

ANNEX I

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*. The completed application should be submitted through the [STDF online application system](#).

PPG Title	An ISO 17025 accredited mobile laboratory for food safety testing for the agro and food sectors using next generation technologies – Proof of Concept and prototype design
Budget requested from STDF	\$49,069
Full name and contact details of the requesting organization(s)	Council for Scientific and Industrial Research - An assignee of the South African Department of Science and Innovation. Physical Address Meiring Naudé Road Brummeria Pretoria South Africa Postal Address PO Box 395 Pretoria 0001 South Africa
Full name and contact details of contact person for follow-up	Dr Nomusa Dlamini nrldlamini@csir.co.za +27 79 477 0955

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?

This PPG is requested to conduct a feasibility study to assess the potential impact and economic viability of mobile ISO 17025 accredited food safety testing laboratories in SADC nations along their food safety value chains, with an initial focus on 4 SADC countries namely South Africa, Namibia, Eswatini and Lesotho.

Bill and Melissa Gates made the prediction that Africa would feed themselves by 2030. In order to achieve this and build "The Future We Want" innovation needs to be accelerated within Africa allowing us to ensure safety in order to assure food security. Therefore, the next generation innovative technologies are required in the field of food safety especially within developing countries. Combining the force of indigenous food safety knowledge and practices as well as those of scientific research is key to achieving these goals.

The WHO/FAO (2020) has re-iterated that **food safety is a shared responsibility**. However, food insecurity is a threat to all people as access to raw supplies may be compromised leading to food fraud and compromised food safety during the Covid -19 pandemic. The Covid-19 pandemic has placed the spotlight on food security, food safety and on the importance of adapting food safety systems to respond to supply chain disruptions; and ensuring the continued access to safe food. The global food safety testing market is estimated to be valued at USD 10.5 billion in 2020 and is projected to reach USD 12.3 billion by 2021, recording a compounded annual growth rate (CAGR) of 16.6%. Growing concerns among consumers for processed food due to the outbreak of COVID-19 across the globe will increase the security and safety of food products, thus driving the food safety testing industry growth. However, this may not be the case in SADC and South Africa where the priority is access to food, regardless of whether it's safe or not, particularly through informal markets and rural economies where food safety testing is not easily accessible. Analytical issues also vary across the different food supply systems in developing countries.

Other factors that exacerbate African problems include constraints in resources and infrastructure, a lack of adequate regulatory and control systems for monitoring mycotoxin contamination, and limited availability of food due to war, famine and other natural disasters. Due to inadequate facilities for monitoring mycotoxins, the institutionalization of food safety regulations in Africa has been difficult. As a way to address some of the challenges associated with food safety testing at ports of entry, and in remote areas, the Council for Scientific and Industrial Research proposes an ISO 17025 accredited mobile laboratory for food safety testing for the agro and food sectors using next generation technologies. This project, thus proposes the development a of mobile laboratory prototype for food safety testing in 3 phases, with this PPG envisaged to contribute to phase 1 by analysing feasibility of having mobile ISO 17025 accredited facilities along the food processing value chains in identified countries namely, South Africa, Namibia, Eswatini and Lesotho.

Food safety testing mobile laboratories have been designed and exist in countries like India and Dubai, where new smart mobile labs do spot testing to minimise the risk of food-borne illnesses and food samples can be tested on the spot in these paperless lab in two days as against the current turnaround time of five working days.

Dubai has earmarked use of the mobile laboratories for testing at big events (international events) near many eating outlets. India has also initiated a scheme to provide mobile units for food testing to reach out to consumers through as many touch points as possible. These mobile units are called "Food Safety on Wheels". Apart from conducting simple tests for common adulterants in milk, water, edible oil and other items of food of daily consumption, these mobile units would also be used for awareness building around food safety, hygiene and promoting healthy eating habits in citizens at large and for conducting training and certification programme for food handlers and supervisors in food businesses, particularly petty food businesses.

Mobile laboratories that exist currently vary from mini vans to horse and trailers.



A minibus, allocated to the state by the Food Safety and Standards Authority of India, is in the city to test food samples and create awareness against adulteration at marketplaces.



Mobile Food safety testing laboratory at a CSIR hosted workshop (2020) - Horse and trailer owned by a SMME funded through the Small Enterprise Development Agency- South Africa.

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.

Concerns about food safety are escalating globally, particularly in developed countries where food safety issues influence consumer perceptions and policies with respect to food production, processing, handling and trade. However, with the quest by developing countries for a larger share of the global food trade and the desire to earn the necessary income for development, attention is now being paid to food safety issues. Food safety is an issue of growing importance due to several world-wide trends that contribute to increasing safety risks in food systems, such as the growing movement of people across borders; increased movement of agricultural and food products across borders; rapid urbanisation; changes in food processing and handling practices; and the re-emergence/emergence of diseases, pathogens, toxins and other issues. Emphasis is now being placed on the ability of all stakeholders in the food chain to be able to demonstrate adequate traceability of all food sources. Issues relating to food safety will therefore impact on agricultural production, agro-processing, food service industry, trade and commerce, public health and overall economic development. The food industry also has a role to play in assuring food quality and safety through the application of quality assurance and risk-based food safety systems utilising current scientific knowledge. The implementation of such controls throughout production, handling, processing and marketing will lead to improved food quality and safety, increased competitiveness, and reduction in the cost of production and wastage, which can be addressed through the use of a mobile food safety testing facility.

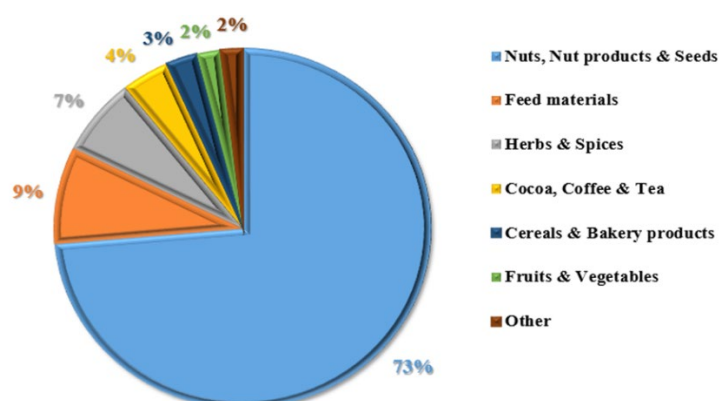
African governments and the African Union (AU) are prioritizing food security, including good nutrition in their development strategies. Through the Malabo Declaration and the Comprehensive African Agricultural Development Program (CAADP), the governments recognized the central role that market driven agriculture and value-added agri-businesses play in Africa's development, in the struggle to achieve food security for African consumers. The government strategies in Africa offer a tremendous growth opportunity to the food safety testing market which is expected to see an exponential growth. Food safety associations are being formed in the region to address food safety concerns. The African Food safety Network (AFoSaN) is a network of stakeholders uniting to strengthen food safety control systems in Africa with testing laboratories as the foundation. The first 3 of the 17 Sustainable development Goals- reducing poverty, achieving food security and improving health address Africa's most fundamental needs and are all intended outcomes of Africa's agriculture led development strategy, for which food safety is a mandate.

The growth of the food safety testing industry is fuelled by a rise in foodborne disease outbreaks, advances in food safety testing technologies, globalization of the food supply and stringent international food safety regulations (Global Markets and Technologies for Food Safety testing, 2018). A Business Communications Company (BCC) report of 2018 states that Africa is lax with respect to compliance to food safety testing and it is where the problem of contaminants usually occurs. The report further states that smaller companies in these countries have no qualms about cutting corners to maintain profitability (Global Markets and Technologies for Food Safety testing, 2018). However, there are many underlying issues in the African context that make food safety testing compliance lax.

One the areas of concern is a lack of enforcement of stringent regulations that are in place such as the Foodstuffs, Cosmetics and Disinfectants Act, 1972 (Act 54 of 1972) (FCD) in South Africa. However, currently, laboratories for safety testing for both commercial and SMME farmers for residue and pathogen testing in particular are not easily accessible. This has led to increased expenses to courier samples (representative samples can be 20kg/consignment) to laboratories from pack houses, ports, central markets, airports and borders, with the added risk of sample integrity being compromised. It is therefore important that services delivered are relevant, cost effective and acceptable to import, export and local authorities.

Food safety is a serious global concern with mycotoxin contamination taking a central stage. Many food industries especially those that export their products to Europe require analysis of mycotoxins in export goods particularly grains and nuts. The contamination of food and feed by mycotoxins (toxic metabolites of fungi) are recognized as significant sources of food-borne illnesses (FAO, 2004), and priority has been given to their regulation in food and feed at the domestic and international levels.

An analysis of the RASFF alerts of exports from African countries show that Rapid Alerts systems for recalls show that in the past twenty years (1999 to 2019) the RASFF reported on mycotoxin detection in food and feed products originating from 35 African countries.



Schematics showing the product categories of RASFF mycotoxin notifications issued for products exported from African countries from 1999 to 2019 ("European Commission RASFF Portal," 2019).

In 2017, the ILO and International Cooperative Alliance's Africa Regional Office (ICA Africa) jointly conducted a Rapid Assessment (RA) on cooperative competitiveness and potential for export and import in the selected Southern African Development Community (SADC) countries. Barriers to trade include **quality, safety and service standards** which are posing big issues for SADC based cooperatives to take advantage of the opportunities. International demand for agricultural products is high, and the SADC countries currently have low market share in growing international markets. There are sustainable opportunities to replace current imports in SADC markets and to supply domestic in-country markets.

For companies (Food business operators- processors in particular) to get fully certified and accredited to supply any country, protocols and host country standards can be prohibitive and even block entry.

There is therefore a need for strengthening access to intra-Africa markets for local agricultural products. In aid of this goal, the infrastructure and equipment for the analytical services laboratories are being upgraded. Laboratory accreditation should be attained to ensure analytical test results are internationally recognised. This is expected to strengthen global market access by providing assurance to global trading partners that the country's products meet technical standards for human safety and food quality. Furthermore, inspection services are strengthened to increase capacity at ports of entry to improve plant and animal quarantine services (Treasury, 2018). The export-oriented fruit industry, is accompanied by stringent import regulations in international markets in the form of import tariffs, import permits, and sanitary as well as phytosanitary standards constituting key barriers to trade in fresh fruit. Governments often lack the capacity and skills to provide support and regulatory services required throughout the value chain up to the point where fruit is ready for export markets.

Analytical issues vary across the different food supply systems in developing countries. From this perspective, three situations can be identified. Firstly, there is the export oriented food value chain, then there is commercial food processing of products marketed in outlets ranging from first world style supermarkets to small scale sellers, and then there is the rural food supply in the form of subsistence farmers or small local markets selling local farmers' excess produce. Firstly, the value chain involving export of food commodities which must meet legislated requirements at their destination, mostly relies on private laboratories, preferably accredited to ISO standards. Given the cost of rejections at border controls, the data provided by these laboratories needs to be reliable and controlled by adequate quality assurance methods and to be generated from correct sampling plans. Frequently, these laboratories may not be in the country of origin of the food export due to a limited local market for such services.

As a way to address some of the challenges associated with food safety testing at harbours, packhouses, and in remote areas, the project thus proposes the development of mobile laboratory prototype for food safety testing. The value proposition is a mobile lab for food safety testing with the unique proposition of ISO 17025 accreditation, a customised Laboratory information management system, customised mobile testing equipment and generation of results in real time at point of testing using digitized testing equipment for the agricultural sector.

Having access to accredited testing laboratories that may also be considered for statutory testing for export markets adds value to products of the SMME and commercial farmer, affording them an opportunity to sell products at a premium to larger markets. Having these mobile laboratories are also opportunities to create more jobs for technicians and food scientists and analytical chemists on the ground to support the food value chain for surveillance and monitoring to alert public health facilities to anomalies in testing and potential foodborne disease outbreaks.

A part of the feasibility study will include the production of a 3D printed model of a mobile Laboratory to suit the needs of a specific country based on logistics and road infrastructure. Having a printed model will enable potential users to understand the operational limits and benefits of a mobile lab better than a digital model. A digital model is not easy to interact with and internalize. A physical model would also be useful as a promotional piece as it can be very engaging. However, the model envisaged through this proposal will be designed incorporating the basic requirements and common needs across the 3 countries, dependent on funding available.

Currently the Department of Science and Innovation (DSI) and the Council for Scientific and Industrial research have provided some co funding to support the feasibility study – Phase 1- Concept and business operating model for identified sectors in South Africa. There is a need to evaluate the need for cross border services (eg Zimbabwe, Botswana, Mozambique) from these identified countries (Lesotho , Eswatini and Namibia) using the mobile food safety testing laboratories as an extension of stationary laboratories and/ or set up of country specific fit for purpose mobile facilities based on infrastructure and accessibility to targeted sectors.

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.

The Department of Science and Innovation (DSI) of South Africa has expressed support for this feasibility study. A preliminary workshop hosted in South Africa with country stakeholders, funded by the DSI revealed buy in by govt and private sector and SMME representative organisations.

The Small Enterprise Development Agency has expressed support for this study.

Namibia through AMTA (Agro Marketing and Trade Agency) has also supported this initiative to evaluate the feasibility of a mobile laboratory for food safety testing in that country.

The SADC Regional Laboratory Association representing 11 out of 13 SADC states in food safety testing has expressed its support for such a study in the 4 identified countries (Namibia, South Africa, Lesotho and Eswatini).

One of the outcomes of the networking and stakeholder session was that the CSIR has established a partnership with Mobile AGri Skills and Development and training (SMME) to support customisation of the mobile laboratory for sustainability. A research collaboration has been signed between the 2 entities and the collaboration has been profiled on social media and popular articles to secure further investment for phase 2 and phase 3.

Phase 2 deliverable is envisaged to be a fully functional prototype for on field testing and phase 3 involves accreditation of all processes through SANAS (SA) and SADCAS (SADC countries) and a fully operational prototype servicing identified sectors with income generation.

For the Mobile Lab food safety concept- CSIR Social media engagements through the New and Digital media Practitioner of the CSIR using platforms such as Twitter Takeover, LinkedIn and Facebook.

https://fbreporter.co.za/files/foodfocus/documents/FBR_MARCH_LR.pdf

CSIR
Published by Lyndi Meyer [?] · 20 April at 10:29 · 🌐

The CSIR and Mobile Agri Skills Development Training (MASDT) are collaborating in the development of a mobile laboratory prototype for food safety testing with a unique proposition of ISO17025 accreditation.

Read the full article in the latest edition of the Food and Beverage Reporter, p 10 - 12. https://fbreporter.co.za/.../foodf.../documents/FBR_MARCH_LR.pdf

MOBILE LABORATORY TESTING
- Removing barriers to safe food in South Africa

The Agri Framework for food products in South Africa includes...
How can you be sure your produce complies with the toughest...
What is the objective of the mobile...
How can you ensure the...
What is the...
How can you ensure the...

Performance for your post

4,275 People Reached

93 Reactions, comments & shares 🗨️

69 Like	48 On post	21 On shares
10 Love	10 On post	0 On shares
2 Comments	1 On Post	1 On Shares
12 Shares	12 On Post	0 On Shares

187 Post Clicks

60 Photo views	12 Link clicks 🗨️	115 Other Clicks 🗨️
-----------------------	--------------------------	----------------------------

NEGATIVE FEEDBACK

0 Hide post	0 Hide all posts
0 Report as spam	0 Unlike Page

Reported stats may be delayed from what appears on posts

Get more likes, comments and shares
When you boost this post, you'll show it to more people.

4,275 People reached **280** Engagements **Boost Post**

👍👎 Ole Mogwerane, Thab'sile Ledwaba and 55 others 1 Comment 12 shares

👍 Like 💬 Comment ➦ Share ⌵

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.

The initial mobile laboratory for food safety testing in South Africa was funded by the Small enterprise Development Agency (SEDA) for US\$167,000. This laboratory needs to improve its testing capabilities to be able to provide accurate, reliable and accredited testing services and be financially sustainable, using innovate 4th Industrial Revolution technologies such as solar power customised equipment for mobility.

The PPG is envisaged to evaluate the feasibility of different business operating models of the current prototype, expansion into other regions (Namibia, South Africa, Lesotho and Eswatini) as an immediate assessment and feasibility for those countries based on existing infrastructure and requirements.

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.

The Department of Science and Innovation has budgeted a co funding of phase 2 following the completing of phase 1 (Feasibility study that has begun in South Africa).

In kind contribution from private investors of infrastructure are being discussed following signing of a non-disclosure agreement.

The Mobile Agri Skills and Development and Training (MASDT) is our current mobile lab partner. This is a black owned small medium enterprise whose facility will be customised to become financially

sustainable. A Research Collaboration Agreement has been signed between the CSIR and MASDT to use the prototype to showcase the potential of optimisation for use in the food safety value chain in South Africa and cross border food safety value chains.

6. Briefly explain how gender and environmental issues are relevant for this PPG and, if appropriate, how they will be addressed.

Africa is in a precarious position because the environmental conditions and cultural practices across the continent favour fungal attacks of crops and commodities. Other factors that exacerbate African problems include constraints in resources and infrastructure, a lack of adequate regulatory and control systems for monitoring mycotoxin contamination, and limited availability of food due to war, famine and other natural disasters. Due to inadequate facilities for monitoring food pathogens, the institutionalization of food safety regulations in Africa has been difficult.

Climate change is likely to have considerable impacts on food safety, both direct and indirect, placing public health at risk. With changing rainfall patterns and increases in extreme weather events and the annual average temperature we will begin to face the impacts of climate change. These impacts will affect the persistence and occurrence of bacteria, viruses, parasites, harmful algae, fungi and their vectors, and the patterns of their corresponding foodborne diseases and risk of toxic contamination. Alongside these impacts, chemical residues of pesticides and veterinary medicines in plant and animal products will be affected by changes in pest pressure. The risk of food contamination with heavy metals and persistent organic pollutants following changes in crop varieties cultivated, cultivation methods, soils, redistribution of sediments and long-range atmospheric transport, is increased because of climate changes.

Climate sensitive risk factors and illnesses will be among the largest contributors to the global burden of food-related disease and mortality, including under-nutrition, communicable, non-communicable, and diarrheal- and vector borne diseases.

Therefore, having access to food safety testing is critical on site and along the value chain to provide rapid and reliable qualitative and quantitative testing, fit for purpose.

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.

The CSIR will lead with expert scientists in food safety testing and networks in the region. The CSIR also has a consultancy team of experts in Enterprise Creation for Development (ECD) that will provide support as needed. ECD is a group that conducts feasibility studies, opportunity analyses, economic studies, strategy formulations business plans for various sectors as needed for the broader organisation.

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\$)	
<ul style="list-style-type: none"> • Dialogue with country specific agricultural and food industry sectors and identify needs, or specific analysis requirements (Namibia, South Africa, Lesotho and Eswatini). • Gap and Needs analysis through evaluation of market reports, policy 	CSIR	Travel for 3 to Lesotho (Return)	855
		Travel for 3 to Eswatini (Return)	885
		Accommodation for 3 – 6 nights - Lesotho	1 200

<ul style="list-style-type: none"> documents, food laws and national food control systems. In depth regulatory evaluation and alignment to CODEX, FAO, WHO etc. Evaluation of primary and secondary information Determine current offerings in food testing and gaps in the identified countries along their food safety testing value chains. Value chain analysis from farm to fork – Situational analysis in identified countries 		Accommodation for 3 – 6 nights - Eswatini	1 101
		Car hire – 7 day rental-Lesotho	160
		Car hire – 7 day rental-Eswatini	132
		Consumables (data, stationary, reports, policy documents, standards)	560
		Subsistence (\$90pp/day) for food allowance (14 days x3= 63)	3 780
		Subtotal	8 673
<ul style="list-style-type: none"> Conduct multi-stakeholder workshops in each of the countries to discuss initial findings. Farmers, Laboratories, policy makers, exporters, retailers will be identified (Namibia, Lesotho, Eswatini, South Africa) 	SADC Regional Laboratory Secretariat	Mobile lab Prototype display (MASDT) in all 3 countries	6 330
		Travel for 4 to Lesotho (Return)	1 140
	Travel for 4 to Namibia (Return)	1 180	
	Travel for 4 to Eswatini (Return)	1 180	
	CSIR	Accommodation for 4 – 3 nights - Lesotho	800
		Accommodation for 4 – 3 nights - Namibia	870
		Accommodation for 4 – 3 nights - Eswatini	734
		Car hire – 7 day rental-Lesotho	160
		Car hire – 7 day rental-Namibia	120
		Car hire – 7 day rental-Eswatini	132
		Workshop over 3 days in each country – Venue + food.	7 000
		Transport of farmers to workshops	2 000
	Stationary and projector	550	
			Subtotal
<ul style="list-style-type: none"> Identify and document appropriate regulations for mobile laboratory testing to conform to ISO 17025 Compile dossiers for the mobile laboratory to conform to the regulations 	CSIR		4 200
	<ul style="list-style-type: none"> Operational concept of the lab including how it will be used to ensure food safety, where it will be used, its inputs (samples, requests) and its outputs (information). Cost benefit analysis 	CSIR	
		Subtotal	5 200

Feasibility report and proposal for phase 2- Customised prototype	CSIR		1000
*One 3D printed laboratory model for the region	CSIR		11 000
		Subtotal	12 000
		TOTAL	49 069

Appendices

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

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