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of the United Nations**



**MTF/SOI/003/STF
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Project Evaluation Report**

FAO/MULTILATERAL TRUST FUND

STRENGTHENING THE CAPACITY OF THE NATIONAL PUBLIC HEALTH LABORATORY TO PROVIDE SERVICES IN SUPPORT OF MARKET ACCESS FOR SOLOMON ISLANDS FISH EXPORTERS

SOLOMON ISLANDS

PROJECT EVALUATION REPORT

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Acronyms

CA	Competent Authority
CI	Cawthron Institute
CLSR	Centre for Laboratory Services and Research
DANIDA	Danish International Development Agency
DFAT	Department of Foreign Affairs and Trade Department of Foreign Affairs and Trade
EIF	Enhanced Integrated Framework
EMS	Electronic Monitoring System
EU	European Union
FAO	Food and Agriculture Organization
FAO SAP	FAO Sub-regional Office for the Pacific
FDA	Food and Drug Authority
FFA	Forum Fisheries Agency
FRI-CSIR	Food Research Institute of the Council for Scientific Research
HCC	Honiara City Council
HPLC	High-Performance Liquid Chromatograph
IANZ	International Accreditation New Zealand
IFC	International Finance Corporation
ILCP	Interlaboratory Comparison Programme
IPPC	International Plant Protection Convention
ISO	International Organization for Standardization
IWG	Industry Working Group
LDCs	Least Developed Countries
MAL	Ministry of Agriculture and Livestock
MCILI	Ministry of Commerce, Industry, Labour and Immigration
MFAET	Ministry of Foreign Affairs and External Trade
MHMS	Ministry of Health and Medical Services
MM	Microbiology Method
NGO	Non-governmental Organisation
NMS	National Medical Stores

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NPC	National Project Co-ordinator
NPHL	National Public Health Laboratory
NZ Aid	New Zealand Foreign Affairs and Trade Aid Programme QMS Quality Management Systems
OIE	Office International des Epizooties
PFPT	Pacific Fisheries Training Programme
PHAMA	Pacific Horticultural & Agricultural Market Access
PSC	Project Steering Committee
PU	Procurement Unit
QC	Quality Control
QM	Quality Manual
QMS	Quality Management System
SANAS	South Africa National Accreditation System
SDGs	Sustainable Development Goals
SIG	Solomon Islands Government
SOPs	Standard Operating Procedures
SP	Service Provider
SPC	Secretariat of the Pacific Community
SPS	Sanitary and Phytosanitary measures
STDF	Standards and Trade Development Facility
TCP	Technical Cooperation Programme
TCPf	Technical Cooperation Programme Facility
TOR	Terms of Reference
UN	United Nations
WHO	World Health Organization
WOAH	World Organisation for Animal Health

Executive summary

The project, “Strengthening the capacity of the National Public Health Laboratory (NPHL) to provide services in support of market access for Solomon Islands fish exporters”, was funded by the Standards Trade and Development Facility (STDF) from September 2017 to July 2022. An overview of the project showing budget costs, the project theory of change and the evaluation framework is shown in Annex 1.

- i. The project goal was to develop the capacity of the NPHL located in Honiara, Solomon Islands, to conduct microbiological testing on water and food products in compliance with international standards, particularly, International Organization for Standardization (ISO) 17025. The project sought to address technical knowledge gaps of the NPHL staff and provide improvements to the facility systems and procedures to ensure compliance with Sanitary requirements of the European Union (EU) and other trade partners, to gain and, importantly, maintain access to those markets.
- ii. The successful delivery of the project outputs was to include three ISO 17025 assessments of the NPHL, facilitated by the International Accreditation New Zealand (IANZ) with the final assessment report marking the project closure¹. The assessments would ensure and confirm that the NPHL was in full compliance for ISO 17025 accreditation.
- iii. A radical change in the project’s environment caused primarily by the unforeseen and unprecedented global COVID-19 pandemic prevented the achievement of the project goal of obtaining ISO 17025 accreditation within the project timeframe. The pandemic prevented on-site, face-to-face training or in-person external audits due to travel restrictions enacted across the globe which, significantly stalled the progress towards accreditation. Multiple staff changes at the NPHL due to slow recruitment, retirement and the absence of the National Project Coordinator (NPC) who travelled overseas for post-graduate studies, also paused the project progress for two years. The project goal was consequently modified to focus on building the microbiological testing capability and quality management systems of the NPHL and put it on a strong path to ISO 17025 accreditation.
- iv. Evaluation of the project has involved desk research of available background information and project reports, online interviews with relevant project participants, particularly, the Service Provider (SP), which was the Cawthron Institute (CI) in New Zealand, and staff from NPHL who were the funding recipients and major project beneficiaries. Another beneficiary interviewed was the laboratory superintendent of only Tuna cannery company (SolTuna) in the country. The SolTuna company was selected as it represents a major target beneficiary of the services of an accredited NPHL lab since it will save costs from sending samples to accredited overseas laboratories for analysis by having an in-country accredited lab.
- v. An essential output (Output 2, Activity 2.3) of the project was an overseas travel by laboratory technicians from Solomon Islands to CI to be trained in-person on microbiological testing methods based on ISO 17025 standards. Global travel restrictions enforced by the COVID-19 pandemic eliminated the possibility of accomplishing this output during the project timeframe. The project was, however, able to adapt to this change by designing remote training for the Solomon Islands NPHL personnel by experts from CI. To show the effectiveness of the remote training NPHL participated in an international Interlaboratory Comparison Programme (ILCP; run by Global Proficiency, a New Zealand company), which involved microbiological testing of food and water

¹ Project document: “Strengthening the capacity of the National Public Health Laboratory (NHPL) to provide services in support of market access for Solomon Islands fish exporters, May 2017”

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reference samples. The ILCP provided a way to assess the testing proficiency of laboratory technicians at NPHL for microbiological methods in accordance with ISO 17025 standards. The NPHL lab technicians were able to improve their testing skills and to produce consistently good results over the longer period compared to what could be achieved during a short-term in-person training.

- vi. According to the experts at CI, remote laboratory training was found to be even more impactful since it provided the opportunity for training over a longer period and a better understanding and evaluation of the abilities of the NPHL lab technicians. This notable impact, however, cannot replace the more effective development of laboratory skills that in-person training will ultimately provide.
- vii. Although the project goals were modified by conducting online training to enhance the capability of the lab and put it on the path to accreditation there remain hurdles that must be addressed to achieve readiness for an assessment towards accreditation. These hurdles include funding support for more Proficiency testing, purchase of control cultures, calibration of laboratory equipment, conduct of pre-accreditation and accreditation assessments as well as the need to improve the current procurement system to enable the NPHL to have better control of their laboratory budget and sources of consumables and service providers.
- viii. Based on the final project report by the service provider, CI, “the aims of the project to enhance the scientific capabilities of staff at the NPHL for specific microbiological tests and establish systems and methods in line with the ISO 17025 standard, were achieved. This included but was not limited to writing a Quality Manual (QM, an essential document that governs how the laboratory operates), calibration documents, microbiology methods (MM) for the analysis of water and food, and a variety of accompanying Quality Control (QC) worksheets. However, the objective to achieve ISO 17025 accreditation was not possible with the delays the project experienced due to the global COVID pandemic and staff turnover”².
- ix. Interviews and questionnaire responses with the staff of NPHL (Annex 4) confirmed that “despite several key achievements, outstanding gaps remain including external equipment calibration, internal and external audits, IANZ Assessments, continued method development and training, development of a Laboratory Information Management Systems (LIMS), setting up of a calibration room, further Proficiency Testing or ILCPs and overseas attachment training at an accredited lab for NPHL laboratory staff”.
- x. The main conclusion of this evaluation is that key strides have been made in enhancing the capacity of NPHL in the face of unprecedented challenges as was, particularly, the unforeseen COVID-19 pandemic. The Service Provider, CI, was able to effectively adapt and manage risks to achieve the training objectives for NPHL to a high degree of competency.

It is the view of the evaluator however, that some costs and expectations were not sufficiently estimated by the project design:

A major requirement for achieving accreditation is Proficiency Testing. According to the United Nations Industrial Development Organisation (UNIDO) practical guidebook on ISO 17025, “Interlaboratory comparison is listed in ISO 17025 as only one of several quality maintenance

² Murray JS and Oakly J. 2022. Strengthening the scientific capabilities of the National Public Health Laboratory of the Solomon Islands - Project conclusion report. Prepared for the Food and Agricultural Organization of the United Nations. Cawthron Report No. 3823. 42 p.

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options, and most accreditation bodies will insist on its use wherever possible. The recently changed world security situation has resulted in severe difficulties in shipping samples for proficiency testing across national boundaries, especially by airfreight. This has, unfortunately, coincided with an increase in the insistence, by accreditation bodies and particularly by the regional laboratory accreditation conferences, on proficiency testing as an activity for accredited laboratories. As a result it is becoming almost essential for any national accreditation body to ensure that adequate proficiency testing is available within the country before it can seek international recognition”³. Proficiency testing that was conducted by NPHL staff under the ILCP run by Global proficiency and results indicated that NPHL staff can perform microbiological analysis at the standard required of an ISO 17025 accredited laboratory. However, only one round of testing was conducted within the project timeframe which is insufficient to develop an adequate evidentiary record of results to assess proficiency. ILCP samples need to be tested six times a year for ‘Potable Water’ and four times for ‘Food’ to demonstrate continued competency in the Microbiology Methods (MMs), which is a requirement of ISO 17025 accreditation.

Secondly, the cost of control cultures for quality control monitoring of microbiological testing was also not sufficiently captured in project budget estimates even though these costs could be considered relatively minor. In their final report, CI indicated that “laboratory control cultures used at NPHL have either been gifted from the Solomon Islands Medical laboratory or isolated from the wild”⁴. It was reiterated in the report that control cultures must be purchased from certified suppliers in order to comply with ISO 17025.

A third essential pre-requisite for ISO 17025 compliance is the proper calibration of equipment. Although the project included cost estimates for calibration it was insufficient to cover costs such as travel, daily sustenance allowance (DSA) and charge fees for an external calibration service provider, shipping costs for equipment that need to be shipped overseas and purchase of reference equipment that can be used for in-house calibration checks.

- xi. Achieving accreditation and sustaining it will require new funding. In a final project report, the CI experts provided some cost estimates and potential service providers for the remaining activities needed to obtain ISO 17025 compliance and accreditation for the NPHL. The unit costs for control cultures, equipment calibration and initial assessment for accreditation are provided in Annex 10. Most facilities require three assessments before receiving full compliance for accreditation.
- xii. At the project closure it can be concluded that the technical competence and quality management systems of the NPHL have been significantly enhanced and placed on a strong path to accreditation. A renewed effort at resource mobilization will be required to obtain funding to support ISO 17025 compliance activities, particularly, Proficiency Testing, purchase of control cultures and equipment calibration, without which accreditation cannot be achieved. In addressing its support for this

³ Complying with ISO 17025. A practical guidebook for meeting the requirements of laboratory accreditation schemes based on ISO 17025:2005 or equivalent national standards. United Nations Industrial Development Organization, Vienna, 2009

⁴ Murray JS and Oakly J. 2022. Strengthening the scientific capabilities of the National Public Health Laboratory of the Solomon Islands - Project conclusion report. Prepared for the Food and Agricultural Organization of the United Nations. Cawthron Report No. 3823. 42 p.

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project, the Solomon Islands government stressed the critical role an internationally accredited NPHL will play in ensuring market access for Solomon Island fish exporters as well as safeguarding public health by having an increased capacity to monitor water quality and food contamination. Efforts at resource mobilization to achieve ISO 17025 accreditation for the NPHL must include more advocacy for government funding and in-kind support as well as private and external donor funding.

1. Introduction

The STDF/PG/:521 project “Strengthening the capacity of the National Public Health Laboratory (NHPL) to provide services in support of market access for Solomon Islands fish exporters” aimed to develop the capacity of the National Public Health Laboratory to conduct microbiological testing on water and food products in compliance with international standards, particularly, ISO 17025.

“The technical focus of the project was to enhance microbiological testing capability to meet, among other needs, the requirements of the Solomon Tuna industry to maintain their market access for exports to the EU. The project proposal approach also offered an inter-disciplinary benefit aimed at achieving an improved capacity to support public health work relating to quality assurance of the public water supply, assisting local water bottling companies, hotels, and other enterprises including environmental monitoring of water quality in watersheds as well as an increased capacity to monitor and evaluate contamination risks associated with food”⁵.

“Maintaining market access for fish exports to the EU are reported to protect approximately 2000 jobs in the Solomon Islands and sustain USD 45 million in export returns and service-related income. The fish industry is an increasingly important source of export income as the Solomon Islands face the significant economic challenges from the likely decline in revenues from its current main export industry of whole logs (USD 200 million/annual exports)”⁶

Under an interim agreement the Solomon Islands currently have access to the EU for their fish exports, utilising the non-accredited NPHL. However, there is the need to demonstrate that significant efforts are being made to use an accredited laboratory for microbiological testing. Demonstrating a strategy to achieve accreditation by the NPHL within a reasonable timeframe was determined to be critical for a positive lab assessment outcome during the next audit by the EU in order to maintain continued market access. To demonstrate a strategy to achieve accreditation the project aimed to build the capacity of the NPHL in Honiara, by targeting the following three project outputs over the project time frame:

- a) NPHL facility is equipped and organized according to international standards
- b) NPHL staff are trained to ISO 17025 standard for certification
- c) Essential NPHL systems are developed and or amended to comply with international standards and promote efficient workflow in the lab

⁵ Project document: “Strengthening the capacity of the National Public Health Laboratory (NHPL) to provide services in support of market access for Solomon Islands fish exporters, May 2017”

⁶ Project document: “Strengthening the capacity of the National Public Health Laboratory (NHPL) to provide services in support of market access for Solomon Islands fish exporters, May 2017”

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In 2019, the absence of laboratory technicians led to a pause in the project progress. The project team however, planned to make up lost ground in 2020 through face-to-face, hands-on intensive overseas training at CI laboratories in New Zealand as well as on-site training in Solomon Islands by experts from CI. The COVID-19 pandemic which was not and could not have been foreseen in the risks and assumptions framework of the project extended through 2020 and continued in 2021. This prevented in-person overseas laboratory training and other direct on-site project interventions, consequently rendering the project's original objective of attaining ISO 17025 accreditation by project's end unachievable.

The FAO subsequently agreed, with NPHL, CI and STDF in 2020, to focus assistance on enhancing the capacity of the NPHL and place it on a strong path to ISO 17025 accreditation. The activities were, accordingly, adjusted to achieve concrete and optimal results in the remaining time frame.

The objective of this evaluation is to assess the relevance, coherence, effectiveness, efficiency, impact, and sustainability of the project, based on the logical framework and the modified project objectives aimed at placing the NPHL on a strong path to accreditation. The evaluation will also "identify key experiences, good practice and lessons to inform future decision-making and interventions by the project beneficiaries, other project stakeholders, as well as members of the STDF's global partnership and other development partners more broadly"⁷

This evaluation was carried out by Dr. Nana Annan, an International Consultant for Food Safety and Nutrition, currently assigned to Samoa on a Codex Trust Fund project titled "Strengthening scientific advice for Codex standards" and Cook Islands on a project to "Promote agricultural value chains to strengthen local food systems (impacted by COVID-19)". She has worked as an FAO International Consultant on National Codex Systems in the Republic of Kiribati in 2018 and 2021. She has had no previous dealings with the WTO or STDF.

2. Methodology

The evaluation was conducted by means of desk research of available background information and literature, project document and terms of reference (TOR) for the service provider, project progress and final reports, online open-ended, qualitative interviews with relevant project participants namely, experts from the CI, New Zealand, SolTuna Lab superintendent and NPHL Laboratory staff.

Telephone interviews were conducted with representatives of accredited laboratories in a developing country, namely Ghana, in West Africa.

Questionnaires were distributed to interviewees to supplement responses provided in online interviews. The list of persons contacted is provided in Annex 2.

3. Findings and analysis

3.1. Relevance

- The project objectives were relevant to SPS-related needs and priorities of the project beneficiaries and to the STDF's goal to facilitate safe trade. The project effectively addressed the

⁷ STDF 214 (2021). Guidelines for the evaluation of projects funded by the Standards and Trade Development.

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technical knowledge gaps of the NPHL staff and provided improvements to the quality management systems (QMS) and procedures of the facility to ensure compliance with SPS import requirements of the EU and other trade partners and to gain and maintain access to those markets. Building capacity to support the productive sector and facilitate trade meets the government priority to develop the national capacity to comply with SPS requirements, both in the public and private sector. Enhancing the capacity of the NPHL to conduct microbiological testing on water and food products, particularly, tuna, which is the most important food export commodity in the country, in compliance with international standards, helps to achieve the STDF's goal of facilitating safe trade. Maintaining the market access of fishery products into the EU helps to support the domestic economy by contributing to employment earnings and government revenue. The improved testing capacity and capability of the NPHL helps the government of Solomon Islands achieve its priority of increasing access to clean water and safe food for all communities.

- To ensure that local contexts, public and private sector needs, government participation and public awareness of project goals were considered in the design and implementation of the project, an inception workshop was held in Honiara, the capital, at the beginning of the project. The workshop was attended by various ministries, industry, farmers, producers, and other relevant stakeholders and the importance of attaining accreditation for NPHL in relation to market access and public health was addressed. The project goals were also aligned to meet the areas of assistance identified by the Industry Working Group (IWG), a public/private partnership made up of representatives of key departments and the fishing industry. The IWG was established in 2012, under the Pacific Horticultural and Agricultural Market Access (PHAMA) programme to discuss and coordinate actions on market access issues. The IWG identified the need to increase the capacity of NPHL to test food products domestically and to comply with international standards for tuna exports into the EU.
- The relevance of the project remained significant throughout the course of implementation despite unprecedented challenges such as the global COVID-19 pandemic and staffing shortages occurring in the middle of the project. Enhancing NPHL capacity to conduct SPS related tests, increases competitiveness and sustains access to overseas markets. It is reported that market access to the EU of fishery products through these measures will protect approximately 2000 jobs in the Solomon Islands and sustain USD 45 million in export returns and service-related income.⁸ Domestically, an increased capacity to monitor and evaluate contamination risks associated with water and food provides greater public health protection for Solomon Islanders.

3.2. Coherence

- “The project goal of enhancing the capacity of NPHL fit well with other interventions in the country aimed at assisting Solomon Islands maintain access to key export markets and an improved capacity to support public health work. The work of the Ministry of Health, the Forum Fisheries Agency (FFA) and World Health Organization (WHO) in establishing the Competent Authority for Food Safety formed the foundation of this project. The Ministry of Health and Medical Services (MHMS) is recognized by the EU as the Competent Authority (CA) charged with

⁸ Project document: “Strengthening the capacity of the National Public Health Laboratory (NPHL) to provide services in support of market access for Solomon Islands fish exporters, May 2017”

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enforcing food safety policy for exports. MHMS created the NPHL to serve as the facility to perform the necessary microbiological tests for exported goods.

In 2012, PHAMA conducted an initial assessment of the testing capacity of the NPHL and carried out initial training of laboratory personnel on microbiological testing methods and QMS in 2014. The current project builds on the recommendations and activities of the PHAMA projects”.⁹

- Other interventions and policies that supported the project goals include projects funded by the FAO to address the challenges facing food safety and quality control in the Solomon Islands. FAO supported a Technical Cooperation Programme Facility (TCPf) from 2015 to 2017 on “Strengthening National Capacity for Food Control in the Solomon Islands (TCP/SOI/3501 Baby 1)”. The specific focus of the project was assisting the MHMS, and related ministries and departments that have responsibility for imported food control, to increase their capacity and effectiveness to control the safety and quality of imported foods. In 2017, the Food Fortification Initiative (FFI) secured funds from the Australian Department of Foreign Affairs and Trade (DFAT) to build on work started under the FAO TCPf in respect to imported food control. The activities of the FFI included continued support for amendments to the Solomon Islands Food Safety Act and Pure Food Act to enable effective implementation of imported food control by MHMS, provision of staff resource support to MHMS for a dedicated imported food control inspector – for a limited term, completion of the Imported Food Control Guidelines/SOPs and further training of inspectors. A separate focus of the TCPf related to strengthening the rapidly emerging street food sector in Solomon Islands. It was considered critical to provide street food vendors with appropriate and simple training to help mitigate the risks of unsafe food practices”¹⁰. Other complementary work has also previously and concurrently been undertaken by the World Health Organization (WHO) to update the Solomon Islands Pure Food Act (1996) and Pure Food Regulations (2010).
- Work by IWG complemented the STDF project effort by helping to identify and prioritize the need for assistance to NPHL to serve as the facility that will be certified to perform the necessary microbiological tests for exported goods in compliance with international standards, specifically, ISO 17025, which is the standard requested by the EU for fish export quality. PHAMA published an initial assessment report of the testing capacity of the laboratory in 2014, and following this, carried out initial training on microbiological methods and Quality Management Systems (QMS). The current STDF project aimed to build directly upon the initial training to further train laboratory staff at an accredited lab, namely CI, in New Zealand.
- Solomon Islands joined the Enhanced Integrated Framework (EIF) in 2006 and has since benefited from the Enhancing Capacity on Agriculture Trade (ECAT) which is a Tier 2 project under the programme. The Enhanced Integrated Framework (EIF) is a multi-donor programme which supports the Least Developed Countries (LDCs) in their effort of promoting economic growth and sustainable development by addressing their trade and trade-related constraints to help build their capacity to trade and take advantage of global trade. The EIF project is housed

⁹ Project document: “Strengthening the capacity of the National Public Health Laboratory (NPHL) to provide services in support of market access for Solomon Islands fish exporters, May 2017”

¹⁰ TCPf “Strengthening National Capacity for Food Control in the Solomon Islands (TCP/SOI/3501 Baby 1)” 2015-2017

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within the Department of External Trade in the Ministry of Foreign Affairs and External Trade (MFAET) and the ECAT project is aimed at improving and addressing the capacity of NPHL, Ministry of Agriculture and Livestock (MAL) and Ministry of Commerce, Industry, Labour and Immigration (MCIL) in food safety and quality assurance.

Under the ECAT project the NPHL received \$140,000 worth of laboratory equipment and chemicals in 2018, to enhance NPHL's capacity to conduct proper testing and analysis of agricultural products. According to the Permanent Secretary for MFAET, the ECAT project aims to boost exports of key agricultural commodities, namely taro and cassava, by establishing an appropriate policy environment to increase investment and tap into existing value chains and boost the capacity of local testing facilities to ensure compliance in the area of food safety¹¹. The ECAT project focuses on chemical analytical methods for agricultural commodities and effectively complements the STDF project which focuses on developing the capacity of the NPHL to conduct microbiological testing on water and food products in compliance with international standards. In 2022, a new NPHL office complex funded by the ECAT project was opened. The new office space according to the Minister for Health and Medical Services "will enable the NPHL to meet current ISO 17025 accommodation requirements, which will boost local testing capacity to international standards for the export of agricultural commodities such as Cassava and Taro including our very own SolTuna products, Kava, Noni Juice and so forth"¹²

- "A new course on Seafood Safety Training has been proposed under the Pacific Fisheries Training Programme (PFTP), a program funded by The New Zealand Foreign Affairs and Trade Aid Programme (NZ Aid) and jointly implemented by the Pacific Islands Forum Fisheries Agencies (FFA) and the Secretariat of the Pacific Community (SPC). The purpose of the course is to train seafood processing laboratory technicians to carry out simple laboratory analysis to determine the health standards of fishery products. The intended target groups are industry quality control/quality assurance workers from Pacific States, including Solomon Islands, that process seafood, and pursue export to the EU currently, or are aspiring to do so"¹³. The proposed NZ Aid PFTP offers a valuable opportunity for synergy within the fisheries sector and consequently complement the project goals of developing Solomon Islands' capacity to conduct microbiological testing on water and food products in compliance with international standards, and support market access for Solomon Islands fish exporters.
- These interventions show coherence with the project goals aimed at assisting Solomon Islands maintain access to key export markets as well as achieving an improved capacity to support public health work. Developing the NPHL capacity to conduct SPS related tests to exporters of their products will increase the competitiveness of Solomon Island fishery products and sustain access to overseas markets including the EU. The increased capacity will contribute towards greater protection of Solomon Islanders from water and food contamination through an increased capacity to monitor and evaluate contamination risks associated with water and food.

¹¹ SIG © 2015 - 2022 Solomon Islands Government Ministry of Foreign Affairs and External Trade, March 1, 2021. <http://www.mfaet.gov./external-trade/trade-and-development/eif.html>

¹² SIG ICT Services © 2020 Solomon Islands Government Portal, March 14, 2022. <https://solomons.gov./new-national-public-health-laboratory-opened/>

¹³ Project document: "Strengthening the capacity of the National Public Health Laboratory (NHPL) to provide services in support of market access for Solomon Islands fish exporters, May 2017"

3.3. Effectiveness

- The project objectives were modified based on staffing issues and travel restrictions caused by the COVID-19 pandemic. The initial project goals were to attain accreditation for the NPHL by the project's end. This had to be modified to focus on building the capacity of NHPL. In 2020 an agreement was made between FAO and NPHL, CI and STDF to provide assistance to place NPHL on a path and in a strong position to achieve ISO 17025 accreditation at a later date. The project activities were adjusted to achieve concrete and optimal results in the remaining time frame.

Interviews (Annex 9; Figures 1&2) with the project service provider (CI) indicated a “strong agreement” that the modified project objectives were largely met (90-100%) while responses from the project beneficiaries (NPHL staff) ranged from “disagree” to “agree” (Appendices 3&4). The project beneficiaries disagreed on the project outcome that would indicate that “The benefits of the project are likely to continue over the longer term after project end, without STDF funding or other donor support.”. According to the NPHL staff, “That would have been the outcome if all the project objectives had been achieved but since that did not happen, STDF funding or other donor support would be essential to finish off the gaps left in the project.”

An institution is ready for accreditation after it has implemented an ISO/IEC 17025 management system and allowed ample time for laboratory employees to a) become familiar with the system and b) develop a sufficient evidentiary trail of documents that can be assessed¹⁴.

The NPHL staff continue to familiarise themselves with the Quality Management System (QMS) and are developing an evidentiary record of documents in compliance with ISO 17025 that can be assessed for accreditation at a later date.

Challenges still remain in the pursuit of achieving the modified goal of placing NPHL on the path towards accreditation and these include:

- The need to perform calibrations on all laboratory equipment used in the microbial testing methods that are to be accredited. This activity has not been completed and is an essential requirement for the achievement of accreditation.
- Proficiency testing must be continued after the project ends in order to develop a sufficient evidentiary trail of reproducible laboratory data that can be assessed for accreditation. Proficiency testing would also require the acquisition of control cultures for comparison testing as well as standard freezers (-20 C) for storing control cultures.
- The functionality of the NPHL must be improved by increasing the number of samples analysed. The sample throughput is an important factor in achieving a sufficient evidentiary record of analytical results data that can be assessed for accreditation.
- An efficient Procurement System is required by NPHL for the proper functioning and operation towards accreditation. The current system of procurement is slow and limited. Funds for laboratory operations are controlled by the budget under the MHMS and purchase of laboratory supplies is hampered by several rules and regulations that

¹⁴Steps to ISO/IEC 17025 Accreditation © 2009 by Perry Johnson Laboratory Accreditation, Inc.

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cause delays and the consequent delivery of reagents that are often expired on arrival and are unsuitable for microbial testing.

The major factors influencing the non-achievement of some project objectives, outcomes and outputs included staffing issues relating to an inability to recruit laboratory technicians which led to a pause in project activities in 2019. The project's original objective of providing in-person laboratory training could not be achieved due to travel restrictions and social distancing measures mandated under COVID-19 protocols.

The project addressed environmental issues, particularly, the testing of water samples for microbial contamination. A manual of Microbiological Methods (MM) was developed containing twelve methods for the microbiological examination of water and food in compliance with ISO 17025. A well-functioning NPHL will serve environmental organizations and government agencies by providing water monitoring services and will support the development of water projects. As well, the "SDG 17: Sustainable development through global partnerships" is supported as the project is directly concerned with maintaining market access for Solomon Islands and fostering trade between developed and least developed nations¹⁵.

The recruitment of two laboratory technicians for the project included a female ensuring gender balance. Enhancing the analytical capacity of the NPHL will empower female beneficiaries such as food processors, restauraners, food producers, and seaweed farmers to provide safe food for the community and to have better market access for their products and services. Women associations were also participants in project workshops and this ensures that knowledge and achievements of the project are effectively disseminated.

3.4. Efficiency

- The project resources were used to build upon support provided by other donors conducting similar activities in the country. This afforded cost effective utilization of project funds for the enhancement of existing infrastructure, equipment capacity, human resource capability and standardization of microbiological test methods in compliance with ISO 17025. The project benefited from primary research, organizational knowledge, and technical recommendations of partner organizations in the region, including reports under the PHAMA projects¹⁶

Overseas trainings for laboratory staff planned to take place in New Zealand at the CI could not be achieved due to travel restrictions caused by the COVID-19 pandemic. Project funds and resources were nevertheless effectively channeled to build the analytical testing capability of laboratory staff using online demonstrations and review of test results conducted by the international ILCP run by Global Proficiency. The NPHL team performed well obtaining "good" results which are the highest scores that can be achieved. It was observed that the online Proficiency Testing afforded a longer-term training of laboratory personnel and provided the opportunity to better understand the abilities of the personnel to produce consistently good

¹⁵ Project document: "Strengthening the capacity of the National Public Health Laboratory (NHPL) to provide services in support of market access for Solomon Islands fish exporters, May 2017"

¹⁶ Technical Report 39: Improved diagnostic services for processed fish exports (SOLS12 Stage 1), and the 2014 PHAMA Report on the Status of the National Public Health Laboratory (SOLS12 Stage 2)

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results. On-line training, however, cannot effectively supplement what can be observed during in-person training. On-line training was an effective and efficient use of resources that helped to achieve some of the training objectives that would otherwise have been stalled as a result of the COVID-19 pandemic travel restrictions.

The project which was originally commissioned to run from May 2017 to May 2020 was completed in June 2022. Staffing issues at the NPHL and the occurrence of global COVID-19 pandemic hindered project progress causing a period of “inactivity” that resulted in the termination of the existing LOA and workplan in June 2020. New work plans were developed for online training and captured in two LoAs signed for September 2021 to December 2021 (four months) and February to June 2022 (five months). Progress towards ISO 17025 accreditation and online training of the laboratory staff was undertaken during the shorter “active” period of the project which achieved the modified project objective of placing the NPHL on a strong path to accreditation. This contributed to the operational efficiency of the project.

3.5. Impact

- Developing the Solomon Islands NPHL capacity to conduct microbiological testing and provide sanitary related tests to exporters of their products will increase the competitiveness of Solomon Island fishery products and sustain access to overseas markets including the EU¹⁷.

In an interview with the lab superintendent for SolTuna Company which is the only tuna cannery in the Solomon Islands and the largest employer in Noro, Western Province, the benefits of accreditation by NPHL to the company was reiterated (Annex 9; Figure 4). The company currently ships samples to the accredited lab in Fiji in order to meet international standard requirements. The improved technical competence and methods developed at the NPHL under the current project benefits the laboratory staff of SolTuna who train at the NPHL facilities to improve their competence. Other benefits for the SolTuna company include the ability to conduct interlaboratory comparison testing of in-house samples between the Soltuna lab and the accredited NPHL. This inter-laboratory cooperation with SolTuna can support NPHL in the important accreditation requirement of Proficiency testing activities. The current relationship between SolTuna and NPHL staff increases trust, and this should generate advocacy by NPHL to encourage SolTuna to send more samples to the NPHL for testing.

The private sector’s access to the EU market is dependent on their cooperation with the Competent Authority, which includes soliciting the services of NHPL to confirm product safety. Initiating this project at the NPHL prior to a forthcoming EU Commission Audit of Fishery Products allows the Solomon Islands to develop the necessary systems and capacities to comply with EU standards and provides canned tuna exporters the potential benefit of uninterrupted trade. The date for the audit has not yet been finalized.

- The NPHL and staff have benefited significantly as the recipients of capacity development and technical inputs. The facility has benefited from expert technical support from CI through the development of systems and training to support an efficient and effective workflow. The staff

¹⁷ Project document: “Strengthening the capacity of the National Public Health Laboratory (NHPL) to provide services in support of market access for Solomon Islands fish exporters, May 2017”

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(50% of which are women: 2 males and 2 females) have received high quality technical training which has improved their professional development and increased the quality of their work in the area of microbiological testing and quality management systems (QMS). Interviews with the laboratory staff indicated they have experienced a real difference in the following areas:

- i. improved reporting of results
- ii. improved expertise in laboratory techniques
- iii. improved team spirit
- iv. improved compliance and focus on international standards for testing
- v. increased staff capacity
- vi. improved laboratory management
- vii. improved approaches to problem-solving

Government agencies, especially the MHMS, which is the supervisory body of the laboratory, have the benefit of well trained and competent microbiology staff at the NPHL who can perform analysis at the standard required of an ISO 17025 accredited laboratory. Additionally, a Quality Management System was developed in line with the ISO 17025 standard. The increased capacity of the facility serves the government as a reliable resource for food contamination testing, water monitoring, quality assurance and interdisciplinary environmental and public health studies relating to microbiological water contamination¹⁸.

The establishment of the Competent Authority for Food Safety with support from the Ministry of Health, the Forum Fisheries Agency (FFA) and World Health Organization (WHO) provided significant strides in boosting economic development through participation in trade. Further capacity development, however, was needed to support the local fishery exporters to comply with sanitary and phytosanitary measures (SPS) and maintain trade partnerships. The project activities were effective in raising government awareness on sanitary challenges and contributed to support for enhancing laboratory capacity to meet food testing and water quality monitoring needs.

Significant accomplishments were made towards the modified project goal to build lab capacity and place the NPHL on a strong path to accreditation. The achievements provide a strong foundation to bolster support towards mobilization efforts for additional resources to attain accreditation and help sustain and guarantee the safe quality of fish exports, particularly tuna, from the Solomon Islands.

3.6. Sustainability

Although the project did not achieve its original goal of achieving ISO 17025 accreditation, the benefits of the project are continuing and are likely to continue over the longer term and after the end of STDF funding. An interview with the Director of the NPHL indicated that the project has helped to enhance the profile of the lab as the main service provider of analytical testing for food and water in the Solomon Islands (Annex 5). Six to ten Honiara City Council (HCC) health inspectors were trained in sampling and sampling schedule development by the CI experts. The training was not a project output but was organized by the MHMS to improve on sampling

¹⁸ Project document: "Strengthening the capacity of the National Public Health Laboratory (NHPL) to provide services in support of market access for Solomon Islands fish exporters, May 2017"

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techniques and collection. An initial impact was observed as the sampling plan developed resulted in an increase in number of samples submitted to the lab. Sampling collection and submission has, however, began to decline due a lack of logistics including vehicles, fuel and a budget to collect samples on a consistent basis. A government commitment to support this sampling schedule will help boost the sample numbers required to support the functionality of the NPHL and provide a track record of results required for accreditation.

The Solomon Tuna factory (SolTuna) continues to use the NPHL for the testing of their effluent water samples and tuna loins. Testing and monitoring effluent water samples will also help to protect the domestic health by ensuring detection of harmful substances before consumption of food or the potential contamination of drinking water sources. An accredited NPHL will further enhance their export trade.

- Sustainability of the project was not sufficiently addressed at the design stage of the project. A third progress report¹⁹ covering the period from 1 June 2018 to 30 November 2018 indicated that sustainability after accreditation and the components required to maintain accreditation were then being identified and costed. These included ongoing audits, proficiency testing (participation in ILCP) and calibrations for weights, thermometers, and volumes. The report noted that there were no known auditors and calibration specialists in the Solomon Islands and travel to bring them in-country will increase the sustainability cost.

One major challenge that was identified during the project was the low number of samples that were received at the lab for analyses. The testing of sufficient samples is essential to build competency and establish a record of testing capability which is a key requirement for a successful accreditation assessment. CI experts recommended that the number of samples needed to be increased from the current 5-10 samples to at least 50-100 samples per week. The low sample numbers were found to be attributable, among other factors, to a lack of collaboration between the laboratory and food inspectors who randomly select food samples for testing. The project sought to address this issue by supporting NPHL to promote industry awareness on sample collection through MHMS press releases and MHMS liaison with HCC to develop a schedule of sample collection. HCC health officers were given sample collection training by CI experts. A schedule of sample collection would ensure that regular numbers of samples are delivered to the lab for testing on a regular basis. Collaborations with NPHL to organize stakeholder engagement workshops, particularly targeting restaurants, fish businesses, and food inspectors to encourage them to send samples to the laboratory for analysis were also conducted.

- Procurement of laboratory consumables remains a major challenge for the NPHL. According to the Director of the lab, “the procurement system is a nightmare due to the fact that it is a government system that requires tenders and other administrative protocols and red tape that significantly delay release of funds for procurement purposes”. He indicated that an autonomous laboratory budget or imprest will significantly improve the procurement of reagents and equipment.

¹⁹ STDF PROJECT PROGRESS REPORT. 22/01/2019

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The Project Steering Committee (PSC) drafted a "fee for service" recommendation for the Undersecretary of Health to be discussed with other relevant government Ministries, including the Ministry of Finance. The recommendations had not yet been implemented at the end of the project. The NPHL leadership are continuing to advocate for changes to the procurement system and a "fee for service" that will support and help sustain the activities of the lab.

- Sustainability of results achieved under the project will effectively require a renewed effort at resource mobilization for funds to support in-person training for laboratory staff and a procurement system that facilitates the easy and fast access to reagents and consumables for testing. Funding support will be required to continue the proficiency testing initiated during the project and to promote the activities that will achieve a higher laboratory sample throughput in order to attain a sufficient history of testing compliance necessary to demonstrate competency for ISO17025 accreditation. The commitment of the Solomon Islands government will be required to support an appropriate procurement system to ensure the efficiency of lab operations and to complete the next steps toward ISO 17025 accreditation. Financial commitment from the government will also be essential for the longer-term support of the quality components associated with being an ISO 17025 accredited laboratory, such as participation in an ILCP programme and follow-up audits to maintain lab accreditation.

3.7. Cross-cutting issues

- Women play an important economic role in food production and transactions in many countries and an internationally recognized analytical laboratory will facilitate safe food trade thereby indirectly help them to improve their social and economic status. Gender balance in laboratory staff recruitments which occurred under the project encourages equal participation of women and men in food and water control activities at the national level.
- The right of everyone to have access to safe and nutritious food, consistent with the right to adequate food and the fundamental right of everyone to be free from hunger was reaffirmed by World leaders at the 2012 Conference on Sustainable Development (Rio+20). The Sustainable Development Goal to "End hunger, achieve food security and improved nutrition and promote sustainable agriculture" (SDG2) was launched at the conference. By placing the NPHL on the path to accreditation, the project contributed to ensuring the right to safe, sufficient, and nutritious food in the Solomon Islands.
- Enhancing the capacity of the NPHL to conduct microbiological testing of food and monitoring of particularly, E. coli, in water in compliance to international standards helps to address environmental contaminants of public health concern and supports the reduction in environmental pollutants and promotion of sustainable agriculture and safe food.

3.8. Risk Management

- One of the significant risks encountered during the project implementation was the issue of staff shortages. The project anticipated staff turnovers and the inability to hire additional staff but ranked the probability of their occurrence as "little likelihood" and "somewhat likely", respectively²⁰. Staffing issues ultimately stalled the project progress for two years, however, the

²⁰ Project document: "Strengthening the capacity of the National Public Health Laboratory (NHPL) to provide services in support of market access for Solomon Islands fish exporters, May 2017"

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recruitment of two government salaried laboratory technicians and the return of the project's National Coordinator from a post-graduate study overseas effectively restored the project to achieving its goals based on modified objectives that sought to place the NPHL on a strong path to accreditation.

- Even though the project stated, “adverse climatic events such as cyclones as ‘somewhat likely’”,²¹ it was impossible to anticipate the unprecedented, once in a century COVID 19 pandemic which prevented the achievement of the one of the main project goals of conducting in-person training of NPHL technicians at accredited facilities at the CI. The project was able to adapt to the challenge by delivering practical online training by experts from the CI. The highly innovative approach was even found to be more impactful as it afforded a longer training period where the abilities of the trainees could be better assessed for consistency compared to a shorter term in-person training. Although the benefits of online training cannot effectively replace in-person training the experiences and lessons achieved through remote learning are very relevant for future lab capacity development projects.
- Another risk to the project impact and sustainability was the issues of limited financial support from the Solomon Islands government to ensure laboratory operations are sustained going into the future with particular concern being the need for a reliable procurement system. In a final project report the Service Providers, Cawthron Institute experts²², recommended three different funding models for sustaining the lab activities. This are summarized as follows:
 - i. An expanded government funded laboratory budget to include funding required to support the on-going quality requirements for ISO 17025 as well as the ability for NPHL to purchase consumables directly, and when required from suppliers
 - ii. A combined government funding and commercial testing service where two revenue streams will be generated from firstly, the MHMS to support the analysis of water and food borne illness and secondly, from fee-for-service testing for businesses in both the private and commercial sectors.
 - iii. An independent commercial testing service where NPHL would be recognized as an independent laboratory offering fee-for-service testing for both the Solomon Islands government and the private and commercial sectors.

The risk that private sector stakeholders such as SolTuna may continue send samples overseas instead of the NPHL was explored in an interview with SolTuna. The lab supervisor expressed great enthusiasm for an accredited NPHL that will reduce the costs associated with overseas shipping of sample as well as the administrative regulatory required by customs agencies on both the overseas and domestic sides of exporting samples for analysis. Although the NPHL did not achieve accreditation within the project timeframe, it was placed on a strong path to accreditation as a result of highly competent laboratory staff trained in testing methods and a

²¹ Project document: “Strengthening the capacity of the National Public Health Laboratory (NHPL) to provide services in support of market access for Solomon Islands fish exporters, May 2017”

²² Murray JS and Oakly J. 2022. Strengthening the scientific capabilities of the National Public Health Laboratory of the Solomon Islands - Project conclusion report. Prepared for the Food and Agricultural Organization of the United Nations. Cawthron Report No. 3823. 42 p

Quality Management System (QMS) at the level of ISO 17025. The enhanced level of competence provides mutual benefit and trust between the NPHL and SolTuna who continue to send some samples such as effluent water from the factory and tuna loins to the lab for testing,

4. Conclusions and recommendations

The main conclusion of this evaluation is that the NPHL has made significant advances towards achieving accreditation of its microbiological facility in compliance with ISO 17025. There is, however, an urgent need for a boost of donor support to meet the on-going costs associated particularly, with important mandatory requirements for accreditation which are equipment calibration, proficiency testing (or ILCP) with the associated cost for the purchase of control cultures, and preassessment external audits. Donor support will, however, require complementary national government support and commitment in order to sustain the current gains of the project as well as maintain lab accreditation after it has been achieved.

Based on the key questions evaluated, the project was found to be *relevant* to SPS-related needs and to the STDF's goal to facilitate safe trade. It was also relevant in meeting the priorities of the Solomon Islands government to maintain market access of fishery products into the EU thereby contributing to employment earnings and government revenue. Improving the testing capacity and capability of the NPHL also helps the government to achieve its priority of increasing access to clean water and safe food for all communities. The project goal of strengthening the capacity of the NPHL was *coherent* with other interventions in the country aimed at maintaining access to key export markets and supporting public health work. These interventions included the activities of the Competent Authority aimed at enforcing food safety policy for exports, and the development of the chemical analytical capacity of the NPHL under the ECAT project which complements the enhancing the microbiological analytical capacity under this project. The project was *effective* in achieving the modified project goal of placing the NPHL on a strong path to accreditation. In spite of travel restrictions mandated by the COVID pandemic, training of NPHL laboratory staff was achieved through remote training and was found to be very impactful as it afforded a longer period for increasing the ability of laboratory staff to produce proficient and consistent test results. Remote training also contributed to *efficiency* by allowing cost-effective use of project funds. This was achieved through building upon support provided by other donors conducting similar activities in the country, such as projects under PHAMA where the project was able to save cost by utilizing or enhancing existing infrastructure, equipment capacity, and available human resource capability. The project achievements have significantly *impacted* the country by enhancing the capacity of the NPHL to protect Solomon Islanders from water and food contamination. Further gains towards achieving accreditation will provide a measurable impact on trade, and contribute to sustainable economic growth, poverty reduction and food security. Finally, the *sustainability* of the project benefits can continue for the longer term in the area of technical expertise obtained by the NPHL laboratory staff however, more resources will need to be mobilized to achieve the initial project goal of ISO 17025 accreditation for the NPHL and maintain it from year to year.

Recommendations for Key Stakeholders to support accreditation for the NPHL include:

- i. MHMS: The MHMS must continue to promote industry awareness of the laboratory services and maintain the schedule of sample collection to ensure that sufficient samples are analyzed to

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maintain a track record of results for accreditation. The ministry currently manages the budget for all lab procurement including consumables and laboratory equipment) resulting in inefficiencies including delays in purchase and delivery as well as inaccuracies in orders. It is recommended that a separate budget managed by the NPHL be allocated by the MHMS.

- ii. NPHL: The NPHL must pursue a funding model that will help meet the cost of laboratory operations. As mentioned earlier, three funding models are proposed, namely, a government-funded, government funded plus commercial testing service, and independent commercial testing service. NPHL staff must continue to maintain compliance with, and use of, the developed QMS and methods in accordance with the ISO 17025 standard, The staff must keep records of testing results to ensure that a track record of non-conformities and corrective actions are available for lab assessment audits to be undertaken in order to achieve accreditation.
- iii. Solomon Islands Government: A strong national government commitment towards increasing the profile of the NPHL as a testing facility for both the public and private sector will be required to sustain a high sample throughput in the lab. Government financial and in-kind support will also be required to complement any future donor support that may be solicited to sustain the lab's operations.
- iv. Private industry, e.g. SolTuna: The private industry, specifically the fishing industry, must be encouraged to invest in the lab operations by sending their samples there for testing. This will require an increased awareness of the lab activities and an affordable testing fee-for-service. The NPHL and the SolTuna company must continue to build a relationship of trust through the current samples that are sent to the NPHL for testing. This would ensure that SolTuna continues to use the NPHL facilities when it achieves accreditation.

The following recommendations were made to address challenges identified in order to the achieve ISO 17025 accreditation for the NPHL:

- v. Proficiency testing (also referred to as ILCP): Proficiency testing must be conducted over a sufficient amount of time with consistent results for laboratory employees to a) become familiar with the quality management system and b) develop an adequate evidentiary trail of documents that can be assessed.

Proficiency testing conducted within the timeframe of this project involved just one round of testing which is insufficient to develop an adequate evidentiary record of results to assess proficiency. ILCP samples need to be tested six times a year for 'Potable Water' and four times for 'Food' to demonstrate continued competency in the Microbiology Methods (MMs), which is a requirement of ISO 17025 accreditation. An on-going cost associated with the acquisition of control cultures, their storage in standard freezers (-20°C) and the need to replace the cultures when they expire also poses a challenge towards accreditation. This cost was not included in the project budget. The round of proficiency testing conducted during the project time frame was made possible by the availability of unutilized funds that were targeted for overseas travel and in-person laboratory training.

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- vi. Calibration of equipment: Compliance with ISO 17025 requires calibration of all laboratory equipment as well as a detailed record of repairs, routine maintenance, and performance checks. A checking schedule of service/maintenance, calibration and performance will normally be conducted by a combination of service from the supplier, in-house checks and calibrations, or calibrations by a contracted certified external or internal calibration body.

Except for a few thermometers that were bought under this project and shipped to CI and returned after being calibrated there, relatively little calibration of equipment has been undertaken in the NPHL. The NPHL team did some in-house pipette training/calibration. They were also provided with calibration SOPs and calculation sheets. The balances are also calibrated every time they are used. The absence of equipment calibration and maintenance is a major challenge since this is a requirement necessary to satisfy accreditation assessors of the proper and reliable functioning of lab equipment. Calibration and service/maintenance of equipment will require an on-going cost that must be supported by the NPHL and other mobilized resources. According to CI, on-going costs would include overseas shipments of some equipment for calibration as well as travel costs and sustenance allowances for on-site calibrations by external service providers.

- vii. Lab functioning at high capacity: Laboratory assessments for accreditation typically focus on the scope of methods and on the equipment used to deliver them resulting in a laboratory accredited for a specific list of methods. A comprehensively operating quality system is also a requirement for compliance towards accreditation. Methods which are performed infrequently, are difficult to accredit since it is impossible to demonstrate a track record of performance.

The selected methods for accreditation at NPHL are the main microbiological testing methods performed for food and water samples in the country. The throughput of samples currently analyzed in the lab are, however, very low which would result in a record with insufficient data to demonstrate a reliable track record of performance.

- viii. System of Procurement: The general requirement for purchasing services and supplies for accreditation is that “where the quality of any outside services or supplies may have an impact on the quality of the data or calibrations emanating from the laboratory, there must be procedures to ensure that the quality of the services or supplies is adequate and consistently so” . A policy for approving suppliers is normally administered by the quality manager which should state that, wherever possible, the laboratory will use certified suppliers.

The current system of procurement at the NPHL does not afford much control of resources by the laboratory management or quality manager. Funds for supplies and services are controlled by the government department (Ministry of Health and Medical Services, MHMS, via the National Medical Stores, NMS, and Procurement Unit, PU) and typically have to undergo a tendering system. "Purchases via a transparent tendering system often means that the laboratory is not in a position to select suppliers nor, in some instances, influence the selection". The lengthy tendering system and lack of control of resources by the NPHL management results in delays in ordering of essential supplies required for lab work. An inability to select approved suppliers by the quality manager under a tendering system also

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compromises the quality of testing results. Part of the project outcomes still to be implemented includes amending the NPHL procurement system to ensure the efficient provision of goods and services. Engagement with government was undertaken during the project implementation to recommend the adoption of an amended procurement system and other areas that were uncovered in a needs assessment of the NPHL.

- ix. Fee charge for service: Revenue generated from accredited laboratories should be able to sustain the accreditation activities and test methods. This revenue, however, often excludes the salary of the staff which is paid by the government.

The NPHL has a small throughput of samples for analysis and current charges are considered high compared to other commercial laboratories which results in a low number of samples received at the lab with consequent inadequate revenues for lab operations compliant with ISO 17025. Although fee charges need to be affordable in order to encourage a larger clientele, they must be sufficiently high to help meet the costs of analysis. A higher volume of samples flowing through the lab for analysis can help achieve the proper balance for analytical service fee charges.

- x. Sustainability costs: Funds to meet on-going costs for sufficient rounds of Proficiency testing as well as the associated reference materials for testing, contracting of a calibration body for equipment calibration, service, and maintenance, will be required to effectively place NPHL on the path to accreditation.

The costs for sustainability mentioned above as well as costs for keeping up lab operations through an efficient procurement system were not captured in the current project budget estimate as this would require a longer-term commitment of funds past the project timeframe. A lack of the required resources for sustainability will effectively put the goal of reaching accreditation out of reach unless covered in other solicited donor funding with a national commitment and active utilization of the lab facilities by the public and private sector.

There is an urgent need to provide more and better information to facilitate policy-making and regulatory enforcement which would increase the visibility and functionality of the lab. A policy-backed requirement for producers, processors, health inspectors and environmentalists to use the lab will greatly enhance its sustainability as an accredited microbiological laboratory. The adoption of an appropriate fee-for service at the lab will require national government backing as well as client ability to afford.

5. Lessons learned.

- One of the major lessons learned from the project is the need to properly identify and characterize risks during the design phase of the project. The original project application included a risk matrix, however, not all the risks faced were adequately identified or ranked. The role of the National Project Co-ordinator (NPC) was found to be a very critical factor for the successful implementation of the project. The NPC left in the middle of the project to study abroad. This stalled the progress of the project significantly until his return. According to NPHL staff and CI experts it was difficult to meet project deadlines, meeting schedules and

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appointments in his absence. The risk of turnover of lab staff was identified but ranked as a low probability at the design stage of the project. It is important that such staff turnovers be properly anticipated and prepared for.

- The unprecedented COVID 19 pandemic was impossible to anticipate and prevented crucial in-person training and guidance for NPHL staff and relevant stakeholders. The project was able to adapt to the challenge by delivering practical online training by experts from the CI. The highly innovative approach was even found to be more impactful as it afforded a longer training period where the abilities of the trainees could be better assessed for consistency compared to a shorter term in-person training. Although the benefits of online training cannot effectively replace in-person training the experiences and lessons provided are very relevant for future lab capacity development projects. The experiences and methods used should be documented and disseminated to other STDF projects and partners including UNIDO, FAO and WHO. The lessons learned from successful remote activities that help to prevent the non-achievement of in-person project outputs will provide useful mitigation solutions to address risks during the design stage of projects.
- In interviews with NPHL staff there was indication that there needed to have been a wider consultation with NPHL staff during the project design phase (Annex 4). Below are some of comments made by NPHL staff:
 - Project design phase needed a wider consultation with all stakeholders.
 - Inputs of key beneficiaries especially NPHL staff needed to be captured and reflected in the project design matrix.
 - Risks such as the pandemic, Solomon Islands Government (SIG) procurement system, human resources, budget should be carefully evaluated when estimating project costs.
 - Excessive rules on procurement processes, slow communication practices from implementing bodies affected implementation and timely delivery of project outputs.
 - Hands on bench training at accredited laboratory would be very effective for staff training.
 - Public awareness and publicity campaigns are very important for promoting the organisation and business entities, especially, when it comes to boosting sample volume.
 - The availability of National Project Coordination team and financial resources in-country will improve project implementation.
 - Communications between members of the lab and FAO consultant and managers in Samoa and Thailand must be improved. Information flow and replies to emails sent from the NPHL to FAO were slow and need to be improved.

Representatives from two institutions in a developing country, namely, Ghana, in West Africa, were interviewed by phone and given questionnaires for responses (Appendices 6 & 7) as part of the project evaluator's reflection on the experiences and challenges faced by other similar institutions on the path to achieving accreditation. The experiences, which have not yet been shared with the NPHL staff, reiterated the current project's learnings that a key element of achieving and sustaining accreditation was the need for a strong national government commitment. Other learnings from the

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interviews can be shared with STDF project partners and the NPHL as part of dissemination of the project outcomes and recommendations.

- “A public version of the project final report will be prepared by MHMS and disseminated to government agencies concerned with water management and public health, in addition to the private sector stakeholders and relevant non-governmental organizations (NGOs) and international organizations working in public health and water contamination control. The report will notify the reader of improvements made at the NPHL, as well as the services available and corresponding prices. As well recommendations targeted at the role of government and the private sector in helping to sustain the lab operations will be highlighted. These would include the need for a higher sample throughput for the NPHL and a self-managed budget for the NPHL for efficiency in procurement and other lab operations. FAO will work with the Ministry of Health and WHO to facilitate the distribution of the public report to the relevant organizations.

Annexes

Annex 1: Project Evaluation Framework:

1. Introduction

The STDF/PG/:521 project “Strengthening the capacity of the National Public Health Laboratory (NHPL) to provide services in support of market access for Solomon Islands fish exporters” aims to develop the capacity of the National Public Health Laboratory to conduct microbiological testing on water and food products in compliance with international standards, particularly, ISO 17025.

“The project addresses technical knowledge gaps of the NPHL staff and provides improvements to the facility systems and procedures to ensure compliance with Sanitary and Phytosanitary (SPS) import requirements of the EU and other trade partners, to gain and importantly maintain access to those markets. The technical focus for the project is microbiological testing, specifically aimed at the requirements of the Solomon Tuna industry to maintain their market access for exports to the EU. The Solomon Islands currently have access to the EU for their fish exports, utilising the non-accredited NPHL under an interim agreement for a grace period. However, the Solomon Islands need to demonstrate that significant efforts are being made to use an accredited laboratory for microbiological testing. Due to the nature of microbiological testing, this must be done in-country. Demonstrating a strategy to achieve this accreditation by the NPHL within a reasonable timeframe will be critical during the next audit by the EU. Failure to do so may pose a risk to continued market access. The proposed approach offers an inter-disciplinary benefit which is primarily aimed at assisting Solomon Islands maintain access to key export markets and also has beneficial side effects including inter alia, an improved capacity to support public health work relating to quality assurance of the public water supply, assist local water bottling companies, hotels and other enterprises as well as environmental monitoring of water quality in watersheds”

Project timeframe*	June 2017 – June 2022
Budget requested from STDF	USD 355,408
In-kind contribution from Solomon Islands Government-Ministry of Health and Medical Services (MHMS)	USD 112,800
FAO (Food and Agriculture Organization)	USD 20,128
Name and contact details of requesting organization	National Public Health Laboratory, Ministry of Health and Medical Services (MHMS) Honiara, Solomon Islands
Implementing organization	Food and Agriculture Organization of the United Nations (FAO)

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Specialized Institute/Service Provider of laboratory capacity assessment and training towards international accreditation in compliance with ISO 17025 international standards	CI, Nelson, New Zealand
Target Beneficiaries	NHPL facility and staff, Government agencies, especially, MHMS, fish processors and exporters, tuna fishing companies and tuna fisherman, consumers of exports, local consumers

*The project was paused for 6 to 9 months beginning March 2018, in order to recruit two new staff start work at NPHL and to also obtain an extension confirmed for the continuation of the project.

Theory of change

“The Theory of Change in the STDF Strategy for 2020-2024 outlines the pathway through which change will be achieved. More synergies and collaboration driving catalytic SPS improvements in developing countries (Outcome 1) and greater access to and use of good practices and knowledge products at global, regional and national level (Outcome 2) will contribute to increased and sustainable improvements in SPS capacity in developing countries (STDF’s programme goal). This will in turn facilitate safe trade (i.e. trade that ensures health protection, while minimizing transaction costs), contributing to the Sustainable Development Goals (SDGs)”²³

The project will be evaluated based on the assumptions of the theory of change.

Activities	Outputs	Outcomes	Impact
1. Conduct baseline and needs assessment of the NHPL with a focus on the capacity needed to achieve international accreditation for micro-biology. This will include performance of equipment maintenance, calibration and registration	1. NPHL facility is equipped and organized according to international standards	Capacity of National Public Health Laboratory strengthened to attain international accreditation for microbiology (for water analysis)	<ul style="list-style-type: none"> • The capacity of Solomon Islands NHPL to conduct SPS research and provide SPS related tests to exporters of their products will increase the competitiveness of Solomon Island fishery products and sustain access to overseas markets including the EU. • The increased capacity will contribute
2. Perform capacity assessment of the NPHL staff to establish a baseline and inform the training plan. This includes training lab aids in support roles,	2. NPHL staff are trained to ISO17025 standard for certification		

²³ STDF Monitoring, Evaluation and Learning Framework (MEL), 2020

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<p>training laboratory technicians overseas in an accredited lab, and training NHPL staff and management on QMS, SOPs, Environmental Monitoring and procurements systems</p>			<p>towards greater protection of Solomon Islanders from water and food contamination through an increased capacity to monitor and evaluate contamination risks associated with water and food.</p>
<p>3. Review laboratory existing lab manuals and systems.</p> <p>Develop lab SOPs in line with ISO 17025.</p> <p>Amend NPHL procurement system to ensure the efficient provision of goods and services and engage with government to facilitate the adoption of the amended procurement system and other areas uncovered in needs assessments.</p> <p>Develop Quality Management Systems (QMS) in line with ISO 17025, establish record keeping systems as well as Environmental Monitoring systems and procedures.</p>	<p>3. Essential NPHL systems are developed and or amended to comply with international standards for microbiological testing, and promote efficient workflow in the laboratory</p>		<p>• Maintaining market access to EU through these measures will protect approximately 2000 jobs in the Solomon Islands and sustain USD 45 million in export returns and service-related income.</p>

2. Key evaluation questions

Project objectives:

The project aimed to develop the capacity of the Solomon Islands NHPL to conduct microbiological testing on water and food products in compliance with international standards, particularly, ISO 17025.

In 2019, the absence of the laboratory technicians led to a pause, but the project team expected to make up lost ground in 2020 through hands-on intensive training programmes. However, the

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COVID-19 pandemic which remained through 2020 and continued in 2021, was a severe and unique once-in-a-century challenge which was not and could not have been foreseen in the risks and assumptions framework of the project. Given that laboratory training is best delivered in person and through direct on-site interventions, the project's original objective was not achievable.

FAO agreed, with NPHL, Cawthron Institute experts and STDF in 2020, to pursue a more realistic goal of providing assistance to ensure that the NPHL is placed on sound footing to apply and achieve ISO17025 accreditation. Accordingly, the activities were adjusted to achieve concrete and optimal results in the remaining time frame.

“Developing the Solomon Islands NPHL capacity to conduct SPS research and provide SPS related tests to exporters of their products will increase the competitiveness of Solomon Island fishery products and sustain access to overseas markets including the EU. The increased capacity will contribute towards greater protection of Solomon Islanders from water and food contamination through an increased capacity to monitor and evaluate contamination risks associated with water and food. Maintaining market access to EU through these measures will protect approximately 2000 jobs in the Solomon Islands and sustain USD 45 million in export returns and service-related income. This industry is an increasingly important source of export income as the Solomon Islands face the significant economic challenges from the likely decline in revenues from its current main export industry of whole logs (USD 200 million/annual exports)”²⁴

The evaluation will seek responses to key questions that will allow a better understanding of the project implementation and the extent to which project goals were achieved in the following areas:

Relevance

- To what extent did the objectives and design of the project respond to: (i) the SPS-related needs, policies and priorities of the beneficiaries, as well as other stakeholders involved (public and/or private sector, regional, international partners, etc.); as well as (ii) the STDF's goal to facilitate safe trade?
- To what extent were there differences and/or trade-offs between different priorities or needs?
- How were local contexts, public and private sector needs, government participation and public awareness of project goals taken into account in the design and implementation of the project?
- To what extent did the project remain relevant, even if the circumstances changed over the course of implementation?

Coherence: how well did the project fit?

- How well did the project fit other interventions in the country aimed at assisting Solomon Islands maintain access to key export markets and beneficial side effects including inter alia, an improved capacity to support public health work

²⁴ Project document: Strengthening the capacity of the National Public Health Laboratory (NHPL) to provide services in support of market access for Solomon Islands fish exporters, May 2017

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- To what extent did other interventions (including policies) support or undermine the project, and vice versa?
- What were the synergies and interlinkages between the project and other interventions carried out by the same institution/government, as well as with the relevant international (Codex, International Plant Protection Convention, IPPC, World Organisation for Animal Health (WOAH), formerly the Office International des Epizooties (OIE) standards?
- To what extent was the project complementary to and/or coordinated with relevant interventions supported by other actors in the same context, including how did it add value while avoiding duplication of effort?

Effectiveness: did the project achieve its objectives?

- To what extent were the project objectives achieved or are likely to be achieved (based on the indicators for expected outputs and outcomes identified in the project's logframe) including any differential results across groups?
- What were the major factors influencing the achievement or non-achievement of the project objectives, outcomes and outputs?
- To what extent were horizontal issues (particularly related to gender and environment) adequately addressed in the project?

Efficiency: how well were resources used?

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

Impact: what difference did the project make?

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

Sustainability: will the benefits last?

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

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- What follow-up activities, if any, are planned and/or required to sustain these results over time?

Lessons learned

- What lessons can be learned from the project regarding the process of project design and implementation?
- What lessons can be learned from the project, which may be of importance to the broader donor community, and which should be disseminated more widely?
- What actions have been taken by the beneficiary, STDF partnership or others to disseminate, learn and follow-up on the outcomes of the project?
- How could the STDF increase the sharing of good practices on SPS capacity building coming out of this project?

Cross-cutting issues

- Will this project provide equal income, training and employment opportunities for women?
- What environmental risk factors may occur as a result of the project outcomes?

Risk Management

- What risks were associated with the project and were they adequately anticipated?
- Were the processes to mitigate the risks adequate?

3. Data Collection methods and sources

- The evaluation will be conducted by the following methods and sources:
 - desk analysis of available background information, literature reviews, project documents (progress and final reports, and end-of-project assessments if existing), other relevant documents produced under the project and any other information (e.g. training resources, news stories, media articles, video clips, etc.)
 - questionnaires, surveys or interviews with key stakeholders involved in the project (including beneficiaries, training participants, implementing partners, any other relevant public/private sector organizations), as well as any other relevant STDF Working Group members or other organizations that are potentially relevant to the project will be completed
 - at least one case study of project with similar goals of attaining laboratory accreditation in a selected country will be evaluated. This will involve online interviews or questionnaires as appropriate. The selected country will have comparable economic and social challenges as the Solomon Islands.

Workplan:

The Annex shows the schedule of the project evaluation workplan with timelines.

4. Project Evaluation Report framework

The project evaluation report will be based on the criteria set out in the STDF guidelines and will include:

- ii. Executive summary
- iii. Introduction

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- iv. Methodology
- v. Findings and analysis
- vi. Conclusions and recommendations
- vii. Lessons learned
- viii. Annex

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Annex 2: Work Plan_ Solomon Islands Lab Project_STDF/PG/:521															Status	Comments
Expected Outputs			Week 1 July 4-11	Week 2 July 12-19	Week 3 July 20-27	Week 4 July 28- Aug 4	Week 5 Aug 5-12	Week 6 Aug 13-20	Week 7 Aug 21-28	Week 8 Aug 29-Sep 5	Week 9 Sep 6-13	Week 10 Sep 14-21	Week 9 Sep 22-29			
Output 1	Activity 1	Introduction - Write-up														
	1.1	Review work outcomes under the Solomon Islands Lab project STDF/PG/:521 in relation to the project objectives														
	1.2	Provide an overview of the project to include details on the rationale for the project, geographical area, target groups, implementation, known discrepancies between the planned and actual implementation of the project as well as any known factors that may have affected the successful														
Output 2	Activity 2	Responses to Key evaluation questions														
	2.1	Identify relevant stakeholders and confirm their availability and timing to contribute to the evaluation process														
	2.2	Provide responses to key evaluation questions focused on relevance, coherence, efficiency, effectiveness, impact, sustainability, and lessons														
Output 3	Activity 3	Data collection and documentation of data collection methods and														
	3.1	Collect data based on identified data collection methods and sources														
	3.2	List the information collection methods used in the evaluation process. These would include desk analysis, literature reviews, survey questionnaires and/or interviews with relevant project stakeholders (beneficiaries, implementing organization(s), other collaborating or relevant organizations),														
	3.3	List the sources of information used in data collection for the evaluation. These would include project documents, training resources, media articles, relevant key stakeholders and partner organizations involved in the project														Last interview scheduled with SolTuna company completed on September 27, 2022.
Output 4	Activity 4	Data Analysis														
	4.1	Input data and responses to key evaluation questions, relevant indicators and data collection methods and sources, set out in the form of a table or														
	4.2	Analyse data and responses collected during evaluation of project														
	4.3	List recommendations for future work or sustainability														
Output 5	Activity 5	Final Evaluation report														
	5.1	Write-up and submit Evaluation report														Write up completed and submitted

KEY	
	Complete
	At Risk
	Ongoing
	Started
	Not Started
Last Updated 08-Oct-22	

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Annex 2: List of persons and institutions contacted

1. Solomon Islands National Public Health Laboratory (NHPL)
 - Dickson Manongi, Director
 - Kim Irofufuli, Senior Medical Technologist
 - Oliver Lukos, Quality Assurance Manager
 - Jacelyn Parsad, Laboratory Analyst
 - Vincent Suriga, Microbiology Technologist

2. Cawthron Institute (CI), New Zealand
 - Dr. Sam Murray, Cawthron Senior Pacific Consultant
 - Joy Oakly, Cawthron Senior Pacific Consultant

3. SolTuna Company, Solomon Islands
 - Smith Maru, Lab Superintendent

4. Prof. Wisdom Amoa-Awua, former Head of the Food Microbiology Division of the Ghana Food Research Institute of the Council for Scientific Research (FRI-CSIR)

5. Dr Eric Karikari, Head of the Centre for Laboratory Services and Research (CLSR) of the Ghana Food and Drug Authority (FDA)

6. Food and Agriculture Organization
 - Joseph Nyemah Nyemah, Subregional Food and Nutrition Officer FAO Subregional Office for the Pacific Islands (FAOSAP)

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Annex 3 Questionnaire responses.

Participant information

Number of Institutions	2
Names and type of Institutions	NPHL (Project beneficiary) and Cawthron Institute (Service Provider)
Total number of participants	5

Interpretation of scores

Strongly agree	Score 7
Agree	Score 6
Mildly agree	Score 5
Neutral	Score 4
Mildly disagree	Score 3
Disagree	Score 2
Strongly disagree	Score 1
Other information	Other

Participant responses

#	Questions	Number of responses								Mean Score
		Strongly disagree 1	Disagree 2	Mildly disagree 3	Neutral 4	Mildly agree 5	Agree 6	Strongly agree 7	Other*	
1.0	The project design and objectives were well thought through		2	1		1	1			3.6

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1.1	The project objectives had to be modified due mainly to the COVID-19 pandemic					1	3	1		6.0
1.2	The modified project objectives were largely met (90-100% completed)		1	1		1	1	1		4.6
1.3	The larger project objectives towards accreditation remain relevant to the country							5		7.0
1.4	The public, private sector and government were sufficiently aware of the project and project goals	1	1	1			1		1	3.0
1.5	The project delivered results in an economic and timely way, based on the project document		1		2	1		1		4.4
1.6	The project was able to effectively adapt to changes and manage risks encountered during the project		1		1	2	1			4.4
1.7	The project has a high potential to generate measurable impact on trade and contribute to sustainable economic growth, poverty reduction and food security							7		7.0
1.8	The project addresses factors such as gender equality and the environment						2	2	1	6.5
1.9	The benefits of the project are likely to continue over the longer term after project end, without STDF funding or other donor support.	1				1	1		2	4.0
2.0	The sustainability of the project was sufficiently addressed at the design stage and during the project	1	1	2	1					2.6
2.1	The laboratory personnel have been sufficiently trained to sustain the project results over time					3	1	1		5.6

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2.2	The laboratory analytical capacity (equipment and equipment maintenance and calibration) has been significantly enhanced to sustain the project results over time	1	2		1				1	2.3
2.3	The project objectives and design strongly (or have the potential to) respond to the STDF's goal of facilitating safe trade					2	3			2.3

***Responses scored as "Other" are shown below :**

- Question 1.9 and 2.2: The benefits will continue over the longer term due to the training and Interlaboratory sample testing the laboratory has completed. However, there are upfront and ongoing costs associated to achieving and maintaining ISO 17025 accreditation (e.g., calibration, ILCPs). Finding funding for these will be essential if the laboratory is to achieve ISO 17025 accreditation.
- Question 1.6 : 1.6 Cawthron was able to adapt and manage risks related to their objectives so their score would be 6. But the other parts of the project would be scored 2.

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Annex 5: Online interview_ Director, NPHL

July 24, 2022

Questions and Responses

Effectiveness: did the project achieve its objectives?

1. **To what extent were the project objectives achieved or are likely to be achieved (based on the indicators for expected outputs and outcomes identified in the project's logframe) including any differential results across groups?**

“About 70-80% of project objectives were achieved.

The project got off to a good start with Cawthron on board. The following were achieved:

- Laboratory training for laboratory analysts
- Quality Manual completed (took 6-7 months)
- Lab facilities upgraded
- External laboratory Proficiency testing underway: testing was conducted last week (week of July 18) and this week (week of July 25). Involved an Interlaboratory Comparison Program (ILCP) for E-Coli, Coliforms, Staphylococcus, yeast, mold and total aerobic counts for food and water samples
- Successful recruitment of 2 permanent staff (on government payroll) was a big achievement. The lab is hoping to recruit at least two more staff.
- An Electronic Monitoring System (EMS) is in place, but it is sometimes interrupted by power outages. Power outages result in non-conformance records. The following monitoring measures are conducted:
 - Weekly cleaning of air-conditioners (3 air-conditioners)
 - Monthly cleaning of refrigerators
 - Weekly cleaning of water baths”

2. **What were the major factors influencing the achievement or non-achievement of the project objectives, outcomes and outputs?**

“Challenges

- Shipping of samples: delayed flights, freighting results in reagents with expired dates upon arrival.
- The Procurement system is a nightmare. Since this is a government system it requires tenders and other administrative protocols/red tape that significantly delays release of funds for procurement purposes.
- An autonomous laboratory budget or imprest will significantly improve the procurement of reagents and equipment.
- Calibration of equipment requires a calibration body with a budget to support it. This is a requirement by external audits. In-house calibration requires standards of reference such as standard weights, The lab is lacking the necessary standard weights at this moment”.

3. **To what extent were horizontal issues (particularly, related to gender and environment) adequately addressed in the project?**

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“The 2 new staff recruited included a female and a male. The head of the microbiology lab is female. The staff in the lab is 50 -80% female”.

4. What changes and risks, if any, occurred during project implementation, and how was the project able to adapt to these changes and manage risks?

- “The COVID-19 pandemic was not anticipated. It prevented in-person laboratory training. An adaptation was effected through online training. Lab analysts in Solomon Islands conducted microbiological analyses based on Quality Management Standard Operating Procedures (QM SOPs) and Official Methods of Analysis. Results of microbiological analyses were photographed and uploaded to electronic platforms at the Cawthron Institute for review and comments.
- Staffing challenges caused a pause in project activities. The recruitment of 2 government paid staff helped to resolve this challenge”.

5. Was the project a cost-effective contribution to addressing the country's needs?

“The project did not include a budget for an external audit which is a requirement towards accreditation”.

6. How well was the project managed?

“Support from Cawthron Institute was a major contribution to the achievements of the project. The major challenge to the project is the Procurement system. Support from FAO significantly revitalized the NPHL lab accreditation project previously started and funded under an EU project. The previously funded 2 yr-project which started in 1995 was unsuccessful”.

Sustainability: will the benefits last?

7. To what extent are the benefits of the project continuing, or are likely to continue over the longer term, after the end of STDF funding?

“Health inspectors will be encouraged to bring samples for analyses
Exporters of foods such as Kava and Cassava require testing results from NPHL in order to get their products across borders. An accredited NPHL will further enhance their export trade.
The Tuna factory will benefit significantly from accredited testing of their products, and this will enhance their export trade”.

8. Are the necessary capacities and systems (financial, social, institutional, etc.) in place to sustain the project results over time?

“Advocacy campaigns for government involvement, brochures and fliers to promote the work and importance of the lab”.

9. What follow-up activities, if any, are planned and/or required to sustain these results over time?

“Advocacy campaigns for government involvement, brochures and fliers to promote the work and importance of the lab”.

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Annex 6: Questionnaire responses from the Ghana Food Research Institute of the Council for Scientific and Industrial Research (FRI-CSIR)

Questionnaire

Questions

- 2.1. Why was there a need for your institution to seek accreditation?** The Food Research Institute of the Council for Scientific and Industrial Research (CSIR-FRI) carries out analytical services for clients. Some of these clients export their food products to countries and customers who require reports of chemical and microbiological analysis of the products from accredited laboratories to accompany the products.
- 2.2. What were some of the factors, including those listed below, that had to be in place in order proceed on seeking accreditation?**
- 2.2.1. Laboratory readiness? Did you need to have a basic level of equipment capacity?** Yes, this was based on the type of analysis to be carried out and the equipment required to carry out the analysis as stipulated in the method to be accredited. For example for the method of the aflatoxin analysis to be accredited an HPLC was required. However for the type of laboratory some basic types of equipment had to be in place. For example in the microbiology laboratory we needed to have weighing scales, autoclaves, incubators, water baths, a fume cupboard, etc.
- 2.2.2. Staff readiness? Did you need to have a basic number of staff with a basic level of qualification?** The staff had to be well trained and have the necessary qualifications. They also had to be participating in proficiency testing and had a minimum score. We used European proficiency testing institutions, such as FAPAS. The technicians were also interviewed and had to pass a practical test during the accreditation inspection, before they could become technical signatories to the laboratory results/reports. The number of staff required was based on our personnel needs for the activities concerned. Presently the all the technical staff in the laboratories have a minimum of a first degree. Most have a Master's degree.
- 2.2.3. Laboratory sample throughput. Did you need to have a basic number of samples throughput to qualify you to seek accreditation?** Yes, methods which were carried out frequently were easier to accredit since we could demonstrate a track record of performance. Tests carried out less than 12 times per year are more difficult to accredit since it is impossible to demonstrate a track record of performance.
- 2.3. What were the overall/primary goals of your institution's application for accreditation? What were the specific goals?** The laboratory accreditation was carried out as part of a donor funded project funded by the Danish International Development Agency (DANIDA) and in collaboration with the University of Copenhagen in Denmark. Our goals were (i) to be the first laboratory in West Africa to be accredited to ISO 17025 and (ii) to provide accredited laboratory analytical services to the Ghanaian food industry to facilitate their access to foreign markets and (iii) improve food safety in Ghana.

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- 2.4. Were these goals achieved?** These goals were achieved.
- 2.5. What was the duration for achieving lab accreditation by your institution?** Three years, but it could have been achieved in a much shorter time .
- 2.6. What was the name of the accreditation body that approved your institution's accreditation?** SANAS i.e South Africa National Accreditation System.
- 2.7. To what international standard was the accreditation achieved?** ISO 17025
- 2.8. What were some of the challenges encountered during the pursuit of accreditation?** We could not organise inter-laboratory test within Ghana, had to rely solely on international laboratory proficiency schemes.
- 2.9. What plans were put in place for sustainability?** The chemistry and microbiology laboratories of the CSIR-Food Research Institutes have been accredited to ISO 17025 since 2007. Revenue generated from the accredited microbiological, chemical and mycotoxin analysis for clients is able to sustain the accreditation. However this excludes the salary of the staff which is paid by the government as CSIR is a public organization.
- 2.10. Was sustainability achieved? What worked or failed?** Accreditation has been sustained for the past 15 years. Apart from research, the CSIR is very committed to commercialization, hence sustaining accreditation is vital to the operations of the CSIR-Food Research Institute. There was a period of one year where SANAS suspended the accreditation of the Microbiology Laboratory. The institute provided all the resources and commitment to get the accreditation restored. Committed and motivated Quality Manager and thorough internal regular audits have been key to sustaining accreditation. CSIR-FRI has both governmental and donor funded projects. Several of these projects bring in laboratory equipment some of which are used for analytical work for clients in addition to research work, e.g HPLC for mycotoxin analysis. These have also helped to sustain accreditation.
- 2.1. What have been the benefits of achieving accreditation? Can you provide any concrete examples?** Accreditation boosted the confidence of staff and enhanced the image of CSIR-FRI locally and in the sub-region. Thus CSIR-Food Research Institute gained international recognition for its commitment to quality, competence and reliable results. Accreditation has also improved organization and scheduling of work in the microbiology, food chemistry and mycotoxin laboratories. Accreditation increased the clients of the institute and income generated by CSIR-FRI for analytical services substantially. Accreditation gave advantage to CSIR-FRI over other local laboratories providing similar services. However some of these laboratories have also pursued and obtained accreditation to ISO 17025. The project partners from Burkina Faso and Benin in the Danida funded project under which CSIR-Food Research Institute pursued accreditation, have in subsequent projects also obtained accreditation to ISO 17025.
- 2.2. If the lab had not achieved accreditation at the projected milestones, would the journey still have been worth it? Why?** Yes, because pursuing laboratory accreditation to ISO 17025 changed the culture in the laboratories concerned. Laboratory work is better organized and also metrology and regular calibration of equipment, proficiency testing for technical staff, training of staff, consistent use of reference materials in analysis, and other factors became vital to the

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work in the laboratory. Hitherto the focus of the laboratories concerned had only been on research and not much attention was paid to income generation from analytical work carried out for clients and the food industry. All that has changed, and commercialization has become more important to the institute and the Council for Scientific and Industrial Research as a whole.

2.3. Would you advise labs that have been unable to achieve accreditation to continue the pursuit? What actions must they take to ultimately achieve their goal? Yes, I will definitely advise this. However it requires resources and motivation of staff. Also some local services are required, such as an accredited laboratory which can provide calibration of equipment.

Part 3: Consent

Do you consent to allow your responses to be included in a Standards and Trade Development Facility (STDF) evaluation report? Yes

Date: 9th July 2022

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Annex 7: Phone interview _Centre for Laboratory Services and Research (CLSR) of the Ghana Food and Drugs Authority (FDA)

July 25, 2022

What challenges did your institution face as you worked towards achieving accreditation?

1. “The procurement System is also a nightmare. It involves service contracts with several different suppliers which makes it hard to keep up with equipment maintenance and supplies”
 - a. He recommended that equipment be obtained from a minimum number of sources, preferable one or two suppliers. This will reduce the number of service contracts and make maintenance and repair of equipment more efficient.
 - b. Direct contact with suppliers and manufacturers also improves the procurement system.
2. “On-going costs are not cheap. They include:”
 - a. Quality vendors for supplies
 - b. Proficiency testing
 - c. Constant training
 - d. Staff salaries (govt)
 - e. Fee for service charges
 - f. Calibration services or calibration body

“The Food and Drug Authority has the following:”

1. Metrology agency: Ghana Standards Authority that is accredited to calibrate some equipment such as weights, balances, temperature
2. They conducted proficiency Testing over 2-3 years (2011 – 2014)
3. Sustainability: Charge fees for service to cover lab costs and let government pay salaries
4. They have 4 labs: Drugs, Cosmetic, Medical devices and Food and Microbiology
5. They have been accredited since 2014 and have over 60 tests

“The following are considered important:”

1. Good turn-around time for sample analysis. More important than throughput
2. Quality Manual
3. Staffing: 2 or 3 people per test
4. More government recognition
5. Designated Quality Manager
6. Internal audits can be done by different departments e.g. Food chemistry for Food micro and vice versa

Do you consent to having your name and responses included in an STDF evaluation report?

“YES”

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Annex 8: Online interview _Lab superintendent, SolTuna Company, Solomon Islands

September 27, 2022

Questions and Responses

1. Would you mind introducing yourself and your role in the SolTuna company?

“Laboratory Superintendent”

2. Did you attend the inception workshop in 2017?

“No, I joined the company in 2018”

3. Did you know one of the main objectives of the project was to “Strengthen the capacity of the National Public Health Laboratory to provide services in support of market access for Solomon Islands fish exporters” and also to Develop capacity of the National Public Health Laboratory to conduct microbiological testing on water and food products in compliance with international standards

“Yes, we have a good relationship with NPHL”

4. Does SolTuna use the services of NPHL currently? For what type of services? Are the service charges for these services reasonable?

“Yes, we send effluent water samples from the factory for analysis of total bacterial counts, E. Coli and Enterococci. We also send external samples to them for analysis when it is not possible to send these samples overseas. This was particularly frequent when borders were closed during the COVID pandemic. We also send samples to them for comparison of results from our in-house testing.

The service fee charges are reasonable in comparison to the cost for sending samples overseas for analysis”

5. Does SolTuna send samples overseas for analytical testing? Why? For what type of services? Are the costs for overseas testing affordable for your company? What are some of the problems associated with overseas testing? What are the benefits associated with overseas testing?

“Yes. We send external samples to accredited labs in Singapore and Fiji. We send samples for comparison with our in-house results and also to meet export and import permit requirements. The types of analysis we conduct overseas include heavy metal testing in effluent and fish loin, commercial sterility, histamine and nutritional analysis of canned tuna, microbial testing of frozen loins which are total bacterial counts, Salmonella, E. Coli, Salmonella and Listeria.

The costs of overseas testing are high but required. There are significant problems encountered however, from time to time such as cancelled flights that render samples unacceptable for analysis particularly, frozen samples which get thawed and lose their initial quality characteristics.

The benefits of testing overseas in accredited labs makes it easier to export samples to overseas markets as the testing results for fish quality are considered to have met international standards of analysis”.

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6. Is SolTuna aware that NPHL is seeking accreditation?

“Yes”

7. Will SolTuna use the lab if it gets accredited?

“Yes. We are really looking forward to this so that we can save a lot of costs by reducing overseas testing”.

8. Will an accredited lab in Honaria boost your company’s exports?

“Yes”.

9. What other services would SolTuna like the NPHL to provide?

“We would like to conduct interlaboratory comparison testing of samples between NPHL and the Soltuna lab

We would like our technicians to improve their competence by sending them on attachment training at the NPHL”

10. What other economic benefits will come from an accredited lab in Honaria for your company and the country?

“An accredited lab in Honaria will provide cost savings for that will allow the company to continue to be one of the largest employers in the country. SolTuna currently employs 2,000 employees.”

11. Do you consent to having your responses included in an evaluation report as well as a screenshot of our zoom meeting?

“YES”

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Annex 9: Figures

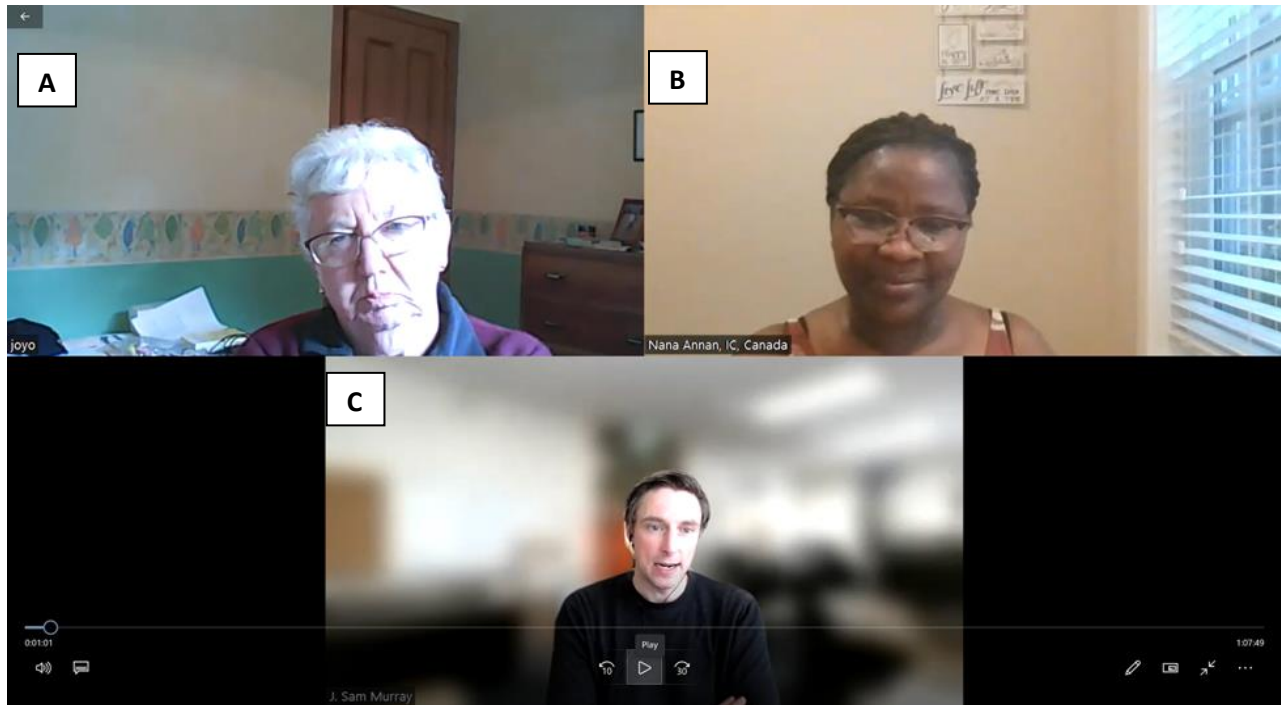


Figure 1 Interview with experts from Cawthron Institute, New Zealand: A) Joy Oakly, B) Nana Annan (Evaluator), C) Dr. Sam Murray). July 25, 2022



Figure 2 Interview with staff of the National Public Health Laboratory (NPHL), Solomon Islands: A) Kim Irofufuli, Senior Medical Technologist, B) Jacelyn Parsad, Laboratory analyst, C) Vincent Suriga, Microbiology Technologist, D) Oliver Lukos, Quality Assurance Manager, E) Dr. Nana Annan, Evaluator. July 27, 2022.

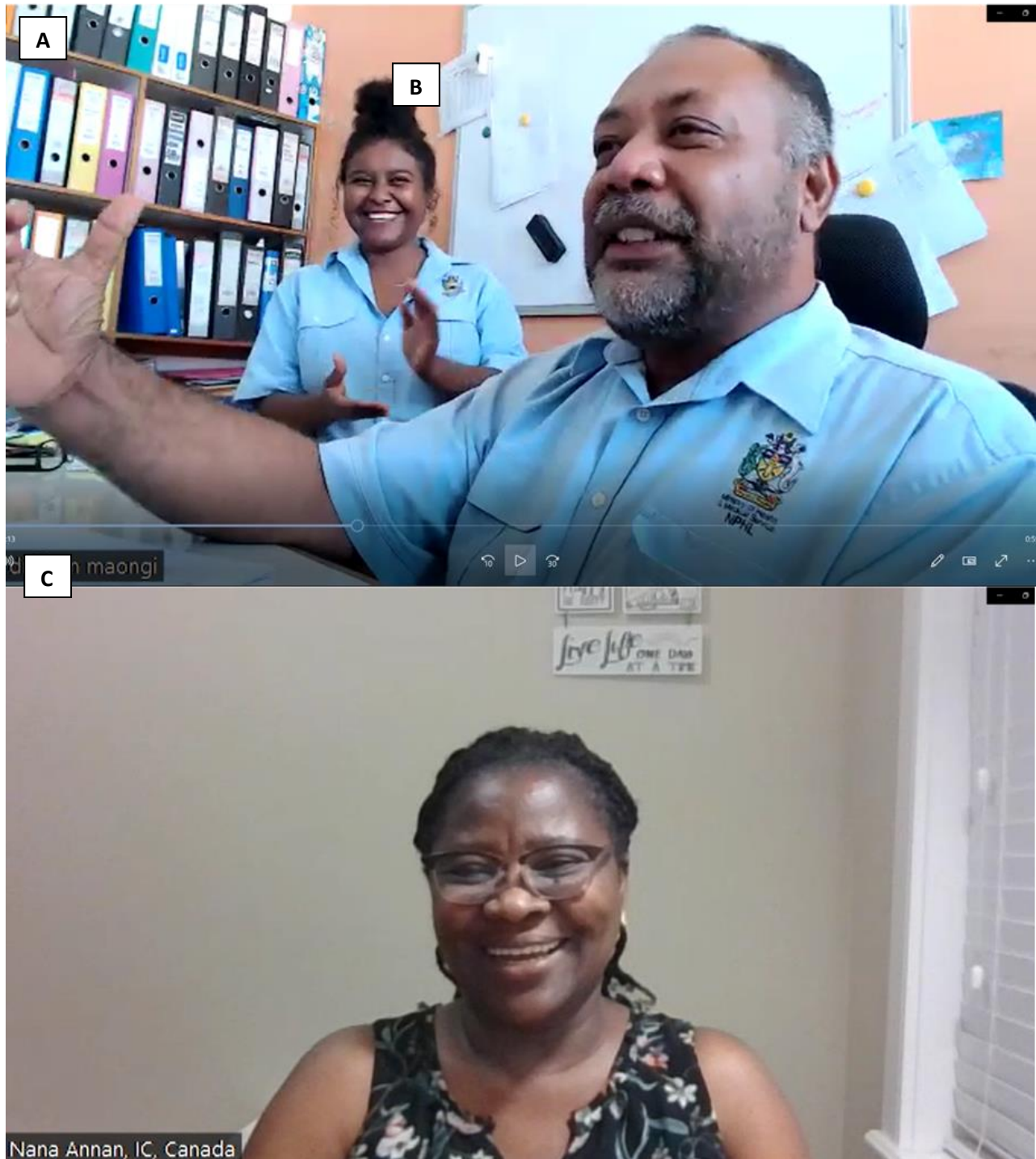


Figure 3 Interview with NPHL staff: A) Dickson Manongi (Director, NPHL), B) Jacelyn Parsad (Laboratory analyst, NPHL) and C) Dr. Nana Annan (Evaluator). July 24, 2022

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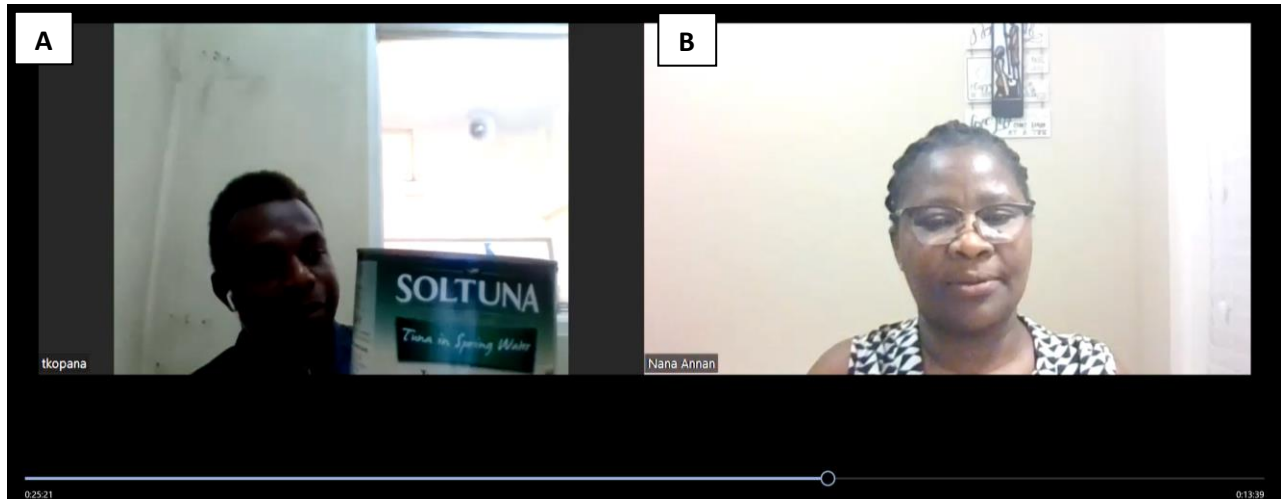


Figure 4 Interview with: A) Smith Maru (Lab Superintendent, SolTuna Company), B) Dr. Nana Annan (Evaluator). September 27, 2022

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Annex 10: Estimated costs for Calibration of equipment, Control cultures, Mock international accreditation assessment fees

Table 1. Calibration costs for essential laboratory equipment²⁵

Item	Cost (NZD \$)	Comments
Autoclave	325	Probes, timer, and basic thermal profile
Balance – 1 d.p	140	–
Balance – 2 d.p	140	
Balance – 3 d.p	160	
Balance – 4 d.p	190	
Balance – 5 d.p	240	
Incubator	265	For digital display and thermal spatial at one temperature
Waterbaths	245	
Oven	365	

²⁵ Murray JS and Oakly J. 2022. Strengthening the scientific capabilities of the National Public Health Laboratory of the Solomon Islands - Project conclusion report. Prepared for the Food and Agricultural Organization of the United Nations. Cawthron Report No. 3823. 42 p



Quotation

Quotation Number: GPOM001005

Prepared for:
Cawthron Institute
Nelson
New Zealand

Prepared By: Chris Silvester

Prepared On: 29/04/2021

Laboratory No: 11023

On behalf of:
National Public Health Laboratory
Ministry of Health and Medical Services
Honiare
Solomon Islands

Debtor No: 41

PROGRAMME	PRODUCT	Schedule d Months	No. sets	Price/unit \$	Total \$
VeriTest Meat Microbiology	Meat FDMal QC Material: 12351 QC-PR8942	-	10	\$ 49.10	\$ 491.00
VeriTest Food Microbiology	Food Micro (FDM) Sample Set	April	2	\$ 269.30	\$ 538.60
WaterCheck Microbiology	Portable (WMP) Sample Set	April	2	\$ 199.90	\$ 399.80
				Sub total	\$ 1,429.40
Dangerous Goods Compliant Packaging (Ultrafreeze)			1	\$ 268.00	\$ 268.00
International Documentation Fee			1	\$ 84.00	\$ 84.00
Domestic Freight (Hani to AKM)			1	\$ 15.00	\$ 15.00
International Freight (Misc)			1	\$1,180.06	\$ 1,180.06
				Sub Total	\$ 1,547.06
				Sub Total	\$ 2,976.46
				GST (NZ)	\$ 446.47
TOTAL				NZD	\$ 3,422.93

Comments:
International freight charges are for shipment to the Solomon Islands
Delivery quoted is for door-to-airport service
(door-to-door is not currently available)

Additional Fees/Charges: This quote does not include costs relating to import permits or duties, quarantine clearance, inspection fees, local taxes, or other variables beyond our control. In the event that any additional costs are incurred, a new quote can be provided prior to invoicing.



Figure 5 Quote from Global Proficiency to provide two rounds of Interlaboratory Comparison Programme samples and ten vials of Quality Control Material²⁶

²⁶ Murray JS and Oakly J. 2022. Strengthening the scientific capabilities of the National Public Health Laboratory of the Solomon Islands - Project conclusion report. Prepared for the Food and Agricultural Organization of the United Nations. Cawthron Report No. 3823. 42 p

**INTERNATIONAL ACCREDITATION NEW ZEALAND
ESTIMATE OF FEES**



CLIENT Solomon Islands
ASSESSMENT TYPE Mock Initial Assessment
ASSESSMENT DATE(S) TBC

Professional Fees and Travel Fees					Excl. GST
Preparation Time	<u>12</u>	hours	at <u>\$247.00</u>	per hour	\$2,964.00
On-site Time	<u>16</u>	hours	at <u>\$247.00</u>	per hour	\$3,952.00
Reporting Time	<u>10</u>	hours	at <u>\$247.00</u>	per hour	\$2,470.00
Clearance of Corrective Actions	<u>0</u>	hours	at <u>\$215.00</u>	per hour	\$0.00
Total Est. Professional Time	<u>38.0</u>	hours			
Travel Time	<u>24.0</u>	hours	at <u>\$123.50</u>	per hour	\$2,964.00
Total Estimated IANZ Time	<u>62.0</u>	hours	Total Estimated IANZ Fees		\$12,350.00

IANZ Expenses					Excl. GST
Airfare					\$1,500.00
Taxi					\$200.00
Meals					\$200.00
Rental car					\$400.00
Rental car insurance					\$20.00
Parking					\$0.00
Miscellaneous					\$0.00
Accommodation					\$1,000.00
Mileage	<u>34.0</u>	km	at \$0.77	per km	\$26.18
			Estimated IANZ Expenses		\$3,346.18

Estimated Total Cost of Assessment \$15,696.18

Prepared by: Anne Hofstra Date: 28 June 2022

Figure 6 Quote from International Accreditation New Zealand for the initial assessment of NPHL for ISO 17025 accreditation²⁷.

²⁷ Murray JS and Oakly J. 2022. Strengthening the scientific capabilities of the National Public Health Laboratory of the Solomon Islands - Project conclusion report. Prepared for the Food and Agricultural Organization of the United Nations. Cawthron Report No. 3823. 42 p

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Annex 11: Documents reviewed

1. Murray JS and Oakly J. 2022. Strengthening the scientific capabilities of the National Public Health Laboratory of the Solomon Islands - Project conclusion report. Prepared for the Food and Agricultural Organization of the United Nations. Cawthron Report No. 3823. 42 p
2. First Project Progress Report, December 13, 2017. Prepared for the Food and Agricultural Organization of the United Nations. Cawthron Report. 12 p
3. Second Project Progress Report, June 15, 2018. Prepared for the Food and Agricultural Organization of the United Nations. Cawthron Report. 22 p
4. Third Project Progress Report, January 22, 2019. Prepared for the Food and Agricultural Organization of the United Nations. Cawthron Report. 23 p
5. Fourth Project Progress Report, August 26, 2019. Prepared for the Food and Agricultural Organization of the United Nations. Cawthron Report. 22 p
6. Project document: “Strengthening the capacity of the National Public Health Laboratory (NHPL) to provide services in support of market access for Solomon Islands fish exporters, May 2017”. 36 p
7. NCE letter: Request for a No Cost Extension from 01 January 2022 to 30 June 2022 under MTF/SOI/003/STF
8. NCE letter: Request for a No Cost Extension from 31 May 2021 to 31 December 2021 under MTF/SOI/003/STF.
9. TCP Facility project code: TCP/SOI/3501 Component 1: “Strengthening National Capacity for Food Control in the Solomon Islands” 5 p
10. TCP Facility Component Results: “Strengthening National Capacity for Food Control in the Solomon Islands” TCP/SOI/3501 Baby 1 8 p
11. Links on the Enhancing Capacity on Agriculture Trade (ECAT) project in the Solomon Islands:

<http://www.mfaet.gov./external-trade/trade-and-development/eif.html>

[http://www.mfaet.gov./media-center/press-releases/external-trade-news/213-eif-funds-d\\$140,000-00-worth-of-lab-equipment-for-nphl.html](http://www.mfaet.gov./media-center/press-releases/external-trade-news/213-eif-funds-d$140,000-00-worth-of-lab-equipment-for-nphl.html)

<https://solomons.gov./new-national-public-health-laboratory-opened/>