



STDF PROJECT PREPARATION GRANT (PPG)

APPLICATION FORM

The Standards and Trade Development Facility (STDF) provides Project Preparation Grants (PPGs), up to a maximum of US\$50,000, for the following purposes (or a combination thereof):

- application of SPS-related capacity evaluation and prioritization tools;
- preparation of feasibility studies that may precede project development to assess the potential impact and economic viability of proposals in terms of their expected costs and benefits; and/or
- preparation of projects proposals that promote compliance with international SPS requirements, for funding by the STDF or other donors.

Applications that meet the STDF's eligibility criteria are considered by the STDF Working Group, which makes the final decision on funding requests. Complete details on eligibility criteria and other requirements are available in the *Guidance Note for Applicants* on the STDF website (www.standardsfacility.org). Please read the *Guidance Note* before completing this form. Completed applications should be sent by email (as Word documents) to STDFSecretariat@wto.org.

PPG Title	Proposal development on establishment and maintenance of fruit production areas free and under low prevalence of fruit fly pests in southern Africa.
Budget requested from STDF	US \$40 000
Full name and contact details of the requesting organization(s)	<p>Department of Agriculture Forestry and Fisheries, South Africa, Directorate Plant Health, Private Bag X 14, Gezina 0031; Tel: +27 123196384</p> <p>Citrus Research International, PO Box 28, Nelspruit, South Africa. Contact: Aruna Manrakhan. E-mail: aruna@cri.co.za; Tel: +27 137598000</p> <p>Stellenbosch University, Department of Conservation Ecology and Entomology, Faculty of AgriSciences, Private Bag X1, Matieland, 7602, South Africa. Contact: Dr Pia Addison, E-mail: pia@sun.ac.za; Tel: +27 218084671.</p> <p>Faculty of Agronomy and Forest Engineering Eduardo Mondlane University, Main University Campus, Avenue Julius Nyerere, Building No. 1, Maputo, Mozambique. Contact: Domingos R. Cugala, email: dcugala@uem.mz or dcugala@gmail.com; Tel:+258823148430.</p> <p>Royal Museum for Central Africa, B3080 Tervuren, Belgium. Contact: Marc De Meyer, Department Biology. Email: demeyer@africamuseum.be / Tel: ++32 2 7695360.</p>
Full name and contact details of	Jan-Hendrik Venter, Department of Agriculture, Forestry

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I. BACKGROUND AND RATIONALE

1. What is the purpose of this PPG? Explain whether it is requested to: (i) apply an SPS-related capacity evaluation or prioritization tool; (ii) prepare a feasibility study (prior to project development) to assess the potential impact and economic viability of proposals in terms of their expected costs and benefits; and/or (iii) prepare a project proposal for consideration by the STDF or other donors?

General purpose: To prepare a project proposal for consideration by STDF donors.

The project to be proposed is the establishment of pest free/low pest prevalence areas in southern Africa with regard to invasive and indigenous fruit fly (Diptera: Tephritidae) pests in tropical, subtropical and temperate horticultural commodities.

2. Explain the key SPS problems and/or opportunities to be addressed. Clarify why these issues are important, with attention to market access and poverty reduction. Describe, if relevant, how these issues relate to SPS priorities in the Enhanced Integrated Framework's Diagnostic Trade Integration Studies (DTIS), the findings of SPS-related capacity evaluations, national poverty reduction strategies, sector development strategies or policies, etc. See Qn. 7. (b) – (d) of the Guidance Note.

The fresh fruit industry of Southern Africa is continuously expanding. High volumes of fresh tropical, subtropical and temperate fruit are being exported from South Africa and Mozambique (FAOSTAT, 2015). South Africa is the second largest exporter of citrus in the world and the third largest producer of deciduous fruit in the southern hemisphere (FAOSTAT, 2015). In the season 2014-2015, net revenues from export of subtropical, citrus and deciduous fruit totalled approximately US \$1.6 billion (Department of Agriculture Forestry and Fisheries, 2016). South Africa recognizes the importance of complying with international SPS regulations in order to participate fully in the global economy, and has developed a sanitary and phytosanitary strategy, including aspects such as development of pest free areas and promotion of regional SPS cooperation (DAFF, 2014). In Mozambique, agricultural produce comprises more than a third of the country's overall exports (DTIS, 2004, 2015), and the annual growth rate of Mozambique's export to SADC countries and the EU has increased over the last years (DTIS, 2015). Nevertheless, horticultural exports are a minor part in the total value of export products, and less than 15% of Mozambique's arable land is under cultivation, allowing a large potential for further agricultural development. The DTIS specifically recommended a sector development strategy that focuses on diversifying into higher value product lines and other export markets with horticultural export (mango in particular) as the principal example. The subsequent crop diversification strategy promoted both by the government of Mozambique and the private sector, led in recent years to a production growth of fresh fruits and vegetables. Mozambique as such has an enormous potential for export, being one of the main trading partners among the SADC countries, mainly to South Africa.

In addition to bringing important revenues to the southern African countries, fresh fruit industries also contribute significantly to employment in these countries. The citrus and deciduous fruit

industries of South Africa employ more than 200, 000 people directly on farm and in packing houses (Department of Agriculture Forestry and Fisheries, 2015). It is estimated that a total of 1.5 million households are dependent on these two fresh fruit industries. Deciduous fruit alone provides on-farm employment for just over 100 000 people, with a further 437 000 or so dependants. In Mozambique, agriculture is the most important sector, employing 80% of the workforce and accounting for 20% of GDP. The Action Plan for Reducing Absolute Poverty (PARPA) envisages agriculture and rural development as one of the strategic priorities to fight poverty, and improvement in horticultural revenue is an essential part of this.

However, the importance of agricultural production in the national economies and the possibility to exploit such opportunities are seriously undermined due to the rigorous restriction measures imposed by importing countries, because of the risk of introduction of invasive pests. The inability to comply with sanitary and phytosanitary measures can lead to the loss of export markets. Fruit flies have always been considered a major constraint in horticulture in the region and several major pests had and still have a large impact on the fruit production and trade. As such they form one of the main phytosanitary issues in Africa. In a recent study for establishing priorities for SPS capacity-building in Mozambique, among the six top priorities selected, four are related to fruit fly issues (Henson et al., 2012). Moreover, in the last decade, the problem is aggravated because of two new developments: the introduction of exotic invasive pests of Asian origin and the recognition that some of the indigenous species are actually a complex of different species with their own ecological thresholds.

In recent years four exotic species of Asian origin were introduced into Africa, and most of them have recently expanded in their occurrence on the continent. The Oriental fruit fly, *Bactrocera dorsalis* (formerly recognized under the name *Bactrocera invadens*), was first detected in East Africa in 2003 . Since then, the Oriental fruit fly has spread over large parts of the continent including southwards. Despite national action plans developed in southern African countries such as South Africa and Mozambique, there is a clear progressive invasion of the Oriental fruit fly in the region, threatening several major fruit producing areas, especially in the western Cape region, which are currently free of the pest. The melon fruit fly (*Zeugodacus cucurbitae*) has been established in eastern Africa at least since the first half of the 20th Century. Over the last 10 years, however, it seems to be expanding its range on the continent. The melon fly was found in northern Mozambique in 2013. In Africa, a further spread of two other exotic fruit fly pests is anticipated: the peach fruit fly (*Bactrocera zonata*) and the solanum fruit fly (*Bactrocera latifrons*). These two exotic pests would need to be monitored vigilantly across Africa including the southern African region. Several parts of southern Africa are currently still free of either or both of the two former pests, providing the opportunity to demarcate pest free areas.

The indigenous Natal fruit fly (*Ceratitis rosa*) has been recognized as a major pest of several tropical and subtropical fruits grown in southern Africa. It has also been introduced beyond its native range, especially in the Indian Ocean. Recent studies showed that this species actually comprises two different biological species with different ecological requirements and different physiology. As a consequence, their distribution throughout the region is not identical with both species occurring together in certain places, but also other parts only affected by one of the two species. As they have a different ecology and physiology, their invasive potential would likely be different, which has consequences for trade and the establishment of pest free areas for either species.

In order to ensure the development of adequate measures to control these exotic and indigenous pests, and in the meantime to ensure compliance with SPS standards and quality norms to guarantee access to the international market (as objective put forward by the DTIS), there is an urgent need for addressing the following issues:

- What is the exact distribution of these exotic and indigenous fruit fly pest species and how can we adequately monitor them?
- What are the major production areas that are, in the short to medium term, vulnerable to invasion of these pests?

- What baseline data are available and should be obtained for establishing pest free areas for fruit flies (in accordance with IPPC ISPM 26) and/or establishing areas of low pest prevalence for fruit flies (in accordance with IPPC ISPM 30)?
- What are the practical implications for establishing such pest free areas for fruit flies (in accordance with IPPC ISPM 26) and/or establishing areas of low pest prevalence for fruit flies (in accordance with IPPC ISPM 30)?
- What is the cost/benefit analysis with regard to establishing pest free areas or areas of low pest prevalence?

The PPG mainly aims at bringing together the different stakeholders in the development of such areas, to evaluate the current situation and knowledge on the topic, to define the shortcomings, and to consider the feasibility of such an establishment. These include the different research groups and experts who will provide the technical information, the government bodies who will implement the actions proposed, and the grower associations who will benefit from such an establishment. The main objective of this preparatory phase would be the development of a full-fledged project for development of operational plans to establish pest free/low pest prevalence areas in selected parts of southern Africa (within the countries of South Africa and Mozambique) with regard to invasive and indigenous fruit fly pests in tropical, subtropical and temperate horticultural commodities. As such it will also be complementary with the identified top priorities for SPS capacity building options in Mozambique in particular.

The proximity of South Africa and Mozambique, the exploration of new markets, and the growing horticultural industry in Mozambique, has led to an increase in movement of plants and plant materials through formal and informal trading between both countries. In addition, they share large ecological regions that form natural corridors and passage ways for organisms such as fruit flies to disperse naturally. The current agricultural industry in Mozambique is largely driven by small scale, developing agriculture associated with the lack of regular area-wide pest management programmes. This will increase the possibility of introduction of quarantine pests in both countries. On the other hand, both countries have very active surveillance and monitoring activities ongoing as well as a number of networking and research programs (see below under point 4) which facilitates the development of a common project. The current study is, therefore, focusing on these two countries.

Addressing these issues would secure the market access through export and trade for the main horticultural commodities that are currently marketed by South Africa and Mozambique. As approximately large parts of the population in both countries make a living through horticultural activities, securing this industry provides an income for a large part of the population, especially of lower income groups.

3. Which government agencies, private sector, academic or other organizations support this PPG request? Letters of support from each of these organizations would be advantageous (Appendix 1). See Qn. 7. (e) of the Guidance Note.

Department of Agriculture, Forestry and Fisheries South Africa (DAFF)

Department of Plant Protection (DSV), Ministry of Agriculture and Food Security, Mozambique

Citrus Research International

HortGro Science

South African Table Grape Industry (SATI)

Citrus Growers Association of southern Africa

IAEA/IPPC

4. How does this PPG complement and/or build on past, ongoing and/or planned national programmes and/or donor-supported projects? See Qn. 7. (f) of the Guidance Note.

National Programs of Surveillance and Monitoring

Several of the partners (indicated in **bold**) are involved in these programs.

For South Africa, the **Department of Agriculture Forestry and Fisheries** and industry bodies such as **Citrus Research International** and Fruit fly Africa, have been involved in a national action plan on the Oriental fruit fly that was developed with a surveillance network being initiated in 2006 in order to allow early detection and eradication (Manrakhan et al., 2015). Because of established presence of the pest in the north to north-eastern parts of the country, the national control strategy continues to focus on preventing further incursions, slowing the spread of the pest and monitoring the extent of its distribution within the country. This is still ongoing and being directed by DAFF. Local industry partners (grower-based funding trusts), such as HortGro Science and South African Table Grape Industry (SATI), who are based in the Western Cape of South Africa, stand to gain from their current pest-free status, and would continue to benefit from such a project if more stringent quarantine measures could be put in place, so as to secure their export markets.

For Mozambique, this project will complement the fruit fly program that was initiated in 2007 with support of the World Bank and USDA-APHIS, and coordinated by the **Eduardo Mondlane University**. Through the fruit fly surveillance program, the South region was declared pest free area for the Oriental fruit fly from 2009 onwards. Because of further spread and establishment, this ceased to be a pest free area in 2011. Due to the current detection of melon fruit fly in the northern region of the country, the government is currently making efforts to determine its current distribution and to establish pest free areas in the central and southern regions.

Networking activities

Several of the partners participating in the PPG application (indicated in **bold**) are involved in these activities.

ERAFRICA is a European Union project aimed at promoting a unified European approach to collaborating with Africa in the field of science and technology research for innovation and sustainable development. The ERAFRICA project is funded by the European Commission, with different institutions in participating European and African countries providing the funding for different project themes. The three year ERAFRICA "FRUIT FLY" project started in June 2014, and includes as partners **Citrus Research International** (as coordinator) (South Africa), **Royal Museum for Central Africa** (Belgium), CIRAD (Reunion, France) and Centre National de Recherche Agronomique (Ivory Coast). The aims of the project are to develop effective and accurate detection methods for fruit fly pests in Africa and the Indian Ocean region. The specific objectives of the project are to (1) determine the efficacy and sensitivity of different trapping systems for monitoring Afrotropical fruit fly pests, (2) analyse the population genetic structure of key indigenous and exotic fruit fly pests in the Afrotropical region for a better understanding of their geographic ranges and dispersal patterns, (3) develop identification tools for Afrotropical fruit flies and (4) set up a standardised fruit fly detection system in Africa and the Indian Ocean region.

FRUITFLYNET is a networking initiative funded by the Belgian Science Policy (BELSPO) of the Belgian Federal Government. The general objective is to facilitate the creation of a network between a Belgian Federal Research Institution (the **Royal Museum for Central Africa in Tervuren**, RMCA) and non-European partners in order to initiate a long-term consolidated network. In the particular case of the FRUITFLY network, RMCA intends to develop a network with three other African partners: the **Stellenbosch University** (Stellenbosch, South Africa; SU), the Sokoine University of Agriculture (Morogoro, Tanzania; SUA) and the **Eduardo Mondlane University** (Maputo, Mozambique; EMU). The network activity focuses on and provides funds for organizing meetings to discuss on how monitoring and surveying activities with regard to fruit flies and conducted by these institutions, can be standardized and harmonized.

The IAEA Technical Cooperation regional project RAF5062 on "Preventing the Introduction of Exotic Fruit Fly Species and Implementing the Control of Existing Species with the Sterile Insect Technique and Other Suppression Methods" was financially supported by the IAEA and has the aim of sharing among the countries of the Indian Ocean (IO) region the knowledge on the status of tephritid fruit fly pests in each of the participating countries and the control techniques in use, including the possibility of applying the Sterile Insect Technique (SIT), and coordinate the joint efforts required to avoid the introduction of the exotic fruit fly pests. This can be achieved through the strengthening of the quarantine and pest risk analysis for each of the participating countries, and the installation of accurate monitoring system to detect early exotic fruit fly pest introductions, with the objective to eradicate at incipient stages of the invasion to maintain the region free of these pests. This networking initiative included the participation of the Member States of the Indian Ocean Region, including **Eduardo Mondlane University**, Mozambique. The **Royal Museum for Central Africa** was involved to provide technical expertise. The project was approved for 2012-2015 and had as main outcomes: (1) the National Plant Protection Organizations of Member States in the region networked in terms of increased awareness and technical capacity to prevent or detect and address invasive exotic tephritid fruit fly pest outbreaks and (2) increased technical capacity of some Member States in the region to integrate, as part of a phased conditional approach, the Sterile Insect Technique (SIT). This regional project will be succeeded by a new IAEA Technical Cooperation regional project RAF5074 on "Enhancing Capacity for Detection, Surveillance and Suppression of Exotic and Established Fruit Fly Species through Integration of Sterile Insect Technique and Other Suppression Methods". A first meeting will take place in July 2016, organized by the **EMU** partner.

In addition to the above, both the **Royal Museum for Central Africa** and the **Eduardo Mondlane University** are partners in a North-South-South Project (third partner Sokoine University of Agriculture, Tanzania) funded by Belgian Development Cooperation, aiming at improving IPM methods for mango in Manica Province, Mozambique. The **Eduardo Mondlane University** has a fruit fly research laboratory established in this province with funding from the World Bank.

An IAEA Coordinated Research Project (CRP) on "Resolution of Cryptic Species Complexes of Tephritid Pests to Overcome Constraints to SIT Application and International Trade" which was recently completed, provides the taxonomic background on the correct identity for the Natal fruit fly, the melon fruit fly and the Oriental fruit fly (main pests involved in this PPG). The **Royal Museum for Central Africa** had a coordinating role in a number of the workgroups involved (see De Meyer et al. 2014 for details).

5. Have you discussed this PPG request – or funding for the project proposal which would result from it – with any potential donors (bilateral, multilateral, Enhanced Integrated Framework, etc.)? If so, provide details below and indicate potential sources of funding for the resulting project. See Qn. 7. (g) of the Guidance Note.

This PPG request, nor the actual project proposal which would result from it, have been discussed any potential donors. Possibilities regarding this will be explored during the forthcoming first meeting of the IAEA new regional project, which will take place in Maputo in July 2016.

6. Briefly explain how cross-cutting issues (e.g. related to gender, the environment) are relevant for this PPG and, if appropriate, how they will be addressed.

Poverty reduction. Although progress has been made over the last decade with regard to poverty reduction, it is still severe and widespread with large parts of the population in particular areas being unable to obtain a minimally adequate standard of consumption. Rural areas, where agricultural activities provide the primary source of livelihood, are hit worse than urban communities. Agriculture is an engine of growth and poverty reduction in countries where it is the main occupation of the poor. The PPG will assemble data on how alleviation of pest species can contribute to increasing the income of rural communities involved in horticulture.

Gender. The role of women in small scale farming is considerable, especially with regard to horticultural activities, and they make essential contributions across the developing world (FAO, 2011). They often comprise almost 50% of the agricultural labour force in Africa, despite the fact that their workload also included other chores and household responsibilities. It is also the most important source of employment, compared to manufacturing and services. The small-scale cultivation of vegetables and fruits is often a niche developed by women as it can be combined with other tasks that require them to stay near the home (such as caring for children and elderly). Improvement in revenue that can be obtained through these activities can improve the status of women within their society.

Economy. During a recent workshop by the Trade Development Facility, held in Maputo Mozambique, it was concluded that the Oriental fruit fly and native fruit flies posed the most significant trade threat to the country and it was recommended that mitigation measures should be the most cost effective way of responding to fruit fly related threats. Large parts of current mitigation procedures focus on insecticide use. However, insecticide costs amount to just under US\$674/ha for stone fruit, therefore making this by far the most expensive input of the pre-harvest crop budget (apart from labour). Similar trends in costs are observed for the other fruit kinds. IPM (Integrated Pest Management) offers other means and ways to mitigate the fruit fly pest problem, while also contributing to the development of areas of low pest prevalence. The PPG will analyse the cost-benefits of the use of pesticides, compared to other methodologies such as IPM.

Health and Environment. Related to the above, the use of pesticides also presents further issues for human health and environmental safety, as the major insect pests on deciduous fruit are still controlled using synthetic pesticides. With additional invasive fruit flies entering previously pest-free areas, the use of these pesticides would increase in line with eradication procedures necessary to contain these pests. With establishment and spread of these pests, chemical control are usually the only initial option for management, with alternate strategies not available in new areas (such as SIT, biological control etc...), as many of these strategies are species-specific. Additionally, invasive fruit flies pose a risk to the local biodiversity of the newly introduced area, as invasive pests often are able to out-compete local species, with added potential negative impacts on the healthy functioning of the agro-ecosystem.

II. IMPLEMENTATION & BUDGET

7. Who will take the lead in implementing this PPG? If particular national experts and/or international consultants are proposed, attach a copy of their Curriculum Vitae and record of achievements (Appendix 2). If no names are provided, the STDF will provide a shortlist of consultants if the PPG request is approved.

It is suggested that the Department of Agriculture, Forestry and Fisheries (DAFF) of the Republic of South Africa will take the lead in implementing this PPG, with as national expert Mr Jan Hendrik Venter, manager of the Plant Health Early Warning Systems at DAFF.

As international consultants involved in implementing the PPG, the following experts are suggested:

Mr Solomon Gebeyehu, SPS specialist with extensive experience in southern Africa and fruit fly related issues. Former SPS Technical and Policy Advisor for southern African for USDA/USAID.

Mr Willem Hoffman, Department of Agricultural Economics, Faculty of AgriSciences, Stellenbosch University. Specialist in farm management.

8. In the table below, briefly describe the main activities to be carried out under this PPG and specify who would be responsible. Provide an estimate of the budget required (e.g. for national/international expertise, travel and DSA of consultants, stakeholder meetings or workshops, general operating expenses, etc.).

Activity	Responsible	Estimated Budget (US\$)
Organisation two meetings of project partners and stakeholders (travel, subsistence)	Jan Hendrik Venter, Department of Agriculture, Forestry and Fisheries	20 000
Data gathering (literature study, database consulting, cost benefit analysis for establishment of fruit fly free areas and areas of low fruit fly prevalence)	Pia Addison, Stellenbosch University	9000
Consultants and international expertise (travel, DSA)	Jan Hendrik Venter, Department of Agriculture, Forestry and Fisheries	5000
Project proposal write up	Aruna Manrakhan, Citrus Research International Domingos Cugala, E. Mondlane University Marc De Meyer, Royal Museum for Central Africa	6000

References

Department of Agriculture, Forestry and Fisheries. 2014. Draft Sanitary and Phytosanitary Strategy. Directorate Food Import and Export Standards, 37pp.

Department of Agriculture, Forestry and Fisheries. 2015. A profile of the South African citrus market value chain. Department of Agriculture, Forestry and Fisheries, Pretoria, South Africa. <http://www.nda.agric.za/doaDev/sideMenu/Marketing/Annual%20Publications/Commodity%20Profiles/FRUITS%20AND%20VEGETABLES/Citrus%20market%20value%20chain%202015.pdf>

Department of Agriculture, Forestry and Fisheries. 2016. Abstract of Agricultural Statistics. Department of Agriculture, Forestry and Fisheries, Pretoria, South Africa. <http://www.daff.gov.za/daffweb3/Home/Crop-Estimates/Statistical-Information>

De Meyer, M., A. Clarke, T. Vera & J. Hendrichs (Eds). 2015. Resolution of Cryptic Species Complexes of Tephritid Pests to Enhance SIT Application and Facilitate International Trade. ZooKeys 540: vi + 557pp

DTIS. 2004. Mozambique Diagnostic Trade Integration Study. Volume 1 Executive Summary and Action Matrix, 69pp.

DTIS. 2015. Revised Diagnostic Trade Integration Study for Mozambique. 123pp.

FAO. 2011. The Role of Women in Agriculture. ESA Working Paper 11-02, 48pp.

FAOSTAT. 2015. Food and Agricultural Organisation of the United Nations Statistics Division. Food and Agricultural Organisation, Rome, Italy. <http://faostat3.fao.org/home/E>

Henson, S. , D. Cassidy & O. Masakure. 2012. Establishing Priorities for Sanitary and Phytosanitary Capacity-Building in Mozambique Using a Multi-Criteria Decision-Making Framework. Standards and Trade Development Facility, 67pp.

Manrakhan, A., J.H. Venter & V. Hattingh. 2015. The progressive invasion of *Bactrocera dorsalis* (Diptera: Tephritidae) in South Africa. Biological Invasions doi 10.1007/s10530-015-0923-2

Appendixes

Appendix 1: Letters of support from each of the organizations supporting this proposal.

Letter of support DSV, Government of Mozambique (divided into two scanned documents)

Letter of support DAFF, Government of South Africa

Letter of support HortGro, South Africa

Letter of support CRI, South Africa

Letter of support IAEA

Appendix 2: Curriculum Vitae and record of achievements for any consultants proposed to implement this PPG.

CV Solomon Gebeyehu

(CV of Willem Hoffman not available at time of submission)

CV Jan Hendrik Venter as national expert