu X (2014) Thiabendazole uptake in shimeji, king oyster, and oyster mushrooms and its persistence in sterile and nonsterile substrates. J Agric Food Chem. 2014, 62(6):1221-6. https://doi.org/10.1021/jf405208h

Wang TT, Cheng J, Liu XJ, **Jiang W**, Yu XY (2012) Effect of biochar amendment on the bioavail-ability of pesticide chlorantraniliprole in soil to earthworm. Ecotox Environ Safety. 83:96-101

Zhang CZ, Zhang ZY, Liu XJ, **Jiang W**, Wu YD (2010) Dissipation and environmental fate of herbicide H-9201 in carrot plantings under field conditions. Food Chem. 119: 874-879

Jiang W, Kon RT, Othoudt RA, Leavitt RA, Kumar S, Geissel LD, Gomaa EA (2005) Method development, validation, and analysis of bifenthrin residues in fresh and dry cilantro foliages and cilantro seeds using GC-ECD. Bull Environ Contam Tox. 73: 9-16

Jiang W, Childs RF, Mika AM, Dickson JM (2003) Pore-filled cation-exchange membranes containing poly (styrenesulfonic acid) gels. Desalination. 159(3): 253-266

Ge J, Cui Y, Yan Y, **Jiang W** (2000) The effect of structure on pervaporation of chitosan membrane. J Membrane Sci. 165: 75-81

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Grace A. Lennon

Experience

02/11-Present RUTGERS Interregional Research Project No.4 Princeton, NJ

- **Associate Research Scientist**
- Plans research and prepares field and laboratory documentation for the submission of petitions to EPA.
- Serves as Study Director by providing technical oversight of assigned studies (protocol development, protocol approval, research coordination, data review) and ensures that research proceeds as planned.
- Serve as chairperson of the IR-4 SOP committee. Responsible for development, revision and implementation of Headquarters SOPs.
- Reviews and assembles research data; writes quality final reports and analytical summary reports that are easily reviewed by all parties (QA, MFG, EPA).
- Creates new Field Data Book pages for unique studies to be implemented in the collection of accurate study specific raw data.
- Submit regulatory packages to EPA and assist registrants with product labeling.

11/09-02/11 Interregional Research Project No.4 Princeton, NJ
(Type 4 Contract Employee)

Associate Research Scientist

- Plans research and prepares field and laboratory documentation for the submission of petitions to EPA.
- Serves as Study Director by providing technical oversight of assigned studies (protocol development, protocol approval, research coordination, data review) and ensures that research proceeds as planned.
- Reviews and assembles research data; writes quality final reports and analytical summary reports that are easily reviewed by all parties (QA, MFG, EPA).

11/01-09/15 G.A. Lennon, QC Consultant/ Interregional Research Project No.4 Wrightstown, PA

Quality Control Auditor

- Reviews and evaluates IR-4 field data books to ensure the data is legible, complete, and consistent with the protocol, study design and EPA GLP regulations. Provides written field data book summaries to Field Research Directors and Regional Field Coordinators.
- Responsible for working with study directors and field research directors to clarify any questionable information using written and oral communication skills.
- Prepared and presented field data book training to the field research directors in the IR-4 Western Region using a Power Point program.

VERONICA PICADO

Education:

B.S. in Chemistry**,** University of Costa Rica, 2006
Professional master's in industrial chemistry, University of Costa Rica, 2007-08
Master's in design, Direction and Management of International Cooperation Projects, FUNIBER 2021-present

Work experience:

Chemist, Chemtica Internacional S.A., 2006-09
Production Manager, Agroambiente of Costa Rica S.A., 2009-10
Chemist; State Phytosanitary Service, 2011-21
Manager Agrochemical Residue Analysis Laboratory; State Phytosanitary Service, 2013-15
Laboratory Project Manager State Phytosanitary Service, 2015-16

Additional work experience:

Exporter RYS Ornamentals, Agrochemical Registry, 2010
State Phytosanitary Service, Coordination National Codex Committee on Pesticide Residues, Costa Rica, 2014-21
State Phytosanitary Service, Review of regulatory proposals for the registration of pesticides, Residue Pesticide, 2014-21
Member of the National Committee of the CODEX Alimentarius, Costa Rica, 2014-21
State Phytosanitary Service / Chemtica Internacional S.A., Chemical Regent, 2006-09
State Phytosanitary Service, Member of the Organizing Committee of the 6th Latin American Congress on Pesticide Waste, 2016-17
CCPR/CODEX Alimentarius, Co-Chair EWG in the Revision of the Guidelines on the use of mass spectrometry
for the identification, confirmation and quantitative determination of residues (CXG 56-2005), 2018-21
2018-2021
CCPR/ CODEX Alimentarius, Co-Chair EWG Opportunities and challenges related to the participation of JMPR in an international joint review of a new compound, 2018-21
State Phytosanitary Service, Member of the Technical Advisory Team, to attend to the development of a Risk Analysis model for the establishment of Monitoring Programs and promotion of GAP, 2017-19
Global Minor Use Foundation, Lead the merit analysis team: Tomato-Leaf Miners, 2020
State Phytosanitary Service, Member of the Technical Advisory Team for the development of processes before the WTO, 2021

Experience in laboratory analysis:

Chemtica Internacional S.A., Synthesis of Organic Molecules (Pheromones - Organic Chemistry), 2006-09
Agroambiente de Costa Rica, Measurement of Chemical Physical Properties Agrochemical formulation, 2009-10
Agrochemical Residue Analysis Laboratory State Phytosanitary Service (SFE-MAG), Determination of pesticides in vegetables, water, soil by LC-MSMS/ GCMSMS and QuEChERS extraction, multi-residue, single and screening methods, 2011-21
Chemtica Internacional S.A., Gas chromatography with FID detector, 2006-09
Chemtica Internacional S.A., Gas chromatography with MS detector, 2006-09
State Phytosanitary Service, Gas chromatography with MS/MS detector, 2011-21

State Phytosanitary Service, Liquid Chromatography with Qtrap Detector , MS/MS Detector, ICP MSD, 2011-21

Experience in Quality Management:

State Phytosanitary Service Residue Analysis Laboratory, Development of technical director functions in a laboratory accredited under INTE- ISO/IEC 17025:2017, 2013-16

Experience in use and management of laboratory equipment and OECD-GLP:

IR-4/USDA/GMUS, Laboratory research director; Study No 11399 Pyriproxifen / Banana Residue Study IR-4/USDA, 2013-14
State Phytosanitary Service, Study director/testing; Study No 123320 Fluopyram/Papaya Residue Study – USDA/IR-4/MUF, 2017-19
State Phytosanitary Service, Coordination of Study 13212 Indoxacarb/Coffee Residue Study, 2021

KEVIN RICE

Education:

Ph.D. Entomology, The Ohio State University, Columbus, OH.

M.S. Entomology Auburn University, Auburn, AL.

B.S. Biology University of North Carolina at Asheville, Asheville, NC.

Professional and Academic Appointments:

Assistant Professor, University of Missouri, Division of Plant Sciences, Columbia, MO.

Post-Doctoral Associate, USDA-ARS-Appalachian Fruit Research Station, Kearneysville, WV and The Pennsylvania State University, State College, PA.

Agricultural Extension Agent, University of Arizona.

Research and Scholarship:

Peer Reviewed Journal Articles

Rice, K.B., Lucas, A.L., Kirkpatrick, D.M., Helms, A.M., Ali, J.G., Tooker, J.F., Dardick, C., Li, Z.T., and Leskey, T.C. Cascading ecological effects of fungus-emitted volatile organic compounds on pant and herbivore growth (in review PLOS ONE).

Tubbs, W.A., **Rice, K.B.**, and Bradley K.W. Response of insect and beneficial species to the timing and severity of dicamba injury in soybean (in review Journal of Economic Entomology).

Benthall, K. J., and **Rice, K.B.** Biology, ecology and management of western corn rootworm (Coleoptera: Chrysomelidae) (in review Journal of Integrated Pest Management)

Leake, L.B., and **Rice, K.B**. Rearing methods and life history traits of red admiral butterfly Great Lakes Entomologist (In press).

Althoff, E.R., and **Rice, K.B.** Japanese beetle (Coleoptera: Scarabaeidae) invasion of North America: History, ecology and management. Journal of Integrated Pest Management (In press).

Benthall, K.J and **Rice, K.B.** Comparison of parasitoid retention on yellow sticky traps. Florida Entomologist (In press).

Bedoya, C.L., Brockerhoff, E.G., Hayes, M., Leskey, T.C., Morrison III, W.R., **Rice, K.B.** and Nelson, X.J. 2020. Brown marmorated stink bug overwintering aggregations are not regulated through vibrational signals during autumn dispersal. Royal Society Open Science, 7: 201371.

Kirkpatrick, D.M., **Rice, K.B.**, Ibrahim, A., Fleischer, S.J., Tooker, J.F., Tabb, A., Medeiros, H., Morrison III, W.R. and Leskey, T.C. 2020. The Influence of Marking Methods on Mobility, Survivorship, and Field Recovery of *Halyomorpha halys* (Hemiptera: Pentatomidae) Adults and Nymphs. Environmental Entomology, 49:1026-1031.

Ludwick, D., Morrison III, W.R., Acebes-Doria, A.L., Agnello, A.M., Bergh, J.C., Buffington, M.L., **Rice, K.B.** ... and Kuhar, T.P. 2020. Invasion of the Brown Marmorated Stink Bug (Hemiptera: Pentatomidae) into the United

States: Developing a National Response to an Invasive Species Crisis Through Collaborative Research and Outreach Efforts. Journal of Integrated Pest Management, 11: pmaa001.

Kirkpatrick, D.M., **Rice, K.B**., Ibrahim, A., Morrison, W.R., and Leskey, T.C. 2019. Influence of harmonic radar tag attachment on nymphal *Halyomorpha halys* mobility, survivorship, and detectability. Entomologia Experimentalis et Applicata, 167: 1020-1029.

Weber, D.C., Morrison, W.R., Khrimian, A., **Rice, K.B.**, Short, B.D., Herlihy, M.V., and Leskey, T.C. 2019. Attractiveness of Pheromone Components With and Without the Synergist, Methyl (2E, 4E, 6Z)-2, 4, 6-Decatrienoate, to Brown Marmorated Stink Bug (Hemiptera: Pentatomidae). Journal of Economic Entomology 113: 712-719.

Kirkpatrick, D.M., Acebes-Doria, A.L., **Rice, K.B.**, Short, B.D., Adams, C.G., Gut, L.J., and Leskey, T.C. 2019. Estimating monitoring trap plume reach and trapping area for nymphal and adult *Halyomorpha halys* (Hemiptera: Pentatomidae) in crop and non-crop habitats. Environmental Entomology, 48: 1104-1112.

Nixon, L.J., Tabb, A., Morrison, W R., **Rice, K.B.**, Brockerhoff, E.G., Leskey, T.C., ... and Rostás, M. 2019. Volatile release, mobility, and mortality of diapausing *Halyomorpha halys* during simulated shipping movements and temperature changes. Journal of Pest Science, 92: 633- 641.

Wallingford, A.K., **Rice**, **K.B.**, Leskey, T.C., and Loeb, G.M. 2018. Overwintering behavior of *Drosophila suzukii* Matsumura and potential springtime diets for egg maturation. Environmental Entomology 47: 1266-1273.

Vito, M.H., Medeiros, H., Tabb, A., **Rice**, **K.B.**, and Leskey T.C. 2018. Invasive insect detection with unmanned aerial vehicles. Robotics and Automation 648-654.

Acebes-Doria, A.L., Morrison III, W.R., Short, B.D., **Rice, K.B.**, Bush, H.G., Kuhar, T.P., Duthie, C. and Leskey, T.C. 2018. Monitoring and Biosurveillance Tools for the Brown Marmorated Stink Bug, *Halyomorpha halys* (Stål) (Hemiptera: Pentatomidae). Insects 9: 1-17.

Rice, K.B., W.R. Morrison, B.D. Short, A. Acebes-Doria, J.C. Bergh, and T.C. Leskey. 2018. Improved trap designs and retention mechanisms for *Halyomorpha halys* (Hemitera: Pentatomidae). Journal of Economic Entomology 111: 2136-2142.

Klooster, W.S., Gandhi, K.J.K., Long, L., Rice, K.B., and Herms, D.A. 2018. Ecological impacts of emerald ash borer in forests at the epicenter of the invasion in North America. Forests 9: 250- 264.

Rice, K.B., Bedoukian, R.H., Mclean, P., Short, B.D., Morrison, W.R., Jentsch, P., Wiman, N.G., Hamilton, G.C., Shrewsbury, P.M., Weber, D.C., Khrimian, A. and Leskey, T.C. 2018. Enhanced response of *Halyomorpha halys* (Stål) (Hemiptera: Pentatomidae) to its aggregation pheromone with ethyl decatrieonate. Journal of Economic Entomology 111: 495-499.

Nixon, L.J., Morrison, W.R., **Rice, K.B.**, Brockerhoff, E.C., Leskey, T.C., Guzman, F., Khrimian, A., Goldson, S., and Rostas, M. 2018. Identification of volatiles released by diapausing brown marmorated stink bug, *Halyomorpha halys* (Stål) (Hemiptera: Pentatomidae) forest. PlOS ONE, 13(1), p.e0191223.

Rice, K.B., Jones, S.K., Morrison, W.R., and Leskey, T.C. 2017. Spotted wing drosophila prefer low hanging fruit: Insights into foraging behavior and management strategies. Journal of Insect Behavior 30: 645-661.

Weber, D.C., Morrison, W.R., Khrimian, A., **Rice, K.B.**, Leskey, T.C., Rodriguez-Saona, C. Nielsen, A.L., and Blaauw B.R. 2017. Chemical ecology of *Halyomorpha halys* (Stål) (Hemiptera: Pentatomidae). Journal of Pest Science 90: 989-1008.

Rice, K.B., Cullum, J.P., Wiman, N.G., Hilton, R., and Leskey, T.C. 2017. *Halyomorpha halys* (Hemiptera: Pentatomidae) response to pyramid traps baited with attractive light and pheromonal stimuli. Florida Entomologist 100: 449-453.

Rice, K.B., Short, B.D., and Leskey, T.C. 2017. Development of an attract-and-kill strategy for *Drosophila suzukii* (Diptera: Drosophilidae): Evaluation of attracticidal spheres under laboratory and field conditions. Journal of Economic Entomology 110: 535-542.

W.R. Morrison, Park, C.G., Seo, B.Y., Park, Y.L., Kim, H.G., **Rice, K.B.**, Lee, D.H., and Leskey T.C. 2016. Attraction of the invasive *Halyomorpha halys* in its native Asian range to traps baited with semiochemical stimuli. Journal of Pest Science 90: 1205-1217.

Rice, K.B., Short, B.D., Jones, S.K., and Leskey, T.C. 2016. Behavioral response of *Drosophila suzukii* (Diptera: Drosophilidae) to visual stimuli under laboratory, semifield and field conditions. Environmental Entomology 45: 1480-1488.

Rice, K.B., Troyer, R., Watrous, K.W., Tooker, J.F., and Fleischer. S.J. 2016. Landscape factors influencing stink bug injury in Mid-Atlantic tomato fields. Journal of Economic Entomology 110: 94-100.

Rice, K.B., Fleischer, S.J., De Moraes, C.M. Mescher, M.C., Tooker, J.F. and Gish, M. 2015. Handheld lasers allow efficient detection of fluorescent marked organisms in the field. PLOS ONE. doi:10.1371/journal.pone.0129175.

Rice, K.B., Bergh, C.J., Bergmann, E.J., Biddinger, D.J., Dieckhoff, C., Dively, J.P. Fraser, H., Gariepy, T.D., Hamilton, G.C., Haye, T., Herbert, D.A., Hoelmer, K.A. Hooks, C.R.R. Jones, A., Krawczyk, G., Kuhar, T.P., Martinson, H., Mitchell, W.S., Nielsen, A.L., Pfeiffer, D.G., Raupp, M.J.,Rodriguez-Saona, C.R., Shearer, P.W., Shrewsbury, P.M., Venugopal, P.D., Whalen, J., Wiman, N.G., Leskey, T.C. and Tooker, J.F. 2014. Biology, ecology and management of brown marmorated stink bug (*Halyomorpha halys*). Journal of Integrated Pest Management: 5: 1-13.

Rice, K.B., and Eubanks, M.D. 2013. No enemies needed: Aphids directly benefit from ant tending. Florida Entomologist. 96: 929-932.

Invited International Presentations:

Rice, K.B. Fall armyworm management options. West African NPPO and partners taskforce annual Meeting, Dakar, Senegal, December 2019.

Petitdemange, J.B. and Rice, K.B. Guidelines for phytosanitary inspection. West African NPPO and partners taskforce Annual Meeting Dakar, Senegal, December 2019.

Rice, K.B. Cascading ecological effects of fungus emitted volatile organic compounds on plant and herbivore growth. MU-GNU Joint Symposium, Gyeonsang National University, Jinju, South Korea, October 2019.

Rice, K.B. Fall armyworm in North America: biology, ecology, and management. Development and Monitoring of Phytosanitary Inspection and Pest Identification Guides Workshop, Abidjan, Cote d'Ivoire, May 2019.

Rice, K.B. Insect sampling and pest identification guides. Development and Monitoring of Phytosanitary Inspection and Pest Identification Guides Workshop, Abidjan, Cote d'Ivoire, May 2019.

Rice, K.B. 2019. Invasive fruit flies in West Africa. Development and Monitoring of Phytosanitary Inspection and Pest Identification Guides Pest Identification Workshop, Cote d'Ivoire, May 2019.

Invited Departmental Seminars:

Rice, K.B. 2020. Lasers, drones, and plant promoting fungi: novel technologies for IPM. Department of Entomology Seminar Series, University of California Davis.

Rice, K.B. 2019. Lasers, drones, and plant promoting fungi: novel technologies for IPM. Department of Crop Science Seminar Series, University of Illinois.

Rice, K.B. 2015. Direct and indirect effects of invasive insects on natural and agricultural ecosystems. USDA Appalachian Fruit Research Station Seminar Series, Kearneysville, WV.

Rice, K.B. 2014. Reproduction, growth, or defense: tradeoffs in a dioecious plants response to a non-competitive invasive herbivore. Departmental of Ecology Seminar Series, Penn State University, State College, PA.

Rice, K.B. 2014. Cascading ecological impacts of emerald ash borer: tritrophic interactions between prickly ash, giant swallowtail larvae, and larval predators. Department of Entomology Seminar Series, Penn State University, State College, PA.

Rice, K.B. 2014. Indirect effects of an invasive herbivore on native butterflies: non-competitive interactions. Department of Biology Seminar Series, Juniata College, Huntingdon, PA.

Invited Presentations at Regional and National Meetings*:*

Benthall, K.J., and K.B. Rice. 2020. An attract-and-kill tactic for Japanese beetle. Trécé Incorporated, Tulsa, Oklahoma.

Rice, K.B. Lucas, A.L., Helms, A.M., Swayamjit, R., Dardick, C., Zhijian, L., and Leskey, T.C. 2019. Effects of fungus volatiles on plant growth, defense, and herbivory. Member Symposium: A Microbe an herbivore and a plant walk into a field. Entomological Society of America National Meeting, St Louis, MO.

Rice, K.B., Landa, A., Hall, B. 2019 Laser ablation tomography: vaporizing insects with 1 million watts to quantify fitness. Program Symposia Entomological Research and technological Innovation. Entomological Society of America North Central Branch Annual Meeting, Cincinnati, Ohio.

Rice, K.B., Nielsen, A.L., and Leskey, T.C. 2019. Brown marmorated stink bug in the north central region. Program Symposia Emerging Crop Pests in the North Central Branch. Entomological Society of America North Central Branch Annual Meeting, Cincinnati, Ohio.

Rice, K.B., Tooker, J., Medieros, H., Tabb, A., and Leskey, T.C. 2018. Laser, lights and drones: New techniques for tracking insects in the field. Organized symposium: Societal challenges with entomological solutions. Entomological Society of America Central Branch Meeting, Madison, WI.

Rice, K.B., Cullum, J., Larcenaire, C., and Leskey, T.C. 2018. Invasive insect dispersal between forest and agricultural landscapes. Organized symposium: Forest Entomology. Entomological Society of America Central Branch Meeting, Madison, WI.

Rice, K.B. 2016. Indirect effects of invasive species on plant-insect interactions. Novel Ecosystems Research Symposium, Pennsylvania State University, State College, PA.

Rice, K.B. Fleisher, S.J., and Tooker, J.F. 2015. Host plant growth stage influences brown marmorated stink bug survival and development. Member symposium: brown marmorated stink bug working group: Synergizing IPM research to deliver solutions. Entomological Society of America. Minneapolis, MN.

Rice, K.B., Gish, M., Mitchell, W.S., Fleischer, S.J. and Tooker J.F. 2014. Insights on brown marmorated stink bug behavior from a mark recapture field experiment. Organized symposium: Leaving a mark: marking

technologies for tracking insect movement. Entomological Society of America Pacific Branch Meeting, Tucson, AZ.

Rice, K.B., Troyer, R., Mitchell, W.S., Kime, L.F., Harper, J.K., Tooker J.F., and Fleischer, S.J. 2014. Economics of BMSB in processing tomato: Influence of landscape and management. Organized symposium: Are we winning the battle against invasive pests? The brown marmorated stink bug and spotted wing drosophila. Entomological Society of America Eastern Branch Meeting, Williamsburg, VA.

Professional Honors and Awards:

People's Choice Award, Second place, Environmental Entomology 2021 Highly Cited Paper Award, Journal of Economic Entomology 2018 Entomological Society of America STEP Travel Award 2016 International IPM Award of Recognition, StopBMSB.org team member 2015 Ohio Valley Entomological Association, PhD Competition, 1st place 2012 Ohio Agricultural Research Development Center, PhD Poster Competition, 3rd place 2012 Entomological Society of America, Student Competition, 2nd place 2011 Delong Research Award, OSU, Department of Entomology 2011 Gamma Sigma Delta Agricultural Honor Society, OSU 2011 Ohio Valley Entomological Association PhD Competition, 3rd place 2010 Entomological Society of America, Student Competition, 2nd place 2006.

LUIS SUGUIYAMA

Education:

M.E. Agricultural Economics, North Carolina State University, Raleigh, NC, 1979.
B.A. Economics and Business, Warren Wilson College, Swannanoa, NC, 1975.
Universidad Nacional Agraria La Molina, Peru.

Professional experience:

Retired as Senior Pesticide Regulatory Manager in the U.S. government with demonstrated record of accomplishment and leadership in complex technical and regulatory programs. Presently, working as an independent international consultant. Demonstrated domestic and international experience in economic analysis, project development, resource management, project implementation, project evaluation and strategic planning, federal contracts and grants, scientific risk assessment, agricultural food safety programs, good and sustainable agricultural practices, integrated pest management practices, pesticide regulatory issues, sanitary and phytosanitary (SPS) programs, and technical capacity building activities.
Well organized, highly motivated, innovative and process driven. Results oriented, work well under pressure, tight deadlines, independently, and in a team environment. Fluent in English and Spanish. Excellent written and oral communication and interpersonal skills. Domestic and international experience negotiating with government officials and private industry. Domestic and international expertise in agriculture, natural resources, environmental protection, integrated pest management, good agricultural practices, chemical laboratory analytical capabilities, food safety, and technical barriers to agricultural trade.

Work experience:

Independent International Consultant, 2012-present.
Working as an international consultant in domestic and international food safety, pesticide registration and management, GAPs and SPS capacity building projects since federal retirement (November 30, 2012). Currently working as an international consultant in a Global Pesticide Maximum Residue (MRL) Project and in South Africa and South Asia Biopesticide Projects.
Have effectively planned and implemented technical capacity building service agreements with the following organizations:
* Office of Capacity Building, Foreign Agricultural Service, U.S. Department of Agriculture (through funding by the U.S. Agency of International Development).
* U.S. Agency for International Development (Feed the Future Program).
* University of Missouri, CAFNR International Programs.
* Michigan State University.
* Universidad Nacional de Costa Rica.
* Inter-American Institute for Cooperation on Agriculture.
* International Atomic Energy Agency of the United Nations.
* Food and Agriculture Organization of the United Nations.
* ALINA/Andina (pesticide industry organization in Latin America).
* Croplife Africa and the Middle East.
* InterAmerican Development Bank.
* Coca-Cola Company.
Countries/regions of service consultancy agreements:
- Central America and the Dominican Republic (ongoing since 2014).
- East and West Africa (ongoing since 2018).
- Peru (ongoing since December 2012).
- Bangladesh (January,2013 – November 2015).
- Egypt (November 2013 and November 2019).
- Colombia (ongoing since February 2013).
- Indonesia (May 2013 – November 2016).
- Morocco (June 2013 – December 2016)
- Ecuador (ongoing since July 2013).
- Bolivia (ongoing since 2013).

- Vietnam (August and November, 2013).
- Algeria (April 2014 – November 2015).
- Jordan (June 2014).
- Caribbean Pest Control Authorities (Jamaica and Grenada).
- Haiti (September 2014 – September 2019).
- Nepal (November 2017).
- Ivory Coast (May 2018).
- South Africa (June 2018 and June 2019).
- Sub-Saharan (Sahelian) countries (September 2018).
- Ethiopia (African Union) (November 2018).
- Switzerland (June 2018).
- Tanzania (East African Community) (March 2019 and May – September 2019).
- Burundi (July 2019).
- Argentina (April 2019).
- El Salvador (April 2019).
- Guatemala (May 2019).
- Burundi (East African Community) (July 2019).
- Chile (November 2019).

U.S. Environmental Protection Agency, Washington, DC, 1992 to November 30, 2012.

Branch Chief, Minor Use and Emergency Response Branch, Registration Division, Office of Pesticide Programs:
Managed a branch composed of 14 technical staff divided in 2 units: the Emergency Response Team in charge of processing requests by Federal Agencies and States for emergency uses of pesticides; and the Minor Use Team in charge of establishing pesticide maximum residue limits (tolerances) for the use of reduced risk pesticides on minor U.S. crops. The work performed by this Branch was highly technical, and required extensive internal and external coordination of scientific assessments for a quick turnaround to address stakeholders' requests.
Senior Registration Advisor, Registration Division, Office of Pesticide Programs:
Provided regulatory and administrative advice to staff, States, and external constituencies on federal pesticide registration and food safety issues. The Office of Pesticide Programs is responsible for regulating the sale and use of all pesticides in the United States. Other responsibilities include: (a) represented the program in domestic and international pesticide and food safety meetings, (b) coordinated the Joint Review and Minor Use reviews, (c) liaised with legal counsel, addressed compliance and enforcement issues, and responded to requests from State and US Territory pesticide officials, (d) managed innovative program to improve production, efficiency, and coordination of scientific review of registration actions, (e) served as Registration Division Ombudsperson, (f) was a technical advisor for registration of minor use pesticides, (g) represented office and division in meetings with key stakeholders, and (g) led the training program in the division.

U.S. Department of Agriculture, Washington, DC, 2008 to 2011 on a detail assignment.
Senior Food Safety Advisor and Pesticide Issue Expert, International Regulations and Standards Division, Office of Scientific and Technical Affairs, Foreign Agricultural Service:
Coordinated U.S. government interagency comments on notifications made to the World trade Organization related to pesticide residue measures. Represented USDA/FAS in the Codex Committee for Pesticide Residues (CCPR) and provided technical knowledge on Codex standards and guidance related to pesticide residues. Addressed bilateral trade issues arising from differences in pesticide residues from trade partners. Developed and participated in capacity building and outreach activities on international food safety, pesticide regulatory and pesticide maximum residue limit issues affecting U.S. agricultural trade with trade partners.

Branch Chief, Fungicide Branch, Registration Division, Office of Pesticide Programs, Environmental Protection Agency. (1997-00):
Managed a pesticide registration unit following the enactment of the Food Quality Protection Act of 1996 and the reorganization of the Office of Pesticide Programs. Responsibilities included: (a) decision-making on registration eligibility of new and existing chemicals (about 180 active ingredients), amendments to existing products (about 1,000 pesticide products), experimental use permits, and State pesticide registration needs; (b) coordination of technical review, (c) establishment of tolerances for pesticide residues in food; (d) supervision of 14 technical staff and two product management teams; (e) management of branch budget and annual plans; (f) management of internal/external communication; (g) review of enforcement cases; and (h) agency

representation to external constituencies. Regulatory work was highly technical requiring knowledge of product chemistry, residue and metabolism, risk assessment processes (hazard, exposure, occupational exposure, dietary risk, and drinking water), ecotoxicological concerns (biological risk assessment and environmental fate), product efficacy, risk benefit analysis, label review, worker protection measures, and pesticide/food safety statutes and regulations. Branch registered newer reduced-risk chemicals which substituted older more toxic pesticides and established tolerances meeting stricter requirements for food uses. As a manager, demonstrated the ability to lead a productive team and achieve positive results. Dealt effectively with management/personnel issues; and received outstanding performance ratings as Branch Chief.

USAID/EPA Central American Project Coordinator, Office of Pesticide Programs. (1992-97)
Managed a Central American Environmental Technical Assistance Project funded by the U.S. Agency for International Development ($3.3 million for 5 years), and jointly implemented by the Central American Commission for Environment and Development. This ongoing project is enhancing Central American efforts to build regional institutional capacity. Main accomplishments were: developed project goals and activities; strengthened environmental legislation, compliance, and enforcement programs in the region; implemented a regional comparative risk assessment and provided technical assistance in priority contaminants (wastewater, solid waste, and pesticides); led interdisciplinary teams with expertise in international law/agreements, enforcement and compliance, pesticides, toxic substances, wastewater, solid waste, air quality, monitoring, community based environmental programs, and environmental information; and promoted regional efforts in coastal zone management, protected biodiversity areas, and community based environmental action plans.
Initially, managed a pilot technical assistance project aimed at improving pest and pesticide use management. As a result, Central American countries improved control over the importation, distribution, use, and disposal of pesticides. Promoted "safer" food export programs through information and technical assistance, provided training and education on safe pesticide management and integrated pest management, and coordinated regional activities of international and donor agencies in Central America. EPA viewed this pilot project as a model technical assistance activity.

U.S. Department of Agriculture, Washington, DC (1983-92).

Supervisory Agricultural Economist, Animal and Plant Health Inspection Service (1987-92):
Managed an economic analysis section composed of seven agricultural economists, which conducted major economic and econometric analyses of agency policies, issues, and programs involving complex data management, statistical models, and integration of biological sciences information into economic and policy decisions. Technical work required knowledge of benefit/cost analysis, risk assessment, and econometric and statistical analyses. The section completed 26 major economic and policy studies, 47 regulatory impact and flexibility analyses, and 2 takings implications assessments. Provided extensive analytical support to APHIS environmental and biological impact statements and evaluations of APHIS programs and management practices. Prepared reports assessing biological, environmental, regulatory, economic, budgetary, and political implications of APHIS programs. Conducted oral briefings to top APHIS managers and represented agency in formal seminars and symposia.

Agricultural Economist, Economic Research Service (1983-87):
Evaluated economic impacts of pest control programs, pesticide regulatory actions, and associated impacts on U.S. agriculture. Evaluated economic severity and intensity of major pests of field and fruit crops in the United States. Served as agency contact point on economic information integrated pest management programs, pest control inputs, pest control and alternative technologies, farm production practices, and economic methodologies for evaluation. Participated in interagency task groups, National IPM task forces, and USDA task forces for the effect of the 1985 Farm Bill Proposals on agricultural inputs, soil conservation, and low input sustainable agricultural production practices. Published research results and formally presented study findings in meetings or conferences and staff briefings.

North Carolina State University, Raleigh, NC (1979-83), Research Associate, Department of Economics and Business, 1979-83.

Conducted economic analysis of area-wide pest control programs. Collected, edited, and analyzed economic data; developed appropriate economic methodology to assess pest control programs; and prepared formal reports of major research findings. Evaluated the economic impacts of the Boll Weevil Eradication Trial Program

in North Carolina, 1978-82 which estimated the changes on cotton production costs, productivity, production practices, and public costs resulting from the absence of boll weevils. This study represented a benchmark economic analysis of an area-wide eradication program conducted on a major agricultural crop.

Honors and Awards
FDA Golden Globe Award, International Pesticide Residue Laboratories, 2011.
EPA Bronze Medal, Pesticide Emergency Exemption Requirements, 2008.
EPA Silver Medal, Enhancing Central American Countries' Ability to Improve Environmental Quality, 2002.
EPA Bronze Medal, Headquarters, Regional, and State Pesticide Issues, 2001.
EPA Bronze Medal, NAFTA Harmonization and Coordination Efforts, 1999.
EPA Bronze Medal, USAID/EPA Central American Project, 1994.
Merit Performance Awards, EPA, OPPTS, OPP, 1992-present.
EEO Certificate of Appreciation, Hispanic Heritage Committee, USDA, APHIS, 1990.
Merit Performance Awards, USDA, APHIS, PPD, PAD, 1988-91.
Economics Award, Warren Wilson College, 1976.
Who's in American Colleges and Universities, 1975-76.
Pi Gamma Mu Social Science Honor Society Scholarship, 1976.
NAIA All-American Soccer Team, 1975-76 and All-South College Soccer Team, 1974-76.
Warren Wilson College Athletic Hall of Fame, 2016.

Appendix 7: Countries´ Development Plans

Argentina

In Argentina (2021), the National Consulting Committee for Agricultural Biotechnology (CONABIA) modified the Bioproducts for Agricultural Use Consulting Sub-Committee (CABUA) to include the Coordination of Innovation and Biotechnology Unit in the Ministry of Agriculture, Livestock and Fishery, Secretary of Food, Bioeconomy and Regional Development, with the aim in 2023 to:

- Give support in terms of quality requirements, efficacy and biosafety for bioproducts that are going to be liberated in the agrosystems.
- Propose new regulations and promotion of bioproducts.

Bolivia

"La Unión es la Fuerza" represents so much about the geographically largest landlocked country in the Americas. With such a multi-ethnical population and thirty-six indigenous languages, it is officially known as the Plurinational State of Bolivia. Between mountains and their valleys, plateaus and their surrounding lowlands, and lakes and rivers and rainforests, Bolivia's geography is the reason why agriculture is such a major part of their economic activities. Products of the agriculture industry have been the fastest growing of Bolivia's exports. Bolivia would benefit from developing and implementing sustainable agriculture practices.

Colombia

In Colombia (2021), the government issued the National Council for Economic and Social Policy (CONPES) 4023, for the reactivation of its economy and sustainable growth that looks to promote biopesticides use by implementing three initiatives:

- The Science Ministry will promote projects to increase bioproduction standards in and between regions.
- The Commerce Ministry will design a project to support promotion and development of projects based on biodiversity and biomass.
- Agrosavia, the Agricultural Research corporation, will increase research initiatives in bioproducts to identify needs and look for technological solutions and promote bioproducts adoption.

Costa Rica

The country promotes a significant contribution to the achievement of sustainable development goals, especially in terms of achieving food security and promoting sustainable agriculture and reducing the effects of climate change, through the National Plan for Food Security, Nutrition and Eradication of Hunger 2025, which seeks adequate food for its citizens, free of adverse substances, especially pesticide residues.

At the same time, it relates to the resilient objective of boosting agribusiness capacity to sustainable and competitive production, through innovation, access to technology and the application of good production practices, established in its National Development Plan 2019-2022.

Ecuador

The large diversity of climates in different regions of Ecuador allow for cultivation of different agricultural goods. Large-scale production of cash crops exists in the coastal regions where coffee, palm oil, bananas, sugar, and rice are produced for export. Ecuador's banana production is also important as Ecuador exports more bananas than any other country. Ecuador is the seventh largest producer of cacao, and around 90 percent of cacao is produced by smallholder farmers. The key to

increasing agricultural productivity in Ecuador is the introduction of higher yielding crop varieties and encouraging small farmers to adopt sustainable agricultural technologies.

El Salvador

El Salvador promotes a National Agrarian Policy that seeks to boost agri-environmental management and achieve resilience to climate change, as well as; To contribute to guaranteeing agricultural health and food safety for the Salvadoran population; it prioritizes food security and the reactivation and sustainable development of crops such as sugar cane, cocoa, coffee, among other vegetables and fruits, with which it hopes to increase the supply.

Guatemala

Guatemala is a Central American country that has family farming systems linked to food security. Family agriculture generates more than 60% of employment and food from the agricultural sector; the main crops from family farming are peas and dried beans, carrots, papayas, among others. This project responds to the objectives in sanitary and phytosanitary measures of the Great National Agricultural Plan of Guatemala which seeks availability and access to healthy and disease-free food, in contribution to nutritional food security, contemplating within its priority axes phytosanitary measures, food security, to strengthen production, comply with international regulations to open new markets and be able to offer healthy food for national consumption and export, this related to a principle of extensionist (exchange of agricultural knowledge that improve the capacities of rural families).

Honduras

One of the objectives of Honduras' vision for the year 2038 is a productive Honduras, generating opportunities and employment, which sustainably uses its resources and reduces environmental vulnerability; with the recent natural disasters, ETA and IOTA, in the Honduran country, have produced an impact on GDP of 9.2%, a percentage that has been increased with the effects of COVID-19, which has led the country to establish Reconstruction and Sustainable Development Plan (PRDS) that is articulated with the objectives and priorities of this Honduran vision.

The reconstruction plan seeks to enhance and transform the productive sectors, presents projects to avoid the increase in the level of infestation of pests (insects and viruses) in horticultural crops, which are affecting the productivity and quality of products and by stopping shipments by pests or residues of agrochemicals; one of these projects is: BIOLOGICAL PROGRAM FOR THE COMAYAGUA VALLEY, which seeks to contribute to the increase of productivity, reduction of pesticide use, and reduction of costs and maintenance of the production of vegetables for export.

Nicaragua

Agriculture is a key sector of the Nicaraguan economy. The sustainability of natural resources (including soil, water, and biodiversity), and the impact of agriculture on the climate and vice versa are inextricably interconnected. Small- holder agriculture plays a crucial role in achieving food security, including nutrition security. Areas that need attention to improve the agriculture sector’s international competitiveness, provide opportunities for broader-based growth in agriculture, and manage climatic risks are grouped on four main fronts: (i) development of an incentive framework; (ii) achievement of greater inclusiveness; (iii) effectiveness of public spending; and (iv) management of climatic risks.

Peru

The government of Peru, through the Agrarian Productive Development Program of the Ministry of Agriculture and Irrigation and local producer groups, is addressing lagging productivity and economic growth, bringing their rural poor into greater equity with other regions and segments of the country already experiencing improving macroeconomic and social indicators.

Program activities include:

- Increasing small-scale producers' resilience and productivity, through diversified and modernization of production and food systems;
- Enhancing climate-sensitive production and sustainable resources management;
- Strengthening institutions for rural and agricultural development.
- Working with the private sector to improve smallholders' access to technical assistance and financial services by developing markets, increasing local capacity to contract services, and strengthening institutional and private-sector service providers;
- Promoting South to South and Triangular Cooperation (SSTC) with national agencies to enhance knowledge management and transfer that supports institutional development.
- Increasing food security and nutrition among rural families and fostering women's economic empowerment and agency in rural organizations.

Paraguay

Paraguay has engaged actively in the multilateral arena to adhere to different standards in the agriculture sector. In the area of sanitary and phytosanitary measures, a National Technical Committee was created in 2005 (6626/05 decree) to adopt WTO standards related to the sector. These are co-ordinated by mainly by SENAVE (for seeds and vegetables) and SENACSA (animal).

In Paraguay, a sustainable strategy (2016-2022) aims at achieving two objectives: i) ensuring sustainability in production and trade; and ii) strengthening social capital by building human and social capital and empowering rural organizations. In this regard, it focuses on empowering smallholder farmers and indigenous families by creating and strengthening rural organizations – in terms of governance, organizational administration and service capacity – to provide members with the tools they need to manage their own development.

Training and funding allow rural organizations' members to increasingly use technology in agricultural production in a number of areas:

- sound input use techniques
- soil conservation practices
- efficient irrigation
- use of appropriate genetic resources.

Key activities include boosting the capacity of smallholder farmers and indigenous communities to set up sustainable, profitable rural enterprises with access to local, national and, in some cases, international markets.

Appendix 8. Crop/Pest/Pesticide Priority Selection

Methodological design

The list of priority cases of crops/pests/pesticides was drawn up using the following methodology:

1. Definition of the criteria to be considered for the discussion and analysis to determine the selection of crops/pests/pesticides, which are presented in the following table:

Table 1. Operationalization of the category of analysis, indicator and observable expected for the selection of priorities

Category	Indicator	Observable expected
Crop Alerts	Number of alerts	Cultivation with a large number of alerts per notification. The pesticide has no alerts, but there will be regulatory changes and needs a plan to avoid future alerts.
Contribution to the region's gross domestic product	Degree of importance to the country's gross domestic product	Very important contribution to the gross domestic product of the region
Chemical analysis	Chemical analysis capacity of the country against the pesticide	The country has the capacity to analyze the molecule and its definition of residue
Biopesticide	Relevance of the existing biopesticide in the industry	At least one biopesticide, tested for efficacy and registered, is potential for use
Regulation of the pesticide molecule	Status of pesticide molecule regulation	Countries have a regulatory status that allows: • Maintain the molecule by changing its application practice (GAP) • Replace the molecule • Residue or efficacy tests are being carried out to contribute to a regulator (CODEX-EPA-EU-ASIA)
Research support	Industry interest in supporting research	The industry has an interest in supporting the research development of the phytosanitary substance

Country priority	Level of importance of the crop for the country	The priority of cultivation is High for the country

Source: PPG 753

2. Selection of information collection and analysis techniques

Based on the definition of the categories of analysis and observation indicators, the following research techniques were defined, which allowed obtaining the necessary data for decision making:

2.1 Information collection techniques:

1. Structured interview: A virtual questionnaire was applied to the representatives of each country covered by the project

2. Bibliographic consultation: A bibliographic consultation was made to the following documentation:

a. Alerts of export rejections and notification for non-compliance with MRLs Period 2018-August 2021 in the following databases

I. RASFF WINDOW (europa.eu)
II. Import Refusal Report (fda.gov)
III. Pesticide Residue Monitoring Program Reports and Data | FDA
IV. Number of Import Alerts by Country/Area (fda.gov)
V. Imported Food Safety | Ministry of Health, Labour and Welfare (mhlw.go.jp) Japan
VI. Border Inspection Does Not Meet Food Information Inquiry _ Consumer Zone (fda.gov.tw) Taiwan
VII. https://www.argentina.gob.ar/sites/default/files/lista_lev_ndeg27_-_plan_creha_vegetal_-_actualizacion_agosto_exceso_853.pdf
VIII. PNCRC/Vegetal - Portuguese (Brazil) (www.gov.br)
IX. Food Pesticide Residue Analysis Program (PARA) - Portuguese (Brazil) (www.gov.br)
X. https://www.sfe.go.cr/DocsResiduosAgroquim/Informe_analisis_de_residuos_de_plaguicidas_2020.pdf

b. National Development Plans of each country (Appendix 7)
c. Regulatory status (CODEX, EPA, EFSA) to 2021

2.2 *Information analysis techniques*

1. Analysis of bibliographic data: the information obtained from the bibliographic data was recorded in an "excel" database

2. Quantitative analysis: we proceeded to process the information of registration in statistical terms to determine trends, quantities and data of interest for the research related to the indicators of observation.
3. Discussion sessions: Based on the data obtained, a technical group discussion was held to interpret the data and integrate the assessments of the economic and political context of the countries before the information collected.
4. Triangulation of the information: from the data obtained through the application of each technique, the data obtained were triangulated and comparisons generated.

Analysis of the results

From the application of information collection techniques, information was obtained from the 11 countries in terms of bibliographic consultation, which were:

1. **Argentina**
2. **Bolivia**
3. **Colombia**
4. **Costa Rica**
5. **Ecuador**
6. **El Salvador**
7. **Guatemala**
8. **Honduras**
9. **Nicaragua**
10. **Paraguay**
11. **Peru**

The following is the data obtained:

In view of the data obtained, there is a trend on the part of countries in prioritizing the attention on banana pests, followed by pineapple´s and coffee´s, especially those that have been affected by the reduction of tolerances by their main trading partners. As shown in Figure 1.

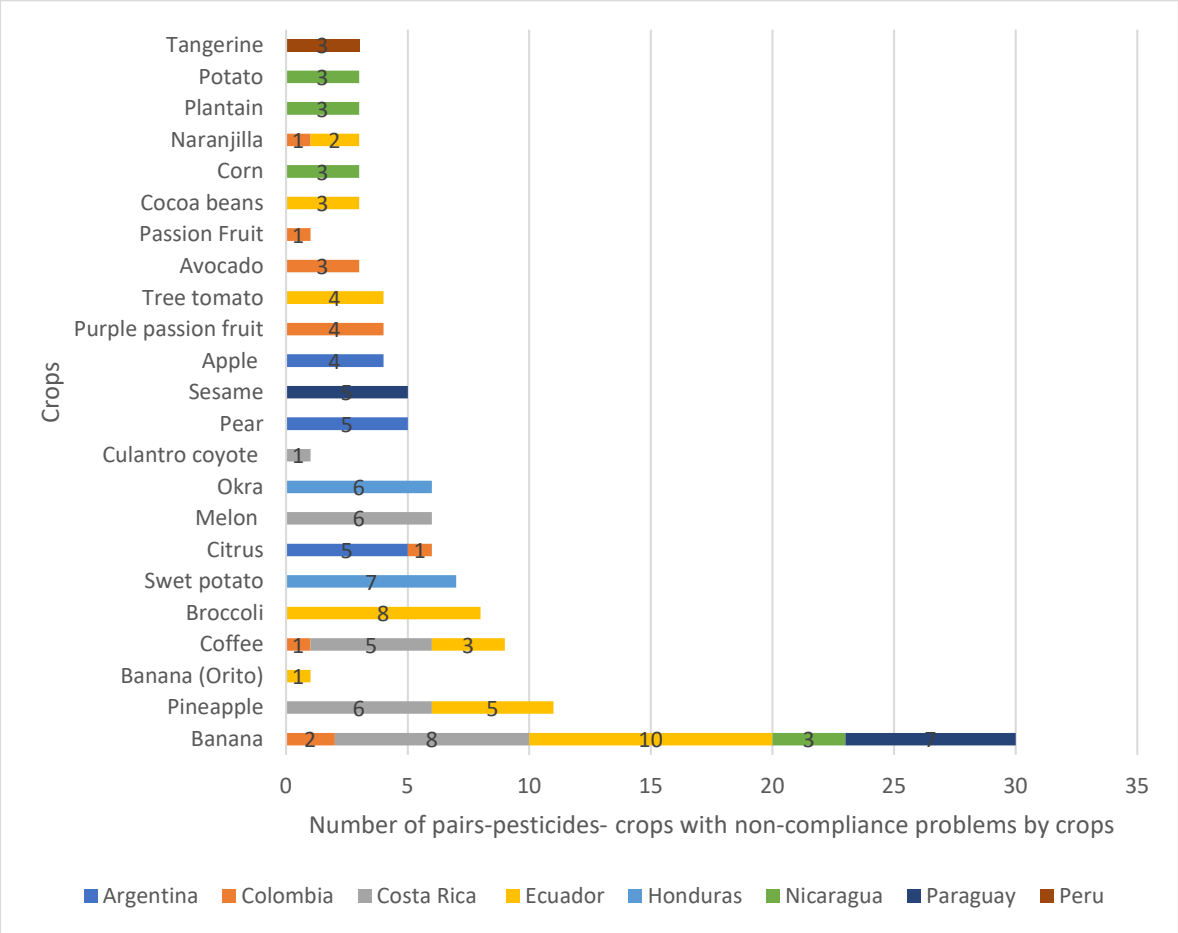

Figure 1. Count of pesticides with non-compliance problems by crop reported by countries, Source: PPG 753.

In the case ofpesticides, countries report concern about pesticides used in bananas: chlorpyrifos and mancozeb. These are used not only on their main export crops, but also on minor crops and domestic consumption (Figure 2).

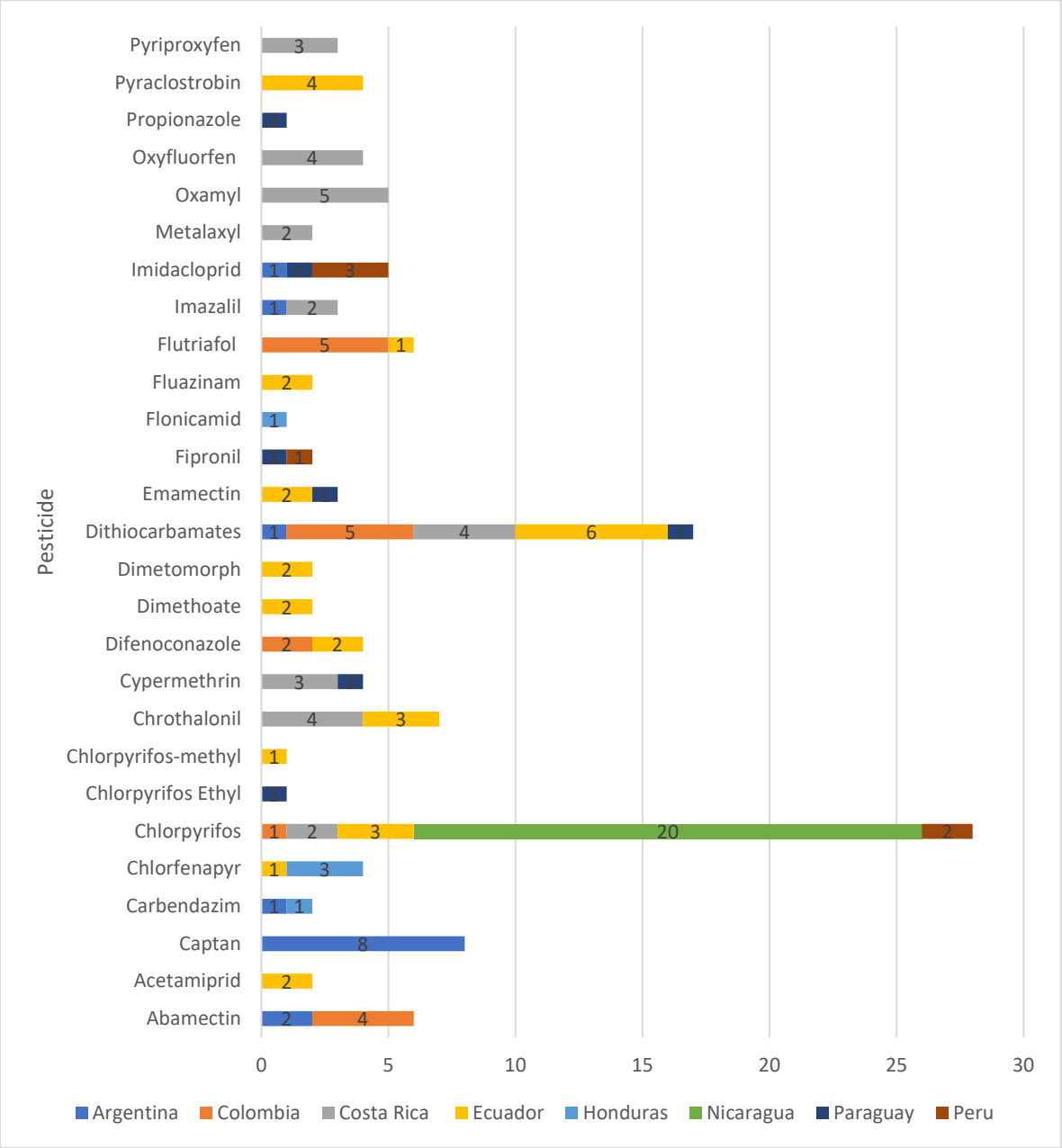

Figure 2. Number of pairs-pesticides- crops with non-compliance problems by crop

However, comparing the information of the priorities indicated by the countries in the survey and the import alerts, it is observed that it is the cultivation of snowpeas, followed by bananas, malanga and pineapples that have the greatest number of problems of non-compliance with import tolerances.

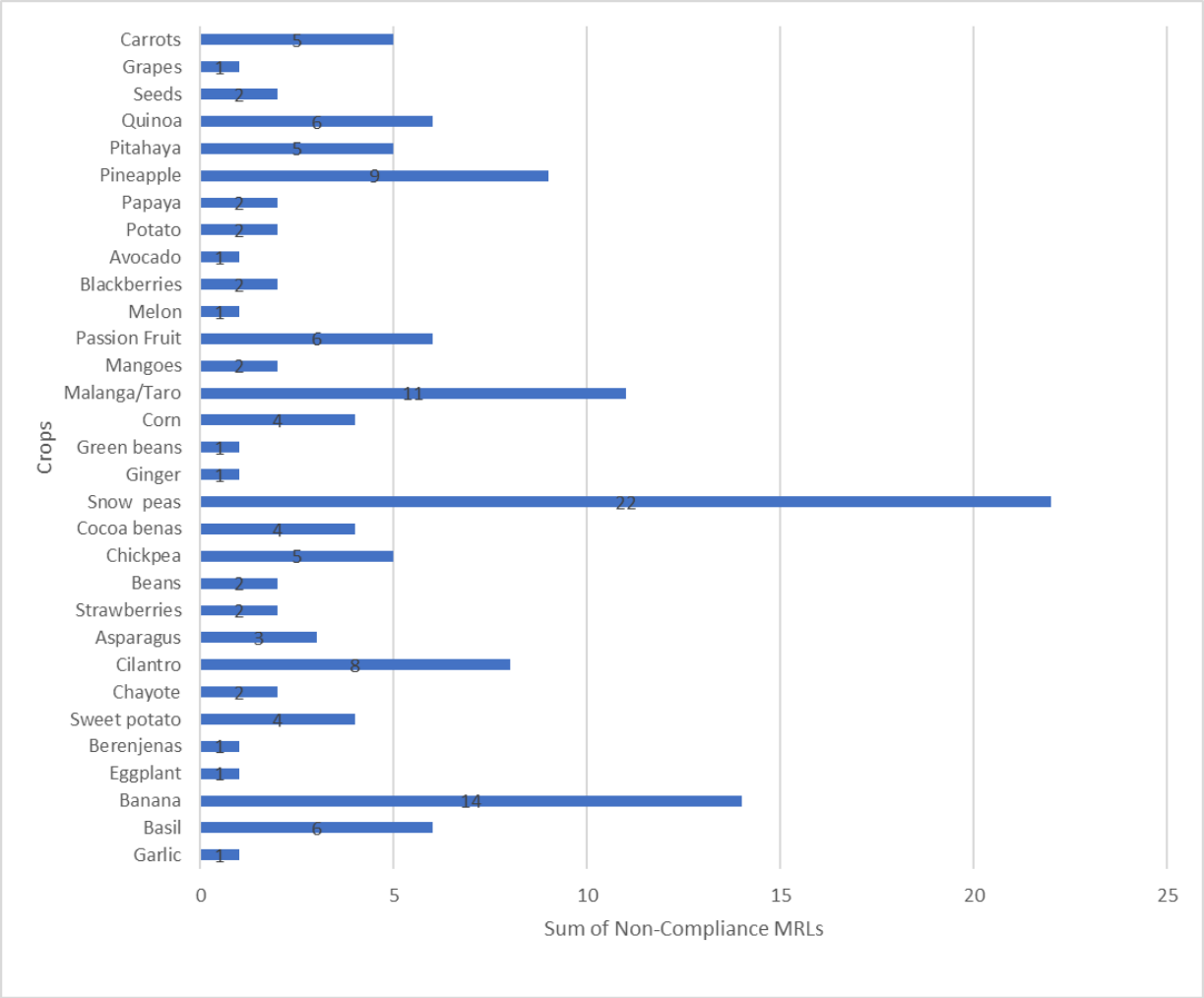

Figure 3. List of non-compliances per crop reported by the Import Alert systems, period 2018-August 2021, Source: PPG 753.

Under the analysis of import alerts, the pesticides with the highest number of non-compliances by the countries integrated into the project are: Chlorpyrifos, Carbendazima, Prochloraz and Tebuconazole, which were also included in the country reports.

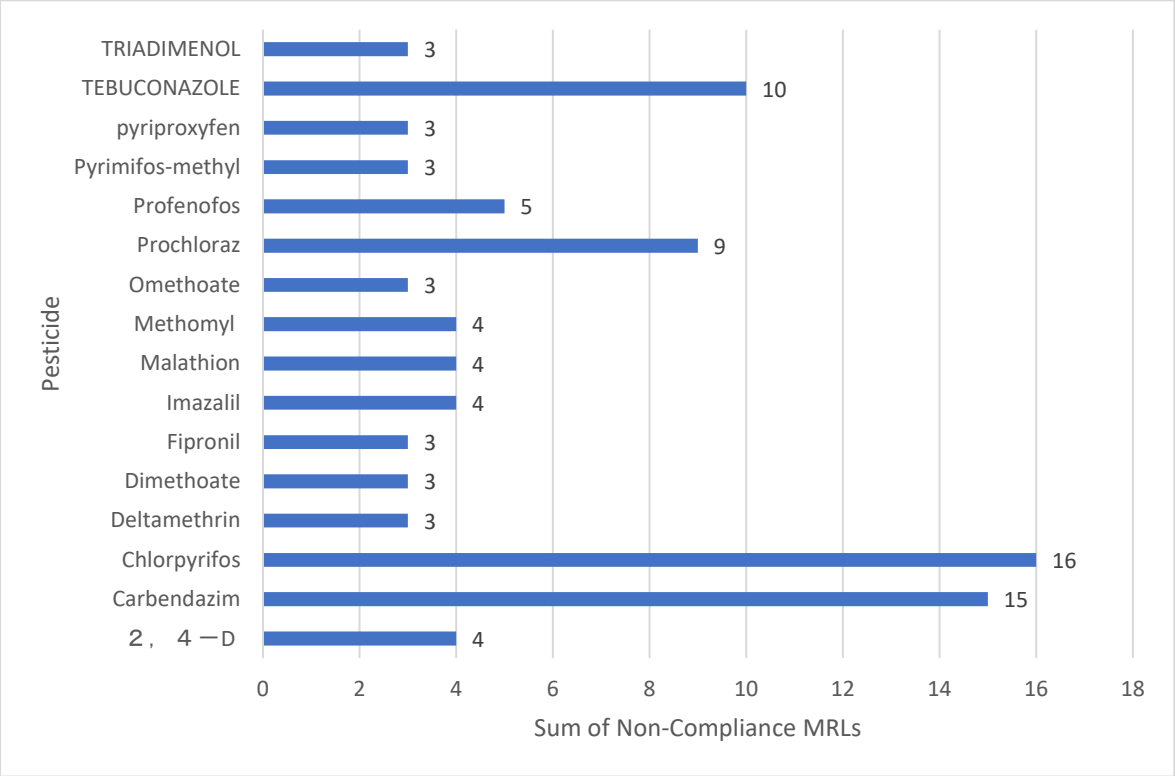

Figure 4. List of pesticide non-compliances reported by import systems, period 2018-August 2021, Source: PPG 753

Subsequently, the national development plans of the participating countries were reviewed (See Appendix 7), and when compared with the information collected, it was identified that crops with important import alerts such as snow peas, coriander, sweet potato, among others, are strategic crops within the development plans of the economy and family farming.

In addition, pesticides identified with non-compliance problems were reviewed with their regulatory status before the organisms that establish tolerances adopted by Latin America. For example, it was considered if health concerns had been presented, before the CODEX Alimentarius, or if they were molecules supported by the manufacturer. If their MRLs were to be revoked soon or if they were in a review process.

Finally, the analytical capacity of countries to analyze the identified molecules was reviewed, when selecting certain pesticides as mitigation objectives of the project.

Based on the information collected, discussion sessions were held to compare the information and from that the following conclusions and Recommendations were obtained.

Conclusions and Recommendations

It was decided to contemplate pairs (pesticide-crop) of the majority export crops, for which the countries showed concern, such as bananas, pineapples, coffee.

However, within the discussion sessions it was concluded that there were a number of small export crops that were of importance to each country, with trends of non-compliance and

that generated a contribution to the development of rural or family agriculture such as snow peas.

From the above, it was decided to prioritize by forming several categories: Cases based on field experiments for two priority cases of crops/pests/pesticides in which:

- There are existing pesticide MRLs in the target markets, but the MRL has been exceeded causing disruptions in trade.
- There are no MRLs for pesticides in target markets that cause trade disruptions.
- Include crops that require the development of mitigation measures on selected crops and pests based on available IPM strategies, but that will not lead to implementation of field trials.

The following is the synthesis of the prioritized crops/pest/pesticide based on the above criteria:

a.1 Crops prioritized for pesticide MRLs in target markets, but MRLs cause trade disruptions

Table 2: Priority crop/pest/pesticide when there is an existing pesticide MRL in the target markets, but the MRL has been exceeded causing trade disruptions.

Crops	Pest(s)	Chemical pesticide(s)	Potential biopesticide or IPM control tool
Plantain	*Fusarium oxysporum f.sp. cubense*	Imazalil, diflubenzurón, tebuconazol	The project will consult with industry. India has published information on the use of a bioplacide based on Trichoderma (EC).
Plantain	Antracnosa (*Colletotrichum musae*)	Imazalil, diflubenzurón, tebuconazol	The project will consult with industry. India has published information on the use of a bioplacide based on Trichoderma (EC).

Plantain	Thrips (*Frankliniella parvula*(*Chaetanaphothrips signipennis*)	Chlorpyrifos, imidacloprid, pyrethroids	Spinosad, spirotetramat, insecticidal nets, Pyganic (chrysanthemum extract)
Avocado	Mites	Spiromesifen, abamectina	Biolife (citrus extract), *Euseius hibisci, Glendromus helveolus, Neoseiulus californicus*
Avocado	Whiteflies	Spiromefesina, abamectina	*Encarsia*
Avocado	Leaf miners	Espiromefesina,abamectina	The project will consult with industry.
Passion fruit	Cladosporium (Roña) (*Cladosporium cladosporioides*) Botrytis (*Botrytis cinerea*) Antracnosis (*Colletotrichum gloesporioides*)	Difenoconazol	The project will consult with industry.
Tirabeques	Various insects	Profenophos, thiamethoxam, abamectin, emamectin benzoate	The project will consult with industry.

Citrus	Various pathogens (spots, fungi)	carbendazim, imazalil,mancozeb	The project will consult with industry.

a.2 Crops prioritized in terms of NO pesticide MRLs in target markets but MRLs cause trade disruptions

Table 3: Priority crops/pests/pesticides where there are no MRLs for pesticides in destination markets causing trade disruptions.

Crop	Pest(s)	Chemical pesticide(s)	Potential biopesticide or IPM control tool
Plantain	Sigatoka negra (*Mycosphaerella fijiensis*)	Mancozeb, methyl thiophanate, carbendazim, triazoles	New, safer fungicides are being developed and there is a companySTK Bio-Ag Technologies that claims the efficacy of a Timorex Gold product (melaluca extract (a tree)) for black sigatoka. The company claims to have conducted efficacy studies in several countries, but it's unclear whether the studies were large-scale and involve aerial applications. More research needs to be done with the industry.

Plantain	Banana weevil*(Cosmopolites sordidus)*	Chlorpyrifos	Piroproxyfen
Café	Coffee borer beetle (*Hypothenums campei*)	Chlorpyrifos	Guard (Biosecure Systems)
Passion fruit	Insect pests	metomilo, fipronil, cipermetrina,dimetoato, omethoato	The project will consult with industry.
Snow peas	Fungal pathogens	Clorotalonil	The project will consult with industry.
Cilantro	Insect pests	Acephate, diazinon, dimethoate, fipronil, indoxacarb, omethoate	The project will consult with industry.
Sweet potato	Insect pests	Flonicamid	The project will consult with industry.
Sesame	Cutter ants, loccust, caterpillars, aphids, thrips	Clorpirifos, fipronil, carbaril, imidacloprid, ethropos	The project will consult with industry.
Avocado	Fungal pathogens	Flutrialfol	The project will consult with industry.

b. Prioritized crops where the project will investigate mitigation measures in IPM strategies, but that do not require the implementation of field trials

Table 4: Priority crop/pest/pesticide where the project will investigate mitigation measures based on available IPM strategies, but which will not require the implementation of field trials.

Crop	Pest(s)	Chemical pesticide(s)	Potential biopesticide or IPM control tool
Coffee	Antrachnose	Coxicloruro superior	The project will consult with industry.
Cilantro	Fungal pathogens	Tebuconazol, triadimenol	The project will consult with industry.
Cocoa	Phytophtphora sp.	Mancozeb, ethaboxam, fluopicolide, proparmocarb, amectoctradin,dimethomorph, metalaxyl	The project will consult with industry.
Dragon fruit	Insect pests	Dimethoate, emmamectin benzoate, cyhalothrin lambda, profenofos	The project will consult with industry.
Pineapple	Phytophtphora sp.	Mancozeb, ethaboxam, fluopicolide, proparmocarb, amectoctradin,dimethomorph, metalaxyl	The project will consult with industry.
Sweet potato	Fungal pathogens	Carbendazim. Thiophanate-methyl, prochloraz	The project will consult with industry.

For selected alternative biopesticides, the project will primarily focus on microorganisms since these microbial agents are not likely to have residue issues of concern for importing countries. Biochemical biopesticides will be considered, especially pheromones and natural plant extracts, but some biochemicals will not be considered if they have regulated moieties and do not have a current pesticide maximum residue limit (MRL) established or a MRL exemption in importing countries. In the absence of effective biopesticides, conventional chemical pesticides may still be needed with extreme pest pressures, which commonly occurs in tropical countries. In these cases, the project may also identify effective and safer chemical pesticides with existing MRL standards in export destination markets that can still be used under IPM as the last application before crop harvest to meet trade requirements.

Appendix 8: Summary of the IICA / USDA project: "Harmonization of the registration requirements for chemical pesticides for agricultural use, biopesticides and alignment of maximum residue limits". Latin America Chapter.

Sponsor: United States Department of Agriculture (USDA)/Foreign Agricultural Service

Implementing partner: Inter-American Institute for Cooperation on Agriculture (IICA)

Beneficiary countries: Dominican Republic, Guatemala, Honduras, El Salvador, Nicaragua, Costa Rica, Panama, Colombia, Peru, Bolivia, Ecuador, Argentina, Chile, Paraguay, Brazil, Uruguay.

Why Latin America chapter: The USDA implements three mirror projects in parallel in the African, Asian and Latin American regions. The three projects constitute a Global program and have strategic alliances for implementation in each of the zones. Additionally, the global project has a team of high-level consultants who provide technical support to the three regions, as well as strategic alliances with the academic sector of the United States.

Implementation period: 2019 – 2024

Budget: Three hundred thousand dollars, with the possibility of expansion depending on the conditions of the project and the sponsor.

Project objectives:
The overall goal of the project is to facilitate world trade, because pesticide registration systems would be better coordinated (farmers in all countries would be able to use the same pesticide products), and standard-setting processes (trading partners would adopt common MRLs).
The specific objective for Latin America is to facilitate the achievement of the global objective through the creation and updating of regional regulatory frameworks, characterized by being based on science, promoting harmonization and facilitating trade.
Technical approach: The project, in the Latin American chapter, focuses on four large technical areas: 1) Requirements for registration, PQUA and Biopesticides; 2) Adoption of the MRLs; 3) Support for programs for "minor uses" and 4) National monitoring and execution programs.

<u>Registrations</u>

- **Crop groups** adopted at the regional level, or at a country level (if more appropriate) Codex groups will be adopted as the foundational system, but some modifications may be needed to include some crops not already in the Codex groups.
- **Mutual recognition of efficacy data** across countries within similar climatic regions.
- **Common registration data requirements** and formats for registration dossiers, based on international best practices and what leading countries in the region already have developed.
- **Registration assessments**/evaluations/decisions based on risk (and not on hazard) principles.

Standards (MRLs)

- **Common MRLs adopted**, first based on Codex, then other trade-based and trade-facilitating criteria (do not adopt decision paths that include "the lowest MRL" or default MRLs that are at the limit of quantification/detection).
- **Crop grouping MRLs** adopted based on Codex crop grouping classifications.

Research

- **Regional priority process** established to prioritize pesticide needs for registrations, MRLs, key pests, and key crops – and develop solution plans to address them (new residue studies, new research, engagement with companies to encourage registrations).
- **Study teams** trained and committed to establish and maintain coordinated minor use research programs, with funds dedicated to residue trial and efficacy research to encourage new pesticide registrations and Codex MRL establishment.
- **Training Center** established to provide on-going capacity to build and strengthen researchers capable of conducting supervised residue trials.

Monitoring Programs

- **Develop national food monitoring programs** to ensure safety of domestic food supplies.
- **Strengthen pesticide product quality** programs at the national level, with a reporting system in place to alert other countries in the region of product quality violations.

Progress achieved: More than 30 training events carried out. Working groups operating at the subregional level. Collaborative work with regional organizations (CAC and CAN). Draft technical regulations on registration issues, MRLs and biopesticides. Creation of a WEB site with the videos of a large number of training events.

Contact points for further information: Nigel Hunter (nigel.Hunter@usda.gov), Eric Bolaños (erick.bolanos@iica.int)

Appendix #9
National Public-Private Articulation Committees.

The need to efficiently coordinate between the country and the Central Administration of the Project, and recognizing the diversity of conditions and characteristics in each of the 12 participating countries, is that an internal coordination mechanism is required to facilitate this process. This internal articulation mechanism will be called the "National Public-Private Articulation Committee"

Committee Objectives:

i) Maintain fluid and permanent communication with the central administration of the Project.
ii) Develop a fluid and permanent communication between the different sectors and institutions that participate in the implementation of the project.
iii) Help identify particular needs or conditions that the country requires for the proper implementation of the project.
iv) Help identify good practices to document and transfer through the central administration of the project to the other countries.
v) Ensure the participation of all sectors and institutions that should participate in the implementation of the project.

Composition of the Committee:

The formation of the National Committee is flexible and responds to the characteristics of the country internally. Its official sector (regulator), its private sector (producers), its private sector (developers of phytosanitary solutions), its extension sector, etc.

The participants in the project will make up the members of the Committee, and the list established below is just a suggestion to take into account:

i) A delegate from the IICA office
ii) A delegate from the official sector designated as a focal point for the project.
iii) A delegate from each institution responsible for agricultural extension.
iv) A delegate from the academy.
v) One, two or three delegates from the private sector producing the selected crops. (preferably from organized groups or guilds).
vi) One or two delegates from the developers of phytosanitary solutions (preferably from organized groups or unions).
vii) One or two official regulatory delegates or those responsible for the registration of PQUA and biopesticides.
viii) A delegate linked to the Uses of Minors program.
ix) Any other delegate that the Committee decides to include.

Coordination of the Committee: The coordination of the National Committee will be the responsibility of the IICA delegate and the designated focal point for the project.

The functions and responsibilities of this Committee will be:

i) Identify the members of the Committee, and ensure their incorporation in a timely manner (representatives of the official sector, representatives of research entities, the private sector, others).

ii) Summon the actors involved in the project and maintain a fluid, permanent and efficient communication that helps to facilitate the management of the project.

iii) Give feedback to the central coordination of the project with those positive aspects that deserve to be informed and with those aspects that require support or decision from the central administration.

iv) Maintain an internal dialogue on the management of the project and seek the necessary dissemination before relevant institutions and authorities.

v) Support the positioning of the project at a technical and political level.

vi) Manage the guidelines or recommendations that may emanate from the central coordination of the project.

Committee Meetings:

The Committee may meet in person or virtually once a month, or whenever it deems necessary. You must generate your own minutes to follow up on the agreements you make and share them with the central administration of the project.