CONSULTANT'S REPORT

Scoping Study on a Regional Approach for Water Sector Training in the Pacific

MARCH 2021

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ABBREVIATIONS

AWP	Australian Water Partnership
CSO	civil society organization
DFAT	Department of Foreign Affairs and Trade
IWA	International Water Association
IWRM	Integrated Water Resource Management
NGO	nongovernment organization
NRW	nonrevenue water
O&M	operation and maintenance
PACE SD	USP Centre for the Environment and Sustainable Development
PAC-WaT	Pacific Advisory Centre for Water Training
PNG	Papua New Guinea
PRIF	Pacific Region Infrastructure Facility
PRIF CO	Pacific Region Infrastructure Facility Coordination Office
PWC	Pacific Water Centre
PWWA	Pacific Water and Wastewater Association
RTA	regional training approach
RTF	regional training framework
SPC	Secretariat of the Pacific Community
SWG	sector working group
TAFE	technical and further education
TVET	technical and vocational education and training
ToR	terms of reference
USP	University of the South Pacific
WAF	Water Authority of Fiji
WaSH	water, sanitation, and hygiene
WRM	water resources management
W&S	water and sanitation

EXECUTIVE SUMMARY

Introduction

In July 2020, the Pacific Region Infrastructure Facility (PRIF) initiated a scoping study for the purpose of exploring the need for, and assessing the feasibility of, a regional approach to water sector training in the Pacific. This work included developing models for such an approach in partnership with key stakeholders. For this study, the water sector has been defined to include the following subsectors: Urban Water and Sanitation; Rural Water, Sanitation, and Hygiene (WaSH); and Water Resources Management.

Current Training

At the time of this report, Pacific water sector organizations did not have access to a regular and comprehensive program of courses for training their staff. This contributes to poor operation and maintenance practices and underperformance of staff and organizations. Training mostly takes place on an *ad hoc* basis (i) by international and regional training institutions, (ii) as part of capacity-building components of investment projects or in partnership with other utilities, and (iii) by companies in connection with the supply of materials and equipment. Training often is (relatively) expensive and of limited duration. Limited budget and lack of access to relevant, low-cost training programs in-country are the most cited reasons that training is not taking place. Existing vocational training institutions focus on young students and provide only limited in-service training services. Water sector organizations in most Pacific island countries (PICs) lack the resources to develop and deliver adequate training programs on their own.

Water Sector Training Needs

The priority training needs for the water sector have been identified as the specific water sector related competencies for operators, technicians, community workers, health educators, technical specialists, and (project) managers in the sector.

An estimated 8,500 persons work in the Pacific water sector. The number of persons needed for achieving the Sustainable Development Goals is substantially higher, especially in Melanesia. Based on these staff numbers, it is estimated that approximately 1,000 persons should undergo training on an annual basis and this number is expected to increase in the coming years.

Objective

To overcome the constraints and enhance sector performance, a regional approach to water sector training in the Pacific is required with the purpose of developing and delivering a low-cost, high-quality, in-service training program consisting of courses that meet priority training needs and are accessible and affordable to water sector organizations and the persons working in the water sector.

Proposed Regional Approach

This study recommends that the priority training needs of the water sector will be met by implementing a regional programmatic approach together with stakeholders, aimed at developing and delivering a rolling training program consisting of two levels of in-service training courses as follows:
(i) <u>A set of low-cost, basic vocational training courses</u> of limited (1–2 weeks) duration on specific water sector topics for operational and junior staff (e.g., network and plant

operators, community organizers, etc.), to be delivered in country by national trainers (about 80% of courses).

(ii) <u>A set of advanced vocational training courses</u> of limited (1–2 weeks) duration on specific water sector topics for planners, (young) managers, and specialist staff, to be delivered either in country or at (sub) regional level, supplemented by online training as required (about 20% of courses).

It is proposed that this training is delivered by a taskforce of trainers from national and regional technical and vocational education and training (TVET) institutions[1] and water sector organizations. For the delivery of training, three subregions have been identified: Melanesia, the North Pacific, and the South Pacific. This is based on geographic location, similarities in culture, and water sector standards. By grouping countries in this way, the size of the target group per subregion will be sufficiently large to be able to offer a diversified training program. Water organizations in very small PICs would be able to send their staff to larger neighboring countries to attend courses.

Structure

To realize the programmatic approach outlined above, a regional training framework is needed, consisting of:

(i) a "Pacific Advisory Centre for Water Training" (PAC-WaT) hosted by the University of the South Pacific (USP) or Secretariat of the Pacific Community (SPC) as the catalyst agency driving the development and delivery of training programs and courses;

(ii) national water sector organizations and their staff as the clients and beneficiaries of training; and

(iii) national and regional TVET institutions for the delivery of training.

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[1] Regional TVET institutions include training and educational institutions providing (among other things) vocational training in the Pacific region.

The framework is schematically presented in the figure below.

Regional Water Sector Training Framework for the Pacific
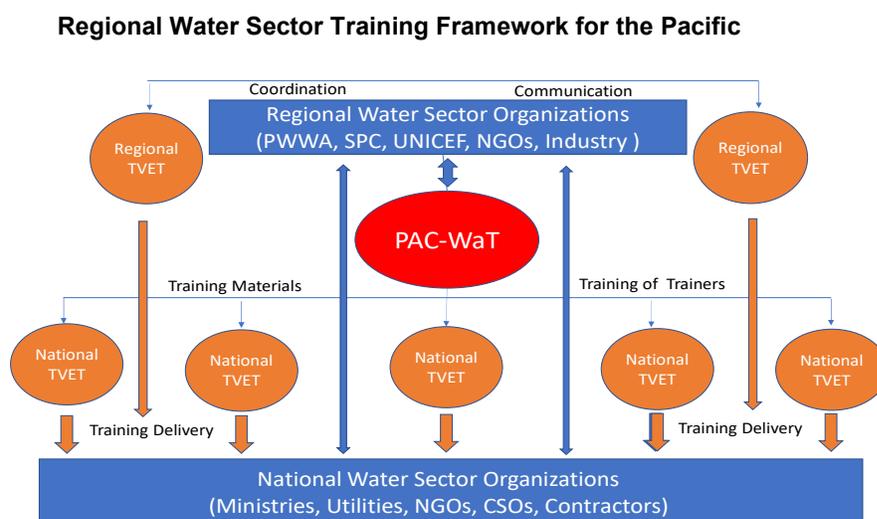
Key Functions of the Pacific Advisory Centre for Water Training

PAC-WaT will be guided by the water sector, provide critical mass, and be the driving force at the center of a regional framework for training, with the following main functions:

(i)   work with and support national and regional TVET institutions in the Pacific in developing and, over time, delivering a comprehensive set of training courses to address the priority training needs of the water sector and promote professional standards of work throughout the Pacific;

(ii)   work with national and regional water sector organizations in identifying and regularly updating training needs of the water sector;

(iii)   develop and maintain a set of training courses and resources to deliver the program, making as much as possible use of existing materials;

(iv)   make the training courses and materials available to national and regional TVET institutions and assist these institutions in integrating these courses in their regular curricula;

(v)   identify and train trainers in PICs (trainers working in TVET institutions and/or suitable staff of water sector organizations) in conducting effective training programs for the water sector;

(vi)   stimulate and support national and regional TVET institutions in working with water sector organizations in PICs (and vice versa) for planning and delivering relevant in-service training programs;

(vii)   ensure the quality of training programs by producing high quality course materials, by training of trainers and by developing an appropriate system of quality assurance through water industry recognition of training courses; and

(viii) coordinate and communicate the delivery of an annual training program for the Pacific water sector, consisting of basic in-country training courses and more advanced training programs at national (80%) and subregional (20%) levels.

During the initial 5 years of PAC-WaT (the development phase), a considerable investment is needed for the development of training courses, the training of trainers and in operationalizing the regional training framework. This will require significant funding and it is therefore recommended to start PAC-WaT as a project or program, hosted by USP or SPC and funded by development partners.

After 5 years, the focus of PAC-WaT will shift to maintaining the set of training courses and coordinating the delivery of the training program. This is called the "Consolidation Phase", during which these functions need to be absorbed by one or more of the regional water sector organizations.

Proposed Governance Arrangements

This scoping study recommends stakeholders to work together and adopt a programmatic approach to water sector training in the Pacific, with the common vision of delivering a structured and regular training program that is accessible to, and meets the priority training needs of, organizations and persons operating in the sector. The following governance arrangements are proposed:

(i)   Water Sector Organizations (e.g., Pacific Water and Wastewater Association, SPC, the UNICEF, nongovernment organizations, and the private sector) need to be represented in the steering committee of PAC-WaT to ensure that training programs and courses effectively meet the current and future training needs of the sector.
(ii) A representative of the host organization (USP or SPC) is proposed to chair the steering committee.
(iii) PAC-WaT will work closely with regional and national TVET institutions, and it will be useful if a regional training institution is represented in the steering committee.
(iv) National water sector organizations and TVET institutions need to be actively involved in the identification of training needs, the development of training courses, and in the planning and delivery of training.

Estimated Costs and Financing

The investment costs for developing a set of training courses and establishing and operationalizing a regional framework for training headed by PAC-WaT are estimated at approximately $5 million. These costs will be spread over 5 years, the so-called "development phase".

In the years thereafter, during the Consolidation Phase, the focus will be on: (i) maintaining and regularly updating the set of training materials, (ii) coordinating the delivery of an annual training program, and (iii) providing a center of excellence and clearing house for water sector training in the Pacific. The cost of carrying out these functions is estimated at about $350,000 per year.

The cost of delivering a regional training program for about 1,000 persons per year, comprising an estimated 59 national and 13 subregional courses, is estimated at approximately $900,000 per year. It is estimated that 40% of this cost can be recovered from tuition fees paid for by utilities, government, and private sector organizations. Tuition fees for remaining courses (mainly for rural WaSH and Water Resources Management) will need to be financially supported by development projects and/or governments.

Alternative Scenarios

If there is insufficient support for an integrated regional approach as outlined above, it is also possible to implement a programmatic approach with the same overarching vision but consisting of a number of smaller projects for subsectors, e.g., as follows:

- A regional training program in Urban Water and Sanitation for staff of water utilities, led by the Pacific Water and Wastewater Association.
- A regional training program for Water Resources Management led by SPC.

- A subprogram for Rural WaSH training in Melanesia, with support of various ongoing rural WaSH programs in Papua New Guinea, Solomon Islands, and Vanuatu.
- A subprogram for Rural WaSH training for outer islands in small PICs, led by UNICEF or SPC.

The above subsector programs could be supported by different development partners. This subsector approach would also benefit from, and require, some form of regional coordination and support.

1   INTRODUCTION

1.1 Background and Process

In July 2020, the Water and Sanitation (W&S) Sector Working Group of the Pacific Region Infrastructure Facility (PRIF), initiated a scoping study with the purpose of exploring the need for, and assessing the feasibility of, a regional approach to water sector training in the Pacific. This included developing models for such an approach in partnership with key stakeholders. By the end of July, an Inception Report for the study was prepared and presented to the working group, outlining the approach and methodology. The study consisted of three phases:

(i) Phase 1 involved an assessment of the need and scope for a regional approach to water sector training in the Pacific (August–September 2020).
(ii) Phase 2 identified and evaluated options for developing and structuring a regional training approach and framework (October–November 2020).
(iii) Phase 3 has focused on developing specific proposals for implementing a regional training approach, including structure, operations, financing, governance, and a roadmap (December 2020–March 2021).

Throughout the scoping study, the consultants met with, and reported to, key stakeholders in the Pacific water sector and with PRIF partners. The process of consultation during the scoping study is presented in Figure 1.1.

Figure 1.1: Scoping Study Process
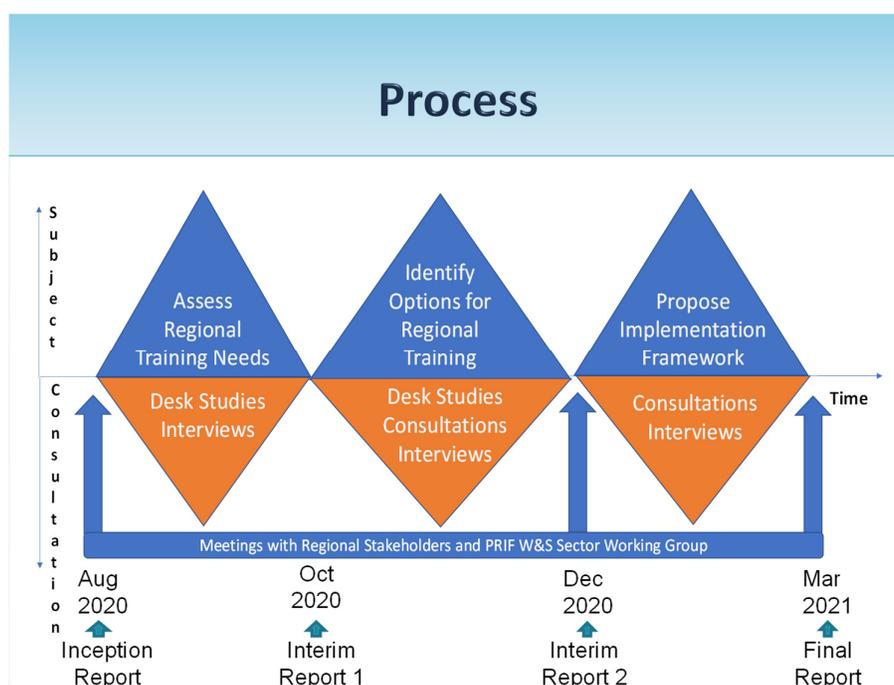
Source: Prepared by consultant

Meetings with the W&S Sector Working Group were held in August and November 2020. A meeting with regional stakeholders—the University of the South Pacific (USP), the Secretariat of the Pacific Community (SPC), the Pacific Water and Wastewater Association (PWWA), the United Nations Children's Fund (UNICEF), and the International Water Centre—took place in

early December 2020. Final meetings, one with the W&S Sector Working Group and one with regional stakeholders, took place in March 2021.

During the study, consultations took place with representatives of regional and national water sector organizations, nongovernment organizations (NGOs), water industry organizations, and organizations involved in water sector training in Australia and New Zealand. Due to the COVID-19 pandemic, all meetings took place on a remote basis. Not all persons responded to requests for meetings, and therefore it was not possible to contact all stakeholders. Overall, working on a remote basis worked reasonably well, especially in contacts with representatives from regional organizations and development partners. Contact with water sector organizations from Pacific island countries (PICs) was more difficult due to a lack of response to requests for remote meetings and questionnaires. Planned missions to a selection of PICs could not take place due to travel restrictions.

1.2   Why a Different Approach to Water Sector Training is Needed

At the time of this report, Pacific water sector organizations did not have access to a regular and comprehensive program of courses for training of their staff. This is a contributing factor to poor operation and maintenance practices and underperformance of staff and water sector organizations.

For this reason, capacity development and training are often part of capital investment projects, which are mostly funded by development partners, and considerable sums of money are spent. But this training is focused on the organizations involved in the project and, once the project ends, training ceases to be delivered. Training organized by regional training institutions often requires participants to travel to distant locations, which is costly and not sustainable without donor funding.

Some of the larger water sector organizations and utilities in the larger countries of the region can arrange training for their staff in a systematic manner. But government agencies, utilities, NGOs, and civil society organizations (CSOs) in smaller PICs often do not have the organizational or financial resources for this. Lack of budget and lack of relevant, low-cost, in-country training programs are the most cited reasons that training is not taking place. Also, organizations and countries are, in most cases, too small to develop effective training programs on their own.

A review of existing technical vocational education and training (TVET) programs offered by local and regional education and training institutes in the Pacific region reveals there are few relevant training programs that focus on the needs of the water sector. Trade programs in plumbing and electrical technology are often the only courses available. Moreover, regional and national TVET institutions mostly focus on providing preservice training to young students who have not yet entered the workforce.

Given the challenges of achieving the Sustainable Development Goals for water and sanitation and the related demand for professional staff, a systematic and structured approach to training is needed. Such an approach will enable skilled trainers to deliver a diverse suite of in-service and low-cost training courses and create a stimulating learning environment that leads to effective outcomes.

1.3   Outline of the Report

This report is based on a review of relevant studies and documentation, and discussions with key stakeholders in the Pacific water sector and the education and training sector. A list of documents is presented under "References" and a list of persons consulted during the study is attached as Appendix 1. The report is divided into the following chapters:

Chapter 1	Describes the purpose and background of this scoping study and the process of consultation with stakeholders.
Chapter 2	Provides a summary of the needs and scope for regional water sector training.
Chapter 3	Presents an outline of the regional training framework, the proposed governance structure, operational modalities, quality management measures, coordination and communication, and an estimate of the costs and proposals for financing.
Chapter 4	Outlines the next steps to be taken in implementing the regional training framework.
Chapter 5	Presents conclusions and recommendations.

2 SCOPE OF A REGIONAL TRAINING PROGRAM

2.1 Introduction

As part of this scoping study, and based on a review of documents and interviews with stakeholders, the key training needs of the water sector—Urban W&S; Rural Water, Sanitation, and Hygiene (WaSH); and Water Resources Management—have been identified. These are described in Interim Report 1[2]. For ease of reference, a summary of training needs is presented in Appendix 2.

Based on the training needs, and after consulting a range of persons currently working in the sector, the scope of a regional water sector training program has been defined, consisting of a series of training courses, which will be delivered on a regular and systematic basis in accordance with the needs of water sector organizations.

The proposed training program is divided into two types of courses aimed at providing in-service training for staff working in water sector organizations:

(i) a set of basic, low-cost, in-country, vocational training courses of limited duration for junior and operational staff (e.g., network and plant operators, electrical-mechanical staff, community organizers, customer services staff, etc.), to be delivered by national trainers (TVET trainers with relevant water sector knowledge or water sector staff with experience in training); and

(ii) a set of advanced vocational training courses of limited duration (1–2 weeks) for senior and specialist staff, to be delivered either in country or at (sub) regional level by experienced trainers with a relevant background in the water sector. These programs may be supplemented by online training programs delivered on a remote basis.

Training courses will be designed to strengthen the competencies required for specific functions in water sector organizations. Courses will consist of a range of modules, so training can be adapted to meet real training needs. In this way, training can become part of career development patterns within water sector organizations. The courses will be of high quality, developed by water sector specialists and will be used to introduce and/or encourage professional practices and behavior.

The next section of this chapter lists the various courses that have been identified for each of the subsectors. Chapter 3 provides additional information about the structure, operational modalities, and financing plan.

2.2 Scope of the Regional Water Sector Training Program

This section provides a list of basic and advanced training courses to be included and delivered as part of a regional water sector training program for each of the three subsectors: Urban W&S, Rural WaSH, and Water Resources Management. Examples of descriptions for a few basic training courses are presented in Appendix 3.

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[2] Training needs have been identified based on reports from recent studies carried out by the PWWA, UNICEF, and SPC and via interviews with chief executive officers of water utilities, NGOs, and water sector experts in the Pacific region.

2.2.1 Urban Water and Sanitation Training Courses

Important for Urban W&S training programs is buy-in and ownership by water utilities. Training needs are huge and, overall, the staff of water utilities are ageing and there is a shortage of skilled and trained staff to replace them. Priority needs are:

(i) Basic vocational training courses for water utility staff, to be conducted in-country by national trainers from TVET institutions or experienced water utility staff, in
    (a) water network operation and maintenance,
    (b) (waste) water treatment plant operation and maintenance,
    (c) mechanical–electrical operation and maintenance, and
    (d) customer relations.

(ii) Specialist and/or advanced vocational training courses, to be conducted in-country or at subregional level by specialist trainers with extensive background in urban W&S, including
    (a) network management and hydraulics,
    (b) management of (waste) water treatment plants
    (c) advanced mechanical–electrical training,
    (d) management of customer relations,
    (e) supervisory control and data acquisition) systems,
    (f) geographical information systems,
    (g) hydraulic modelling
    (h) nonrevenue water reduction planning and implementation,
    (i) WaSH for informal settlements, and
    (j) climate change impact and resilience and disaster management.

(iii) Advanced training courses on management and leadership, to be conducted in-country or at subregional level by trainers with extensive experience in urban W&S, including
    (a) leadership training for supervisors (network, WTP, WWTP, Mechanical and Electrical, Customer Relations)
    (b) project management training
    (c) commercial management of water utilities, and
    (d) young water professionals training.

(iv) Training is also needed for more general topics such as finance, human resource management, marketing, accounting, management, procurement, etc. Courses and materials on these topics are available from existing training and educational institutions and do not need to be specifically developed by the water sector.

2.2.2 Rural Water, Sanitation, and Hygiene Training Courses

(i) Basic vocational training courses for staff of water sector and community organizations (government departments, NGOs, CSOs, the private sector) to be conducted by TVET trainers or experienced rural WaSH experts. In all Rural WaSH training programs, gender issues and social inclusion will be an integrated part of the training in
    (a) community mobilization and organization,
    (b) hygiene education and behavioral change,
    (c) technical options for Rural WaSH (design and implementation),
    (d) Rural WaSH systems (operation and maintenance), and
    (e) project management for rural WaSH.

(ii) Advanced vocational training for staff of water sector organizations (government departments, NGOs, CSOs, the private sector) to be conducted by trainers with extensive rural WaSH experience at national or subregional level, including

(a) project or program design and monitoring for Rural WaSH,
(b) Rural WaSH strategies and policies, and
(c) climate change resilience and disaster management.

2.2.3 Water Resource Management Training Courses

(i) Basic vocational training courses for staff of water sector organizations to be conducted by TVET trainers with knowledge of water resources management (WRM) or national WRM experts with experience in training. Climate change resilience will be an integrated part of the training in
(a) water resources management, and
(b) water security and safety.

(ii) Advanced vocational training for staff of water sector organizations (government departments, research institutions, sector organizations) to be delivered at national or subregional level by experienced trainers with an extensive background in WRM. Classroom training may be blended with online training in
(a) water resources assessment and monitoring,
(b) water resource development, and
(c) climate change resilience and disaster management.

2.2.4 Water Sector Governance, Policies, and Regulation

(i) Advanced training courses for policymakers, politicians, senior staff of relevant ministries, and members of supervisory boards and managers of water sector organizations, to be delivered in-country or at (sub) regional level by senior trainers with extensive water sector experience. This training may involve a combination of classroom and online training in
(a) water sector governance and policies,
(b) water sector regulation, and
(c) training board members of water utilities and similar organizations.

2.2.5 Cross-Cutting Issues

In all water-related training programs, hygiene, public health, climate change resilience, gender issues, and social inclusion must be integrated as cross-cutting issues that affect almost all aspects of water and wastewater management and service delivery.

2.3   Training Approaches and Methodology

2.3.1 Basic Vocational Training Courses (In-Country)

Basic vocational training courses are aimed at operational and field staff, including network and plant operators, technical staff involved in operation and maintenance, field workers, etc. The target groups often have relatively low levels of education and limited experience working with computer technologies.

Basic training will mostly consist of vocational training courses with the purpose of providing trainees with the competencies required for a particular job function or trade. Training that focuses on applied knowledge and skills requires a flexible approach using blended training to maximize effectiveness for learners. Blended training combines methods such as face-to-face classroom learning, practical workshop demonstrations, on-the-job learning experiences, field work and practical activities, project-based learning, group activities, and online learning such as viewing YouTube demonstrations and researching information. Learning can be

based in classrooms of national or regional TVET institutions, or training venues available at water sector organizations. The practical components of the training may take place in a simulated work environment or workplace such as treatment plants, pump stations, storage reservoirs, or community settings.

Generic training needs identified in this water sector scoping study included skills such as problem-solving, initiative, communication, and critical thinking. These skills are most effectively developed through application and integration with basic technical skills training and training methods such as group learning, participatory student-centered learning, and sharing of information.

2.3.2 Advanced Vocational Training Courses

Advanced vocational training courses combine theory (knowledge) and practical work (applied skills). The target groups for this higher-level training will often consist of senior staff with considerable working experience, higher educational background, and skills in computer technologies, including access to the internet. Advanced training courses may take place in the classrooms of national and regional TVET institutions or in facilities of local water sector organizations, or other easily accessible local venues. Participant time away from the workplace for training has advantages such as fewer distractions for these senior personnel, and disadvantages such as lost productivity and urgent matters left unattended. However, both in-house and external options should be considered in selecting venues for advanced training courses. Advanced courses may also be (partly) conducted as online training programs.

Participants of advanced training are most likely responsive to the principles of effective adult learning[3]. These personnel come to the training with a wealth of experience as well as skills and knowledge that can be shared. Thus, it is important for the training methods to use interactive and participatory flexible and blended methods. Methods will include brainstorming, pairing and sharing, large group discussions and activities, and case studies that reflect real-life scenarios in different PICs. Also, advanced training courses may include different modes of online training. Online training includes use of the internet to engage in interactive learning activities, and access information through social media, YouTube videos, reports, and various other visual and written means.

Learning often extends beyond the conduct of a training course, whereby a third party such as a coach or mentor in the workplace may be able to support the learning at a more practical level. For example, developing skills for writing plans, policies, and reports requires practice, review, and support over an extended period of time.

Advanced training courses can also be a platform for developing online networks such as the establishment of communities of practice, working groups, and committees, all of which have a life beyond the end of the training course.

2.3.3 Linkages with Existing Water Sector Training

Developing a set of basic and advanced vocational water sector training courses would also be of benefit to existing training in the Pacific region. At the time of this report, training was taking place in a variety of ways[4], including courses provided by international and regional training institutions, training organized as capacity building for investment projects, training

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[3] Key principles of adult learning: learning preference is by doing, training must be relevant, learners are self-motivated, learners need to draw on experiences, training methods should use multisensory applications, learners need to have control and decision-making in their learning.

[4] For a more detailed description of current training, please refer to Chapter 3 of Interim Report 2 of this scoping study.

conducted in water operator partnerships, and training organized by suppliers of materials and equipment.

If these training providers could have access to a set of high-quality training courses specifically designed to meet the needs of the Pacific water sector and if, in addition, there were qualified trainers available to conduct such courses, it would reduce the costs and enhance the scope of such training efforts.

3 OUTLINE OF A REGIONAL WATER SECTOR TRAINING FRAMEWORK

3.1 Overall Structure

This scoping study recommends adopting a programmatic, interagency approach to regional water sector training, which is agreed upon by all stakeholders and has a common vision of enhancing sector performance. It should do so by developing and delivering a structured and regular training program that is accessible and affordable, and meets the priority training needs of organizations and persons working in the sector. To achieve this purpose, a regional training framework is needed, consisting of:

(i) A "Pacific Advisory Centre for Water Training" (PAC-WaT) at the center of the regional training framework, functioning as a catalyst and taking the lead in the development and delivery of training.

(ii) National and regional water sector organizations as the clients for the training: at the national level consisting of water utilities, ministries (responsible for WaSH or WRM), specialized agencies, NGOs, CSOs, and private sector organizations. At the regional level, this involves organizations such as the PWWA, UNICEF, and SPC.

(iii) National and regional TVET institutions[5] involved in delivering the training. This will involve selected TVET institutions in the larger PICs. Smaller PICs, without a well-established TVET institution, could be clustered with larger PICs.

Schematically, the Regional Water Sector Training Framework is presented in Figure 3.1.

Figure 3.1: Regional Water Sector Training Framework for the Pacific
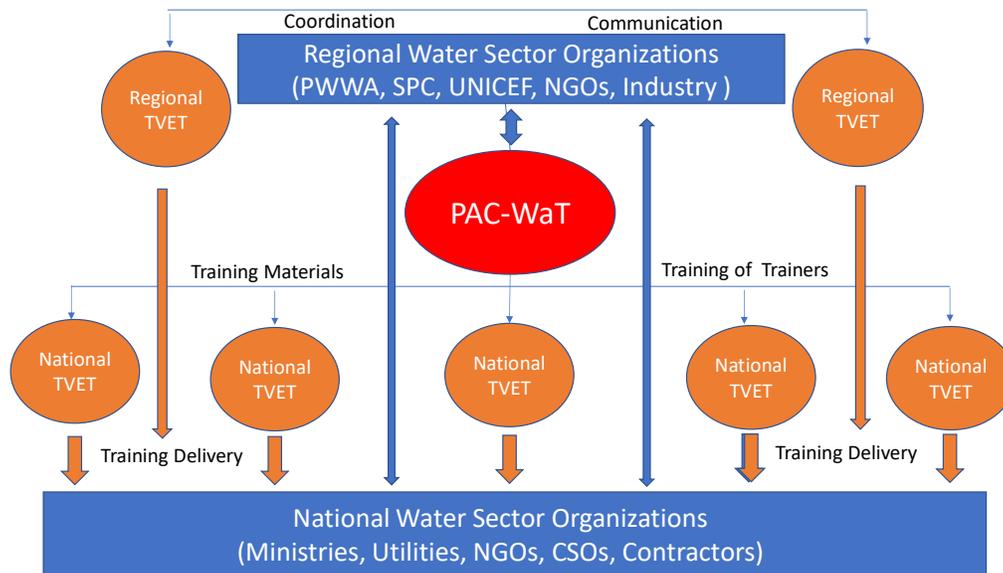
CSO = civil society organization, NGO = nongovernment organization, PWWA = Pacific Water and Wastewater Association, SPC = Pacific Community, TVET = technical and vocational education and training
Source: Prepared by the Consultant

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[5] Regional TVET institutions would include USP, the Australian Pacific Training Coalition, the International Water Centre, TAFE Queensland, The National Institute of Water and Atmospheric Research (NIWA) New Zealand, etc.

Manufacturers and suppliers in the water industry will also continue providing vocational type training, mostly in connection with the supply of new materials and equipment. Often, this training consists of vital training in the operation and maintenance of pumps, treatment plants, pipes, valves, etc. and takes place in-country as part of the delivery process.

3.1.1 The Pacific Advisory Centre for Water Training

PAC-WaT will have a key role in the development and delivery of a regional training program for the water sector. It will be guided by, and work closely with, water sector organizations and TVET institutions throughout the Pacific. Its main functions and governance arrangements are outlined in this section.

3.1.1.1 Key Functions

PAC-WaT will provide critical mass at the center of the regional framework, and implement the following main functions:

(i)   work with and support national and regional TVET institutions in developing and, over time, delivering a comprehensive, high-quality water sector training program throughout the Pacific;
(ii)   work with national and regional water sector organizations in identifying and regularly updating training needs;
(iii)   develop and maintain a set of training courses and the necessary resources (training manuals, booklets, handouts, etc.) to deliver the program, making as much as possible use of existing materials;
(iv)   make water sector training courses and materials available to national and regional TVET institutions and stimulate and assist these institutions in embedding these courses in their regular programs and curricula;
(v)   identify and train trainers in PICs (trainers working in TVET institutions and/or suitable staff of water sector organizations) in conducting effective training programs;
(vi)   stimulate and support national and regional TVET institutions in working with water sector organizations in PICs for planning and delivering relevant in-country and regional in-service training programs;
(vii) ensure adequate outcomes of training programs by producing high-quality training materials, by training of trainers, and by developing an appropriate system of (industry) accreditation; and
(viii) coordinate and communicate an annual training program for the Pacific water sector, consisting of basic in-country training courses and more advanced training programs delivered at national or subregional level.

It is proposed that during the first 5 years of its existence, PAC-WaT will focus on the analysis of training needs, the development of training courses, the training of trainers, and on coordinating the delivery of a regular training program. This is called the **development phase**.

In the years thereafter, PAC-WaT will focus on (i) maintaining and regularly updating the set of training courses, (ii) continuing to coordinate the delivery of the annual training program, and (iii) acting as a center of excellence for regional water sector training in the Pacific. This is the so-called **consolidation phase**.

3.1.1.2 Institutional Arrangements

During the first 5 years of establishing a regional training framework (the development phase), considerable investment is required in the inventory of training needs, the development of training courses, the training of trainers, etc. For this to happen, sufficient funding is required and it is therefore recommended to start PAC-WaT as a multiyear regional training project, financed by one or more development partners.

Once the regional training framework has been established, one of the key tasks of the project will be to consult with stakeholders and develop and propose the institutional arrangements for a long-term, programmatic approach to regional training. For this to happen, the key functions of PAC-WaT need to be taken over by one or more of the regional water sector organizations.

During the development phase, it is proposed that PAC-WaT is hosted by one or more regional organizations. A distinction is made between two alternative scenarios: (i) an integrated regional approach for all subsectors; and (ii) a regional approach for different subsectors. These are discussed in detail below.

Integrated Regional Approach

In this scenario, the regional training framework will include all three water subsectors defined in this study, and it is recommended that PAC-WaT be hosted by either USP or SPC.

In earlier reports, USP has been identified as the preferred institution, because: (i) it is the leading regional educational institution in the Pacific; (ii) it had indicated previous interest in establishing a Pacific Water Centre through an memorandum of understanding with the International Water Centre; (iii) it has a vocational arm of training through Pacific TAFE (technical and further education institutions); and (iv) it is a well-established and highly regarded agency of the Council of Regional Organizations of the Pacific, with a regional network and considerable resources. However, at the time of writing this report, it was not possible for the consultants to obtain a clear commitment from the USP administration on hosting PAC-WaT, nor how and where the center would be embedded in the institution.

If USP is not an option, it is recommended that PAC-WaT be hosted by SPC, as SPC is (i) well established in the Pacific water sector, (ii) has lengthy experience with water sector training for Rural WaSH and Water Resources Management, and (iii) is also a highly reputable agency of the Council of Regional Organizations of the Pacific, with a regional network and considerable resources.

The integrated approach is the preferred scenario, as it would be a more efficient use of scarce resources and offers the opportunity to combine activities such as training needs analysis, training of trainers, and coordinating and communicating a common training program for the sector. For this reason, the integrated approach has been expanded in more detail in the remainder of this report.

Subsectoral Approach

If there is insufficient funding for an integrated approach, an alternative scenario is to organize regional training per subsector, for example:

(i) **Regional training for urban water and sanitation.** The Urban W&S subsector is well organized, with utilities at the national level and the PWWA at the regional level. Utility staff have similar training needs, and the subsector has a revenue stream from which it can contribute to the costs of training. This approach could eventually create a sustainable framework for Urban W&S training.

(ii) **Regional training for water resources management.** The Water Resources Management subsector is relatively small, and training could be led by SPC, which has been implementing training programs for this subsector for many years.

(iii) **Rural water, sanitation, and hygiene training in Melanesia**. The greatest number of persons to be trained are in Rural WaSH in Papua New Guinea (PNG), Solomon Islands, and Vanuatu. In these countries, service delivery for Rural WaSH is extremely low and there exists a huge need for capacity development and training. The issues and

constraints in rural areas in these countries are similar. Various development partners (e.g., the European Union, UNICEF, and the World Bank) have substantial investment projects for Rural WaSH with considerable capacity development components. The development of training programs for Rural WaSH could be supported by these projects and (for example) be coordinated by UNICEF.

(iv) **Rural water, sanitation, and hygiene training in small PICs.** A subprogram could be implemented for Rural WaSH training in small PICs, with a focus on training for WaSH service delivery in the outer islands. The issues for Rural WaSH in the outer islands are quite specific and the number of persons to be trained is relatively small.   This subprogram could be coordinated by SPC or UNICEF, both of which have a long history of training for the outer islands, in close coordination with the PWWA.

In the subsectoral approach, there are also benefits from regional coordination and support for activities such as training needs analysis, supporting TVET institutions, training of trainers, and the coordination and communication on the delivery of training. The form of such coordination will depend on the structure and operations in each of the subsectors.

3.1.1.3 Governance Arrangements

This study recommends stakeholders to adopt a programmatic approach to water sector training in the Pacific, which is agreed upon by all stakeholders and has a common vision of delivering a structured and regular training program that is accessible to, and meets the priority training needs of, organizations and persons working in the sector.

For PAC-WaT effectively to achieve its objectives and carry out its functions, it needs the guidance of water sector organizations in the Pacific. These organizations need to be actively involved in the identification of training needs and in the planning and implementation of PAC-WaT activities to fully benefit from its services. Also, PAC-WaT will work closely with regional and national TVET institutions in the region. This needs to be reflected in the proposed governance structure of PAC-WaT.

To ensure adequate representation of key stakeholders, it is recommended to set up a steering committee for PAC-WaT, to be composed of representatives of various organizations as follows:

  (i)   one member representing the host organization (Chair);
  (ii) one member appointed by the PWWA;
  (iii) one member appointed by SPC;
  (iv) one development partner representative[6]; and
  (v) one water sector training expert appointed by, e.g., UNICEF or NGOs.

The steering committee of PAC-WaT would have the following main tasks:
  (i)   approve project strategies and annual work plans and budgets to ensure that outputs and work are focused on meeting water sector training needs;
  (ii) provide guidance and support in coordinating PAC-WaT's work with regional and national water sector and TVET institutions;
  (iii) ensure the quality of the training programs and courses by developing and approving a system of accreditation and or certification of training programs and courses; and
  (iv) monitor progress against approved workplans and ensure the effective and efficient use of resources.

In addition to a steering committee, it is recommended that PAC-WaT establishes subsector advisory committees to oversee and support the planning, preparation, and delivery of training

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[6] Assuming that PAC-WaT will receive funding from one or more development partners.

programs. It is suggested to establish such committees for each subsector, with various lead organizations:
- (i) Urban W&S, led by the PWWA;
- (ii) Rural WaSH, led by UNICEF or SPC; and
- (iii) Water Resources Management led by SPC.

The water subsector advisory committees would guide and be involved in PAC-WaT's work on:
- (i) the identification of training needs for each subsector;
- (ii) development of relevant training courses;
- (iii) the review of training courses and materials; and
- (iv) the planning and communication of the delivery of training programs.

3.1.1.4 Staffing

To carry out the functions of PAC-WaT during the first 5 years (the development phase) as outlined above, PAC-WaT will need many professional staff. For each position, the key tasks are listed below.

- (i) team leader and/or senior training expert (international recruitment)
  - (a) overall program management;
  - (b) work with stakeholders in introducing and further developing and implementing the concept of regional water sector training;
  - (c) provide support to water sector organizations in assessing training needs and in planning annual training for their staff;
  - (d) provide support to TVET institutions in planning and conducting in-service training for water sector staff;
  - (e) implement demonstration or pilot courses and training of trainers' courses; and
  - (f) oversee the broader communication with stakeholders and beneficiaries of water sector training programs in the region.

- (ii) senior training resources development expert (international recruitment)
  - (a) oversee the process of training needs analysis and curriculum development;
  - (b) manage the development and/or customizing of training courses by short-term experts;
  - (c) monitor the quality of the training modules by rigorous editing and testing of training materials; and
  - (d) review and customize existing training of trainers' courses.

- (iii) regional training expert (regional recruitment)
  - (a) assist in training needs analysis;
  - (b) assist in providing technical support to TVET institutions;
  - (c) assist in conducting demonstration and training of trainers' courses;
  - (d) assist in the development of training materials; and
  - (e) monitor water-sector-related training in the region.

- (iv) training material development experts, to be hired on short-term contracts (international recruitment)
  - (a) review relevant existing training materials for water sector training;
  - (b) customize and further develop training modules;
  - (c) assist in testing of training modules, and
  - (d) assist in training of trainers.

- (v) project management assistant (national recruitment)
  - (a) collect data on training needs from Pacific water sector organizations;

  (b) coordinate with national and regional educational institutions about relevant water sector training programs;

  (c) develop and maintain a website where stakeholders can access PAC-WaT's training materials and a rolling training program for the water sector; and

  (d) develop an effective communication strategy for communicating with stakeholders.

 (vi) project administrative assistant (national recruitment)

  (a) provide administrative assistance to staff;

  (b) monitor PAC-WaT's budget and financial expenditures; and

  (c) assist in organizing the delivery of training programs as necessary.

3.1.2 Water Sector Organizations

Water sector organizations and their staff in PICs will be the clients and beneficiaries of a regional water sector training program. They include staff of ministries, provincial and local governments, water utilities, NGOs, CSOs, specialized agencies (e.g., for WRM or research) and staff of private sector organizations such as contractors, consultancy firms, and private companies providing W&S for their staff.

In most PICs, water utilities are charged with W&S service delivery in urban areas or on the main island(s), and their service areas are clearly defined. Water utilities have their own revenue stream and employees on long-term and fixed-term contracts. Human resources departments are in charge of assessing training needs and organizing training, but their budgets, especially for small utilities, are often very limited.

For WaSH in rural areas, a range of organizations are involved, including ministries, provincial and local governments, NGOs, and CSOs. Rural WaSH organizations in most cases do not have revenues and depend on government budgets and subsidies, which often are very limited and do not allow for staff training and development.

Ministries or government departments are in most cases responsible for WRM, sometimes supported by specialized agencies or research institutions. Also, government budgets are limited, without much funding for training and development.

Generally speaking, the water sector in the Pacific region is quite fragmented and a common strategy for training or development of staff in most cases does not exist. The key functions of national water sector organizations within a regional training framework would be to:

 (i) regularly assess the training needs of staff, communicate training requirements, and prepare annual training plans and budgets;

 (ii) participate in national working groups for water sector training to communicate training needs to PAC-WaT and regional and national training providers and assist in planning, organizing, and delivering training, and in the identification of suitable national trainers; and

 (iii) participate (on a selective basis) in PAC-WaT subsector advisory committees to assist in training needs analysis and the development of training courses and materials.

3.1.3 National and Regional Training Institutions

An assessment and listing of national and regional TVET institutions in the Pacific are included in Interim Report 2 of this scoping study, while a summary of key national TVET institutions is presented in Appendix 7 of this report.

National TVET institutions and their trainers are expected to play an important role in the planning and delivery of in-service training programs for the water sector. In line with the

assessment of TVET institutions as presented in Interim Report 1 of this study, national TVET institutions in most larger PICs are able to provide suitable in-service training courses to staff of water sector organizations. This includes TVET institutions in the Federated States of Micronesia, Fiji, Guam, Kiribati, PNG, Samoa, Solomon Islands, Tonga, and Vanuatu. These institutions could also accommodate training for staff in smaller PICs such as Nauru, Niue, Tokelau, Tuvalu, etc.

The key functions of national TVET institutions in the regional training framework would be as follows:

(i) work with water sector organizations in planning, organizing, and delivering in-service training programs for persons working in the water sector;
(ii) identify suitable trainers who are able to provide in-service training to water sector staff and make them available for training as required; and
(iii) participate (on a selective basis) in PAC-WaT subsector advisory committees to assist in training needs analysis and the development of training courses and materials.

3.2 Operational Modalities

In setting up and developing a regional training framework for the water sector, several steps have to be taken, which are described in this section. PAC-WaT will be at the center of the regional training framework and take the lead in most of the activities.

3.2.1 Establish National and/or Subregional Working Groups

As a first step, PAC-WaT will establish contacts with national and regional water sector organizations and TVET institutions to explain the purpose of a regional water training framework and the role of each of the various stakeholders. PAC-WaT will identify the relevant water sector organizations and assess which TVET institutions are capable and willing to collaborate with PAC-WaT in delivering the required training.

As a next step, PAC-WaT will bring together TVET institutions and water sector organizations, e.g., by organizing inaugural workshops in each PIC. These workshops will be used to identify and/or update the training needs of the water sector (section 3.2.2), to identify potential in-country trainers and to discuss the modalities and possible constraints of organizing future in-country training. During the meetings, a national working group on water sector training will be formed, which will play a coordinating role in identifying national training needs and in organizing and delivering annual training programs.

3.2.2 Identify and Prioritize Water Sector Training Needs

Over the past 10 years, various surveys have been carried out to identify the training needs of water sector organizations in the Pacific. As one of its first activities, PAC-WaT will review, verify, and, where necessary, update and complete training needs analysis and identify priority training needs in each country. This prioritization will form the basis for the subsequent preparation of a preliminary training program, consisting of training courses and related training materials.

It will be important to first rank the courses in accordance with priority training needs. This process will take place in close consultation with representatives of water sector organizations in the region. Unless decided otherwise, it is proposed that PAC-WaT initially focuses on developing a set of basic vocational training courses for each of the water subsectors as proposed in this scoping study. Following this, development of advanced courses should commence, again according to priority needs.

3.2.3 Prepare Training Courses and Materials

A key task of PAC-WaT is to prepare high-quality and relevant training courses and materials for basic and advanced in-service training for water sector staff.

To ensure that training course materials and other resources are of the highest quality, PAC-WaT will need to adhere to quality systems, processes, and procedures for development. The proposed procedure is derived from the steps needed for developing accredited training courses for TVET. The following steps in the process are foreseen, with further details provided in Appendix 4:

(i)   identify the need for, and type of, training;
(ii)   establish contact and/or consult with water sector representatives to provide content input;
(iii)   identify if similar training courses exist, to be modified and contextualized;
(iv)   agree on TVET performance level;
(v)   develop learning outcomes and competency statements;
(vi)   develop the draft training courses;
(vii) distribute the draft training package to sector stakeholders for review;
(viii) test the draft training package; and
(ix)   submit to the relevant water sector committee or accrediting body for endorsement.

An important role in the development of training courses and materials will be played by one or more PAC-WaT water subsector advisory committees, which will assist in validating the training needs and context, setting the required learning outcomes and competencies, and reviewing the draft training courses. It is suggested that there are committees for Urban W&S (lead by the PWWA), Rural WaSH (lead by UNICEF or SPC), and Water Resources Management (lead by SPC). Assistance could be requested from water sector organizations in other countries, such as Australia, New Zealand, and the United States (US).

In the preparation of training courses and materials, PAC-WaT will, as much as possible, make use of existing training materials. There is a wealth of training (open source) materials available from the internet as well as from water sector organizations in the region and globally. For Urban W&S, it is recommended to explore the option of using materials from water sector organizations in the Pacific region or neighboring countries such as Australia, New Zealand, and the US. For Rural WaSH and Water Resources Management, there are several national and international organizations that make training course materials available through their websites. A list of potential sources is provided in Appendix 5.

PAC-WaT will need access to several experienced designers or developers of training materials with a thorough background in the water sector. Draft materials need to be peer reviewed and tested in the field before they are approved as part of any training package. PAC-WaT will need to make sure that its materials are of high quality and meet international standards.

Training courses will cover a range of topics and, for each topic, the necessary materials such as trainer guides and learner activities will be developed. A sufficiently large range of materials based on learning outcomes and/or topics will facilitate flexibility and allow trainers to select and design multitudes of courses tailored to specific needs.

The type of training materials relevant to learning outcomes will depend on the context of the learning. These contexts will include the location, access to field trips and activities, access to equipment and facilities, number of trainees, access to fast internet connectivity and computers or tablet devices, and availability of instructional aids such as whiteboards, data projectors, reference books or handout notes, and guest speakers. PAC-WaT will work

collaboratively with the course developers and instructional designers to ensure the recommended training methods are aligned with feasible training materials.

It will be important to ensure that the training materials are made accessible to trainers and training institutions throughout the Pacific region. They need to be made available in a format that makes it easy for local trainers to adapt, contextualize, and customize the materials to their own needs and local environments. It is proposed that PAC-WaT manages this task by creating an online repository of training materials on its website, freely accessible and identified as open education resources[7].

PAC-WaT is also expected to actively "market" training courses and the availability of training materials in the region. It is suggested this could be achieved by conducting pilot seminars to familiarize trainers with PAC-WaT's training courses and train participants in planning and conducting such courses independently. Such seminars could take the form of training staff of water sector organizations by a small group of national trainers under the guidance of an experienced PAC-WaT trainer. Such demonstration seminars could also be used to train national trainers.

3.2.4 Establish a Workforce of Qualified Trainers

Qualified trainers are a key component of quality assurance and promote confidence in the outcomes of a training course. In delivering a comprehensive regional water sector training program, it is therefore necessary to create a workforce of qualified regional and national trainers.

A regional water sector training program will need two groups of trainers.

(i) For conducting in-country basic vocational training courses: qualified national trainers. This group may include trainers from the locally based TVET workforce and with a background in the water sector, or local water sector specialists with a background in training.

(ii) For advanced courses for senior and specialist staff of water sector organizations: experienced and qualified trainers with extensive background in the water sector. This group of trainers will consist of staff of regional TVET institutions or specialists who are hired on short-term contracts to conduct specific courses. It is not expected that additional training for this group of trainers will be required, but PAC-WaT may initiate some training of trainers to create a core group of regional water sector trainers and to introduce courses and materials to this group.

During the course development process, prerequisite trainer qualifications and work experience will be specified. Given the limited scope of water sector training in the past, the existing Pacific TVET workforce is likely to have only a limited number of trainers with water sector qualifications. Likewise, in-country water sector specialists may have excellent knowledge on water sector issues, but lack experience to act as a trainer.

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[7] Open education resources are made freely accessible to anyone to modify and use how they see fit.

> The existing Pacific regional TVET workforce has highly skilled and qualified trainers. TVET trainers require dual certification: (i) as skilled trainers with a minimum Certificate IV in Training and Assessment, and (ii) hold relevant industry qualifications at least one level higher than the level they are delivering or be deemed to have equivalent competency through relevant work experience. Critical in determining the industry-relevant work experience is the currency of experience. The length of required industry experience varies between PICs from 2 years to 5 years.

It will be important to develop in all (larger) PICs a workforce of qualified trainers able to deliver in-country basic training courses. Based on the number of courses anticipated, it is estimated that 5–10 trainers are needed per country. The options for developing a workforce of skilled trainers to deliver water sector training are:

(i) use locally based qualified TVET trainers (with some existing relevant water sector experience) to deliver basic level trainings (certificate levels 1 and 2);
(ii) use locally based qualified TVET trainers in a partnership arrangement with a water sector specialist; and
(iii) use experienced local water sector staff with sufficient background in training.

Developing a workforce of qualified national water sector trainers will be a multiyear process, which will involve the following steps:

(i) initially, as part of the inaugural workshops in each country, identify suitable candidate trainers;
(ii) involve candidate trainers in pilot training courses, with the purpose of testing and further developing the candidates as national trainers;
(iii) train water sector staff as trainers, working with the Australian Pacific Training Coalition (APTC) or other regional TVET institutions to organize International Skills Training (IST)[8] or Certificate IV TAFE-level trainer qualifications (the new IST course developed by Australia is being delivered by the APTC as an alternative to the Certificate IV courses[9]); and
(iv) work with water sector organizations to facilitate TVET trainers gaining experience and knowledge in the water sector.

It is expected that a core group of national water sector trainers will be established in all larger PRIF Pacific member countries including the Federated States of Micronesia, Fiji, Kiribati, the Marshall Islands, PNG, Samoa, Solomon Islands, Tonga, and Vanuatu. For smaller countries such as the Cook Islands, Nauru, Niue, and Tuvalu, it may be necessary to use at least some trainers from larger neighboring PICs.

3.2.5 Coordinate the Delivery of a Water Sector Training Program

One of the major tasks of PAC-WaT will be to coordinate and communicate the delivery of an annual or rolling water sector training program for the Pacific region. It is expected that the delivery of the training will be done mainly by water sector organizations in association with national and regional TVET institutions.

For the delivery of training courses of any type, the following options exist:

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[8] The IST nonaccredited course provides the PICs with local skilled trainers and assessors to deliver quality competency-based training outcomes.
[9] Training must be delivered by an Australian registered training organization. Training can be delivered in partnership with local training providers, governments, industry, and/or private employers.

(i)   work directly with water sector organizations and support training at agreed local venues;
(ii) coordination and management by a national training provider (e.g., TVET institutions in Fiji, Kiribati, Samoa, Solomon Islands, Tonga, Vanuatu etc.);
(iii) coordination and management by a regional training provider (e.g., USP, the APTC, International Water Centre);
(iv) coordination and management by a development partner, working in partnership with a training provider; and
(v)   coordination and management by PAC-WaT, working in partnership with a training provider (international, regional, national, public, or private).

PAC-WaT is expected to play a major role in planning, coordinating, and communicating an annual or rolling water sector training program, as follows:

(i)   Prepare and/or update, at a minimum once per year, an inventory of water sector training needs, with the purpose of identifying the topics of courses to be included in the following years' training program. The process will include collecting data from water sector organizations, national water sector training working groups where these exist, or by working with sector organizations such as the PWWA, the Pacific Islands Association of NGOs (PIANGO) and similar organizations.
(ii) Based on the identified training needs, national water sector organizations or PAC-WaT will contact national and regional TVET institutions with the request to include the identified training in the training programs they offer.
    (a) At the national level, it is expected that water sector organizations and TVET institutions will already be working together to plan and implement the requested in-country basic training programs. Hence, the role of PAC-WaT will be more of a catalyst and to communicate the planned training programs at the regional level, so organizations in smaller neighboring countries can send their staff to such courses if desired.
    (b) At the regional level, PAC-WaT is expected to play a coordinating role by informing regional TVET institutions of existing training needs and/or by requesting them to plan and organize certain (advanced) courses in response to expressed training needs.
(iii) PAC-WaT will regularly collect and communicate information about relevant training programs in the Pacific, including those in countries such as Australia, New Zealand, and the US, and in subregions such as South East Asia, etc. For this purpose, it will maintain an online rolling program of relevant training programs and communicate the program (e.g., on a quarterly basis) to water sector organizations.

PAC-WaT will develop the necessary web-based tools and instruments for carrying out its coordinating and communication tasks regarding Pacific water sector training.

3.3 Accreditation Options and Quality Assurance

3.3.1 The Need for Quality Assurance and Accreditation

PAC-WaT aims to facilitate the delivery of high-quality in-service training for staff of water sector organizations in the Pacific. One of the questions is how the quality of training programs can be maintained to ensure that the desired outcomes are achieved. One way of achieving this would be to introduce a form of accreditation of courses delivered through the regional water sector training framework. Accredited training courses through national and regional training institutes, with appropriate systems and processes, would provide quality-assured training, thereby meeting the needs of various stakeholders in the Pacific water sector. Quality-assured training provides confidence in graduates as skilled and competent in meeting the stated learning outcomes.

Some form of accreditation of water sector training programs would have the following advantages:

(i)   enhanced quality and comparability of training programs;
(ii)   enhanced development and introduction of regional standards of work;
(iii) facilitating the development of training courses and materials on a regional basis;
(iv)   facilitating the adoption of training programs by national and regional training institutions;
(v)   facilitating accreditation of trainers;
(vi)   making it easier to link training with career development; and
(vii) enhancing employment mobility.

Earlier in this scoping study, it was mentioned by several stakeholders that providing accredited training may make it easier for staff to move to other sectors or countries. This may be true, but, in most cases, it is not training that is the driving force for people to look for alternative employment. Also, it is questionable whether it is fair to staff to prevent them from seeking alternative employment by artificially withholding certificates for training.

3.3.2 Options for Accredited Training

In this report, we make a distinction between three types of training:

(i)   **Accredited training** for TVET refers to a program of training leading to vocational qualifications and credentials that are recognized by the attainment of a formal qualification or award. This can include whole courses (qualifications) or selected parts of a course. Accredited training refers to courses that are approved under structured frameworks, with levels and outcomes associated with qualifications, microcredentials, and skillsets.
(ii)   **Nonaccredited training** refers to a program of structured training that does not lead to the attainment of a formal qualification or award, for example, short courses, product-specific training, and industry or organization-specific training. Nonaccredited training could include courses that are recognized by industry and often meet licensing or specific industry requirements.
(iii) **Informal training** refers to unstructured training that usually occurs on the job through interactions with coworkers as part of the day-to-day work, for example, on-the-job coaching, mentoring, or researching on the internet.

Accreditation of courses is based on qualification frameworks. A qualification framework consists of an integrated education and training policy document, which describes the performance indicators for qualification levels; the specifications for course accreditation and course reviews; authorization of organizations to issue awards; and quality assurance standards for delivery, assessment, and certification. Qualification frameworks provide a benchmark for levels of skill and knowledge and make it easier for employers, institutes, countries, and regions to compare accredited learning. An overview of qualification frameworks in different PICs is presented in Appendix 6. For employers, these make explicit what graduates can "do and know" on completion of accredited learning. There are four options for accredited training for the water sector to consider:
(i)   regional accreditation,
(ii)   national accreditation,
(iii) provider accreditation, and
(iv)   international accreditation.

Other options include:
(v)   industry recognition, and

(vi) nonaccredited training.

The following sections firstly explore the options for developing and delivering TVET accredited courses, followed by the option of industry-recognized training and nonaccredited courses.

3.3.2.1 Regional Accredited Training (Pacific Region)

The regional accreditation system managed by the Education Qualifications Assurance Program, which is governed by SPC, recognizes the different work and cultural influences in different PICs. The policies and procedures for the development and delivery of Pacific regional accredited courses require that not more than 50% of the outcomes may be localized. Localizing more than 50% of the outcomes is deemed to imply that the "regional" flavor of the qualification would be lost, and the qualification would then become a national qualification.

Table 3.1: Regional Accreditation - Strengths and Weaknesses

Accreditation Method	Strengths	Weaknesses
Regional (EQAP)	▪ Standardized graduate outcomes reflecting common industry needs throughout the Pacific region. ▪ Accessible for accredited and nonaccredited training providers. ▪ Clear and comprehensive guidelines for course accreditation and delivery. ▪ Rigorous quality assurance processes aligned with international and Pacific frameworks and standards. ▪ Public confidence in graduate outcomes. ▪ Opportunities for labor mobilization and shared resources in the Pacific region.	▪ Lengthy process (6–12+ months) gathering input from regional industry representatives and endorsement by EQAP. ▪ Comparatively high costs associated with: - quality assurance monitoring and review audit processes; and - application fees for course accreditation and delivery.

EQAP = Education Qualifications Assurance Program.
Source: Consultants' assessment

3.3.2.2 National Accredited Training

PICs have unique cultures and environments, which influence education and training outcomes. Nationally accredited TVET training reflects standards relevant to the national regulatory and legislative environment, which influences aspects such as career and educational pathways, work experience, and on- and off-the-job learning.

Each PIC has developed a national system to progress and enhance quality assurance for TVET through national qualification frameworks. The governance system is either based within a national qualification authority, or TVET is incorporated as a function of the country's ministry of education (or national equivalent). Four countries[10] have aligned their national qualification frameworks to the Pacific Regional Qualifications Framework, with Kiribati and Tuvalu adopting the regional framework as their national framework. National qualification frameworks vary only slightly between countries, with TVET levels being Certificates I to IV and diplomas at levels 5 and 6.

Table 3.2: National Accreditation - Strengths and Weaknesses

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[10] Fiji, Samoa, Tonga, and Vanuatu.

Accreditation Method	Strengths	Weaknesses
National (NQAs)	▪ Relevant learning outcomes reflecting local industry needs, local working environment and culture. ▪ Delivery and development by local personnel (use of local language). ▪ Course reviews and quality assurance processes at a local level are cost-effective. ▪ National training institutes highly regarded, with public confidence in graduates.	▪ Lengthy process requiring input from industry advisory committees, applications for course approval and delivery with NQA. ▪ Competing priorities from industry and national strategic planning for NQA's resources to support specific sector training developments. ▪ Limited resources in government funded NQAs.

NQA = national qualification authority.
Source: Consultants' assessment

3.3.2.3 Provider Accredited Training

PICs have public and private TVET providers funded by governments, donors, church groups, and NGOs. Public providers are the largest TVET institutes in each of the PICs and they deliver a variety of accredited training programs, which include trade and nontrade courses, as well as customized, nonaccredited training for workforces. There are many Pacific TVET national institutes—such as Fiji National University, Kiribati Institute of Technology, National University of Samoa, Port Moresby Technical College, Solomon Islands National University, Vanuatu Institute of Technology—that develop and deliver provider-accredited training courses. National provider-accredited courses are usually also accredited by national qualification authorities. Pacific TAFE is a regional provider and delivers provider-accredited courses, which may also be nationally, regionally, and internationally accredited courses.

Table 3.3: Provider Accreditation - Strengths and Weaknesses

Accreditation Method	Strengths	Weaknesses
Provider Training Institute or Private Provider	▪ Established quality systems for course development, delivery, learning and assessment. ▪ Online resources and blended delivery methods well developed. ▪ Skilled and qualified trainer workforce ▪ Quality assurance monitoring and review processes can be cost-effective using established systems.	▪ Can be a lengthy process working with training institute administration and quality assurance processes and systems. ▪ Institute staff have limited time allocated for research and course development, review, and revision, with demands to focus on course delivery. ▪ Trainers may not have required industry level qualifications and/or work experience.

Source: Consultants' assessment

3.3.2.4 International Accredited Training

Countries such as Australia and New Zealand have significantly different learning environments to those in the PICs. Nevertheless, Australia's Quality Framework and New Zealand's Quality Framework accredited training, or US accredited training in the Northern Pacific, are often considered desirable outcomes in the region, due to enabling a mobile labor force. International courses are also available in specialized areas, such as water security, which are not yet developed in the Pacific region. These courses are costly to access and, with COVID-19 travel restrictions in place, only existing processes for the delivery of internationally accredited courses can be considered as a sustainable option for water sector

training. For example, Australian accredited courses delivered by the APTC in PICs could meet some of the current water sector needs.

Table 3.4: International Accreditation - Strengths and Weaknesses

Accreditation Method	Strengths	Weaknesses
International	- Standardized graduate outcomes reflecting common industry needs. - Opportunities for labor mobilization within the region - Rigorous quality assurance processes aligned with international standards. - Existing courses are available in a range of water sector specializations that may be contextualized for PICs and the region. - High level of public confidence - Pathways to further learning in international environments	- COVID-19 travel restrictions do not allow international trainers access to PICs for face-to-face delivery. - COVID-19 travel restrictions do not allow international travel by accrediting authorities and training providers for initial and ongoing audit purposes. - Comparatively high costs associated with travel by international trainers and Pacific island cohorts of students. - Comparatively high costs associated with the administration and issuance of awards from international training providers.

PIC = Pacific island country.
Source: Consultants' assessment

3.3.2.5 *Industry-Recognized Training*

The industry recognition process requires, in this case, water sector authorities to approve a training course as meeting industry standards. Industry standards are focused on the skills and knowledge of course graduates to carry out specific functions or tasks within an industry. Eventually, industry-recognized courses may become a standard for carrying out certain work functions.

Industry involvement in the development of TVET courses is a critical component of demand-driven training. Accredited training courses are developed based on input from industry advisory groups. However, an industry agency may also lead the development of a new training course or may endorse and/or recognize an existing course. Pacific regional options for PAC-WaT to partner for industry recognition include the PWWA for urban water training, SPC for Water Resource Management training, and SPC or UNICEF for Rural WaSH.

Given the developing nature of water industry authorities in the PICs—compared to the well-established industry agencies in Australia, New Zealand, and the US—the process of industry recognition for water sector training in the Pacific may benefit from partnership arrangements with water sector organizations in the three countries mentioned.

One of the key tasks of PAC-WaT would be to establish an industry recognition system through partnerships which utilize the existing strengths and capabilities of water sector agencies in the Pacific region.

Table 3.5: Industry Accreditation - Strengths and Weaknesses

Accreditation Method	Strengths	Weaknesses
Industry	▪ PAC-WaT partnerships with industry authorities enhance profile and status. ▪ One accreditation that applies to the whole region. ▪ Current industry needs and emerging technologies are reflected in the course development for new workers and upskilling the existing workforce. ▪ Opportunities for labor mobilization and shared resources in the Pacific region. ▪ Ready access to local workplaces for on-the-job training. ▪ Promotes recognition of existing workplace skills through assessment only. ▪ Efficient and cost-effective course development with industry personnel readily accessible. ▪ Public confidence in learning outcomes.	▪ Need TVET expertise to work with industry representatives on course development. ▪ Need partnerships with training providers (local and regional) for consistent delivery of learning outcomes.

PAC-WaT = Pacific Advisory Centre for Water Training, TVET = technical and vocational education and training
Source: Consultants' assessment

3.3.2.6 Nonaccredited Training

Agencies in the water sector can develop personnel skills that are highly job relevant or organization specific through nonaccredited training. Cost, time, and the ability to tailor the training and flexibility in provision are the key reasons for choosing nonaccredited over accredited training. Nonaccredited training is most likely to take the form of short courses that address skills gaps and target the existing workforce.

Table 3.6: Nonaccredited Training - Strengths and Weaknesses

Accreditation Method	Strengths	Weaknesses
Nonaccredited	▪ Training courses can be developed in a short timeframe, without application processes. ▪ Short-term training can target specific skill gaps and be highly effective. ▪ Trainers do not need to be qualified and thus industry personnel may lead the delivery. ▪ Learning opportunities provided to all regardless of previous levels of schooling or training.	▪ No guarantee of graduate outcomes, with varying training methods. ▪ Trainers may not be qualified, and quality assurance limited. ▪ No prerequisite entry requirements may result in different levels of learning for participants and inconsistent outcomes.

Source: Consultants' assessment

3.3.3 Recommendations on Accreditation

It is recommended that PAC-WaT establishes a system in which its training programs are formally endorsed and recognized by industry. The choice for industry recognition is made to (i) maintain and ensure a quality of training programs that is accepted by industry, (ii) avoid

the long and expensive processes of obtaining and maintaining formal accreditation, and (iii) maintain flexibility in the design and delivery of in-service training programs that meet training needs of water sector organizations. It is expected that, in the long run, the ongoing liaison and partnerships with national and regional TVET institutions in the region will support further development of training courses, which will be accredited by these institutions.

Industry endorsement would be given by regional and/or international water sector organizations such as the PWWA, PSC, or UNICEF, based on the criteria and recommendations developed by the PAC-WaT subsector training advisory committees for Urban W&S, Rural WaSH, and Water Resources Management. Once a PAC-WaT subsector training advisory committee has approved a course, the process is validated and endorsed by the steering committee of PAC-WAT, then forwarded to the relevant water sector organization for formal recognition. The processes involved are schematically presented in Figure 3.2.

Figure 3.2: Process for Water Industry Recognition
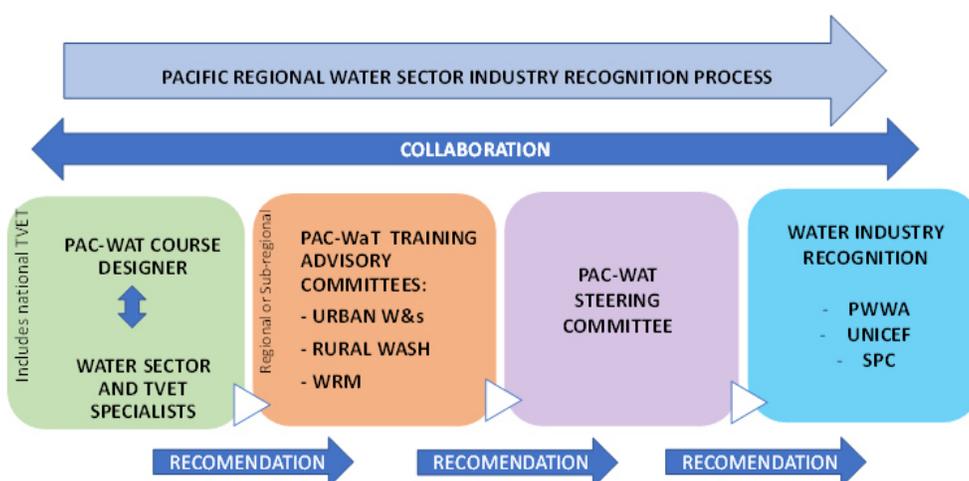
PAC-WaT = Pacific Advisory Centre for Water Training, PWWA = Pacific Water and Wastewater Association, SPC = Secretariat of the Pacific Community, TVET = technical and vocational education and training, UNICEF = United Nations Children's Fund, W&S = water and sanitation, WASH = water, sanitation, and hygiene, WRM = water resources management
Source: Proposal prepared by the Consultant

3.4   Financing Regional and National Water Sector Training

3.4.1   The Costs of the Pacific Advisory Centre for Water Training

3.4.1.1 Provider Accredited Training

In estimating the costs of PAC-WaT, it is assumed that during the first 5 years (the development phase), the project will be located within the premises of USP or SPC in Fiji. Professional staff of the PAC-WaT core team will travel frequently to PICs. PAC-WaT is expected to employ three training experts, of whom two would be hired through international advertising and one from the Pacific region. Fees are based on rates currently used by agencies of the Council of Regional Organizations of the Pacific. The costs of experts who are internationally recruited include professional fees, housing, schooling, moving, etc. In addition, PAC-WaT will have funds for hiring specialist consultants, who will assist in preparing high-quality training materials.

Based on the team composition (as outlined in section 3.2), the annual costs of staffing and operations of PAC-WaT during the development phase (years 1–5) are estimated[11] as follows:

Function	$ ('000)
Team Leader and/pr Senior Training Expert	200
Senior Training Resources Development Expert	200
Regional and/or National Training Expert	120
Short-Term Training Development Experts	200
Project Management Assistant	70
Administrative Assistant	40
Travel Costs	50
Office Establishment and Running Costs	120
Total	**1,000**

The costs outlined should be considered as an investment in establishing and operationalizing the regional training framework. Initially, the total budget will be focused on developing and operationalizing the regional training framework. Gradually, there will also be overhead costs for coordinating the delivery of a regional training program.

3.4.1.2 Consolidation Phase

After its first 5 years, PAC-WaT will focus on the maintenance and updating of existing courses and on coordinating the delivery of a regional training program. The costs during this phase are estimated as follows:

Expense	$ ('000)
a. Team Leader and/or Senior Training Expert (regional)	150
b. Short-Term Training Specialists	100
c. Administrative Support	60
d. Office Running Costs	40
Total	**350**

3.4.2 Estimating the Costs of Water Sector Training Delivery

3.4.2.1 Number of Persons to be Trained

The estimated costs of delivering training depend on the number of persons to be trained and the method and location of the training. Table 3.7 presents an overview of the estimated number of persons working in the Pacific water sector. The data in the table have been estimated based on a review of literature and data from various sources[12]. Further clarification is provided below.

For **Urban W&S**, data on staff numbers in urban water utilities have been collected from the latest PWWA benchmarking reports[13]. Based on analysis of staff composition of utilities in

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[11] In estimating costs, international staff rates have been used as applied by agencies of the Council of Regional Organizations of the Pacific.

[12] The estimated number of persons working in the water sector as presented in this report have, where possible, been compared and aligned with estimates of regional organizations, such as the SPC.

[13] PWWA, 2013 and 2016. *Benchmarking Reports*, 2013 and 2016, Apia, Samoa.

Fiji[14] (large), Tonga[15] (medium), and Chuuk[16] (small), it is estimated that about 70% of water utility staff would need specific water sector vocational training. This group consist of network operators, plant operators, electrical-mechanical staff, planners, supervisors, water meter readers, technical specialists and managers, customer service staff, etc. Based on staff composition, it is estimated that about 80% of training will consist of basic in-country training and about 20% of advanced training in specialized water sector topics. In total, the target group for Urban W&S training is estimated to comprise about 2,500 persons. In addition, other utility staff will need training in nonwater-specific topics such as accounting, finance, human resources management, general management, etc. This group is not included in this analysis.

For **Rural WaSH**, the target group consists of staff in central government agencies, provincial and local governments, NGOs, CSOs, and the private sector. Data on staff numbers involved in rural WaSH are extremely limited and additional information on this is needed. In estimating the number of staff, the following assumptions have been made:

(i) Central government staff includes staff from ministries such as health, infrastructure, water resources, and environment. The number of staff has been estimated based on the number of ministries and the size of the rural population not served by utilities.

(ii) Provincial and local government staff have been estimated based on the number of provinces or districts and local governments in a country, and assuming that at least one government official per province or district or local government will require WaSH training.

(iii) For NGOs, CSOs, and the private sector in smaller Pacific island countries, the number of staff is estimated based on the size of the rural population not served by water utilities.

(iv) For PNG, the number of persons is partly based on a study of the International Water Association (IWA) in 2013[17], which estimated the number of persons working in the WaSH sector in that year at 1,175. It is estimated that since 2013 the number has doubled, and 2,322 persons are working in the sector.

It is assumed that, for rural WaSH training, approximately 90% of persons (community organizers, government officers, WaSH community members, technicians, public health staff, etc.) need to attend basic, in-country vocational training courses at some point in time, whereas the remaining 10% would have a need for more advanced, vocational type of training.

The estimated number of staff for rural WaSH is based on the current number of persons working in the sector. The number of persons needed to achieve the Sustainable Development Goals for water will be much higher, especially for countries such as PNG, Solomon Islands, and Vanuatu. For example, for PNG, the 2013 study by the IWA estimates the number of persons required to achieve universal coverage is 13,030, as compared with a current estimated number of 2,322 persons working in the sector.

For **Water Resources Management**, training will focus mostly on staff of central or provincial government agencies and, in some cases, staff of scientific or specialized agencies, and will mostly comprise advanced level training. All training is considered specific water sector training and the total number of persons to be trained is about 150, as indicated in Table 3.7.

Table 3.7: Number of Persons to Undergo Water Sector Training

[14] Water Authority of Fiji. 2020. *Training Plan 2020*. Suva, Fiji
[15] Tonga Water Board. 2015 *Staff 2015: Educational Levels, 2015*. Nuku'alofa, Tonga
[16] Chuuk Public Utility Corporation 2017. *Utility Report, January 2017*. Chuuk, Federated States of Micronesia
[17] IWA. 2013 *PNG WaSH Sector Capacity Assessment, 2013*.

Country	Urban WASH		Rural WaSH					WRM	Total
	Utilities Total Nr of staff	Staff for water specific training	Central Government Staff	Prov/Local Government Staff	NGO Staff	CSO Staff	Private Sector Staff	Govt and semi Govt	Total No
South Pacific									
Cook Islands	17	12	5	11	2	11	3	3	47
Fiji	1143	800	15	62	55	277	92	15	1317
Kiribati*	70	49	10	10	26	130	43	5	274
Niue	3	2	3	1	0	1	3	1	11
Samoa	304	213	10	2	3	13	4	10	255
American Samoa*	225	158	5	1	0	1	15	5	185
Tonga	101	71	10	36	14	71	24	10	235
Tuvalu	11	8	5	9	2	10	3	3	41
Tahiti	34	24	5	10	1	10	15	5	70
Tokelau		0	3	3	0	3	3	1	13
Sub Total S.Pacific	**1908**	**1336**	**71**	**145**	**103**	**527**	**206**	**58**	**2446**
North Pacific									
FSM	79	55	10	67	22	111	37	5	307
Marshall Islands	61	43	5	29	10	51	17	5	160
Palau*	150	105	3	9	0	9	5	3	134
Guam	295	207	3	1	1	1	2	10	224
Saipan	162	113	3	1	0	1	15	10	143
Sub Total N.Pacific	**747**	**523**	**24**	**107**	**33**	**173**	**75**	**33**	**968**
Melanesia									
PNG	593	415	75	407	250	650	500	25	2322
Solomon Islands	136	95	25	60	140	300	300	15	935
Vanuatu	128	90	15	45	51	255	170	10	635
Nauru	20	14	1	1	0	1	3	3	23
New Caledonia	60	42	3	3	2	36	4	5	95
Sub total Melanesia	**937**	**656**	**119**	**516**	**443**	**1242**	**976**	**58**	**4010**
Total for training		**2514**	**214**	**768**	**579**	**1942**	**1258**	**149**	**7424**
Total Urban W&S	**3592**				**Total Rural WASH**		**4761**	**149**	**8502**

* combined water and power utilities: excludes power staff

CSO = civil society organization, FSM = Federated States of Micronesia, Govt = government, NGO = nongovernment organization, PNG = Papua New Guinea, Prov = provincial, W&S = water and sanitation, WASH = water, sanitation, and hygiene, WRM = water resources management.
Source: Consultants' estimates

3.4.2.2 Estimated Number of Training Courses

The data in Table 3.7 have been divided into three subregions: South Pacific, North Pacific, and the Melanesian countries. This division is based on vicinity, travel connections, and similarities between the countries[18]. By clustering the countries into subregions, the number of staff to be trained per subregion becomes sufficiently large to warrant a diversified training program on an annual basis. It is assumed that, within a subregion, persons of small PICs (e.g., Tuvalu) will be able to join in training programs in larger PICs (e.g., Fiji or Kiribati).

In estimating the number of training courses, it is assumed that, in each subregion, TVET institutions in the larger countries will organize and host basic and advanced subregional vocational training courses. A list of institutions is provided in Appendix 7. Furthermore, given the changing technologies, systems, and processes, and the turnover of personnel, it is estimated that each person working in the water sector would require upskilling and therefore training once every 7 years, and that there will be 15 participants in each course.

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[18] This applies for cultural similarities, but also the South Pacific and Melanesian countries mostly use Australian and/or New Zealand technical standards for WaSH, and the Northern Pacific countries work with US technical standards.

South Pacific
In the South Pacific subregion, all larger countries (Fiji, Kiribati, Samoa, and Tonga) have the capacity to host in-country, subregional basic and advanced vocational training courses. Water organizations in small PICs - such as Cook Islands, Niue, Tokelau, and Tuvalu - could send their staff to participate in courses in these larger countries. In total, the target group consists of 2,412 persons. As suggested earlier, staff would undergo, on average, one training course every 7 years, resulting in annual training for approximately 345 persons. Assuming 15 participants per course this translates to 19 basic, in-country training courses and five advanced courses on an annual basis.

North Pacific
In the North Pacific, subregional courses could be located in Guam, Palau, or Pohnpei. In total, the target group for the North Pacific is an estimated 948 persons. Assuming 15 participants in each training course, this translates to seven basic in-country vocational training courses and three advanced courses for the North Pacific per year.

Melanesia
In the Melanesia subregion, New Caledonia, PNG, Solomon Islands, and Vanuatu each have the capacity to organize and host basic and advanced vocational training courses. Nauru water personnel could attend courses in PNG and Solomon Islands. The current number of persons working in the water sector in Melanesia is estimated at 4,000 persons. Applying the same assumptions as above, this results in 33 basic and five advanced courses per year. These numbers are expected to increase over the years as a substantial number of additional staff are needed in the sector to achieve the Sustainable Development Goals.

The estimated annual number of courses is presented in Table 3.8. Over time, the number of courses needed is expected to increase significantly, especially in Melanesia.

Table 3.8: Estimated Annual Number of Training Courses

Subregion	Subsector	No. of basic in-country training courses	No. of advance subregional courses	Total
South Pacific	Urban W&S	10	3	13
	Rural WaSH	9	1	10
	WRM	0	1	1
North Pacific	Urban W&S	4	1	5
	Rural WaSH	3	1	4
	WRM	0	1	1
Melanesia	Urban W&S	5	1	6
	Rural WaSH	28	3	31
	WRM	0	1	1
Total		**59**	**13**	**72**

W&S = water and sanitation, WaSH = water, sanitation, and hygiene, WRM = water resources management.
Source: Consultants' estimates

3.4.2.3 Estimating the Annual Costs for Regional and National Training Delivery

The number of courses calculated in the previous section is based on the estimated size of the water sector workforce in the Pacific. The future number of staff and, consequently, the number of courses is expected to increase significantly, especially in Melanesia, which currently has a considerable shortage of human resources in the sector, especially for Rural

WaSH. In estimating the costs of delivering training programs for the water sector, a distinction is made between three types of courses, with details of costings provided in Appendix 8:

(i) Firstly, there are in-country basic vocational training courses without lodging. For example, if training takes place for utility staff of the Public Utilities Board in Kiribati, all participants will be living on Tarawa and there will be no costs for food and lodging. The average cost of a 1-week training course for 15 participants is estimated at $5,350 or $357 per person.

(ii) A second type consists of in-country basic training courses with lodging. This would apply, for example, to Rural WaSH courses with participants travelling from the outer islands. The cost of such courses is estimated at $15,850 for a 1-week training course with 15 participants or approximately $1,057 per person.

(iii) Finally, there are subregional advanced training courses for which participants will have to travel within the subregions to one central location and which will require board and lodging. The costs of a 1-week training course for 15 participants is estimated at $33,800 or approximately $2,253 per participant.

Table 3.9 presents the costs of an annual water sector training program for the Pacific region, which amounts to an estimated $906,000 per year for 59 training courses, with a total of an estimated 885 persons.

Table 3.9: Estimated Annual Costs ($) of Water Sector Training Delivery

Courses	No	Costs	Total	Per Person
In-country courses without lodging	25	5,350	133,750	357
In-country courses with lodging	21	15,850	332,850	1057
Subregional Courses	13	33,800	439,400	2253
Total Costs	59		906,000	

Note: The cost estimates in the table are for training on specific water sector topics. Training on general topics, such as accounting, human resources management, general management, etc., are not included in these estimates.
Source: Consultants' estimates

3.4.3 Financing of Water Sector Training

3.4.3.1 Financing of the Pacific Advisory Centre for Water Training

Based on the calculations and discussion in the previous two sections, the total estimated annual cost of PAC-WaT for developing and coordinating the delivery of a systematic and structured regional training program for the water sector is presented in Table 3.10.

Table 3.10: Estimated Annual Cost ($'000) of the Pacific Advisory Centre for Water Training

No.	Item	Development Phase					Consolidation Phase				
		1	2	3	4	5	6	7	8	9	10
1	Development Cost	1,000	850	750	650	650					
2	Overhead Costs		150	250	300	350	350	350	350	350	350
Total		1,000	1,000	1,000	1,000	1,000	350	350	350	350	350

Source: Consultants' estimates

The first cost item (development costs) estimates the costs of establishing and operationalizing the regional training framework, including the assessment of training needs, the development of training courses, and the training of trainers.

The second row (overhead costs) estimates the costs of coordinating the delivery of a regional training program, maintaining the increasing stock of training courses, and the costs of

operating PAC-WaT as a regional center of excellence for water sector training. It is estimated that, after Year 5, the costs will stabilize at some $350,000 per year.

As mentioned earlier in this report, it is proposed that PAC-WaT is established as a multiyear training project, funded by one or more development partners. After year 5, the key functions of PAC-WaT need to be taken over by one or more of the regional water sector organizations. How this will work out and be financed will depend on the proposals prepared during the development phase.

3.4.3.2 Financing of Water Sector Training Delivery

Based on the estimates made in section 3.5.2, Table 3.11 presents the estimated costs of the actual delivery of PAC-WaT training courses, made by TVET institutions and/or water sector organizations. During Year 1, the costs of training delivery will be zero, as all efforts will be focused on assessing training needs and developing the training courses. It is expected that during Year 2 several PAC-Wat developed training courses will be delivered and, over the subsequent years, the number of PAC-WaT courses will gradually increase.

Table 3.11: Estimated Annual Costs ('000) for Training Delivery

No	Item	Development Phase					Consolidation Phase				
		1	2	3	4	5	6	7	8	9	10
1	Overhead Costs	0	150	250	300	350	350	350	350	350	350
2	Training Delivery	0	200	400	600	900	1,000	1,050	1,100	1,150	1,200
Total		0	350	650	900	1250	1350	1400	1450	1500	1550

Source: Consultants' estimates

Potential sources of funding include:
  (i)   revenues from tuition fees paid for by ministries, provincial and local government agencies, utilities, NGOs, private sector organizations, etc.;
  (ii) revenues from tuition fees paid for by development partner projects;
  (iii) subsidies from regional water sector organizations; and
  (iv) grants or subsidies from national governments and development partners.

The next sections will explore the various options for funding in more detail.

Revenues from tuition fees

Training courses organized by TVET institutions or water sector organizations may generate revenues from water sector organizations, as follows:

For the **Urban W&S** subsector, the main constraints for staff development are the high costs of training and the lack of suitable in-country training opportunities. Providing utilities with relevant, low-cost, in-country training programs for large parts of their staff would greatly reduce the costs of training. The number of senior and specialist staff to be trained at subregional level is relatively small and there may also be scope for online training courses. Water utilities have revenue streams and should be able to bear (part of) the costs of such training.

In 2012, the total annual operating revenues of all water utilities in the Pacific was estimated at about $115 million[19] and operating costs $119 million. Although the financial performance of Pacific water utilities is not strong, more than half of the utilities are able to recover the costs of their operations.[20] If all utilities invested 0.5% of their annual turnover in staff training, the

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[19] PWWA. 2012. *Annual Benchmarking Report, 2012*. Apia, Samoa.
[20] PWWA. 2016. *Annual Benchmarking Report, 2016*. Apia Samoa.

costs of training for Urban W&S would easily be covered. Only the utilities in small PICs may face problems in allocating sufficient funds for training.

For **Rural WaSH**, it will be much more difficult to recover the costs of training because, in most cases, Rural WaSH organizations do not generate (sufficient) revenues. Furthermore, the costs will be substantially higher, as most participants are from remote areas (outer islands) and need to travel for training, which requires boarding and lodging. For these reasons, it is likely that training for Rural WaSH will, to a large extent, continue to depend on financing through development projects.

For **Water Resources Management**, most persons are working with government agencies, which are often short in allocating budgets for training. Training programs for this subsector are mostly funded through projects supported by development partners. On the other hand, the number of persons to be trained is relatively small and the target group is likely to be familiar with more advanced and regional approaches to training. Also, online training will be suitable for many in this target group, who have access to suitable technologies and are familiar with online learning processes.

Thus, it is estimated that 40% of the costs of the annual training program could be recovered from tuition fees paid for by water sector organizations in the region, mostly from urban water utilities. In addition, there may be scope to receive tuition fees from the private sector. This could be stimulated by requiring certification from private contractors to be allowed to install and/or maintain water supply and sanitation facilities from households or utilities.

Revenues from tuition fees paid for by development partner projects

Over the next 5 years, Pacific Region Infrastructure Facility (PRIF) partners are planning investment projects in the WaSH sector in PRIF (and associated) countries for an estimated $600 million,[21] 80% of which are for urban water and sanitation, including for small countries such as the Cook Islands, Nauru, and Tuvalu. Most projects include considerable funding for capacity development and training. As these projects are mostly implemented apart from each other, training occurs on an ad hoc basis and, in most cases, ceases when the project is completed.

It would be of great benefit to the sustainability of investments from PRIF partners in the Pacific if the water sector, through PAC-WaT and TVET institutions, could offer a relevant high-quality training program (with a range of training courses), conducted on a regular and ongoing basis, to water sector organizations in the Pacific region. This could be realized if PRIF partners make use of the courses offered under the PAC-WaT training program by paying tuition fees, or if PRIF partners subsidize part of the costs of delivering regional water sector training programs.

Contributions from water sector organizations

A sustained and high-quality training program would be of great benefit to the Pacific water sector. However, developing and implementing such a training program will require an effort at the national and regional levels. Benefits would justify asking water sector organizations to contribute to the development and operations of a regional approach to water sector training. For example, the PWWA could ask its member utilities for an annual contribution to a regional training fund for Urban W&S. With such funds, the PWWA could contribute to the development and delivery of a regional training program in various ways, such as subsidizing the development of specific courses for urban water utilities or paying tuition fees of course participants from small water utilities. In the same way, private sector organizations such as

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[21] PRIF. 2021. Internal report. *Water and Sanitation Sector Pipeline, March 2021*. Sydney.

industry participants or suppliers could subsidize the development of specific training programs and support trainees.

It may not be easy for the PWWA to realize such a training fund. Public utilities receive revenues for water and/or wastewater service delivery in a given country, and it may be difficult for water utilities to explain why they apply customers' revenues to subsidizing training of persons from other countries. It may be easier to justify developing and delivering specific courses at the regional level, with benefits for utilities in specific countries more readily apparent. In these cases, there is a direct benefit for national utilities from regional services.

Grants or subsidies from national governments and development partners

Two ways in which governments of PICs and development partners may contribute to the development and operation of a regional water sector training program are as follows:

(i) Subsidies for TVET institutions: Financing of TVET institutions comes from multiple sources. Public financing constitutes the majority source to cover the operational costs of TVET institutions. However, in many cases, public funding is declining. Private financing through tuition charges and fees is important in many PICs. Almost all countries depend on external financing for capital expenditures. Several countries, mainly in the North Pacific, depend wholly on external financing for all TVET expenditures. Extending services to the water sector may result in a more efficient use of the facilities of TVET institutions and generate additional sources of income through tuition fees.

(ii) The costs of setting up and running PAC-WaT and delivering a relevant and diverse training program to the Pacific water sector may be funded by one or more development partners. The justification for this would be that:
   (a) Offering a comprehensive in-service training program will enhance the capacity of staff and water sector organizations to sustainably operate and maintain their assets, deliver their services and in the long run, achieve the Sustainable Development Goals.
   (b) A (joint) investment in developing and implementing a regional approach to water sector training is more efficient as compared to developing and delivering training programs through projects in individual PICs and saves on the future costs of capacity development, which is currently part of most capital investment projects.
   (c) A regional approach to training is the only way for the water sector in most smaller PICs to get access to low-cost, in-country, in-service training for their staff.
   (d) A regional approach to training will create a center of excellence for the sector and a centralized point of contact for projects and stakeholders to connect with for establishing partnerships and arrangements, which create efficiencies in capacity building through the development and delivery of training courses.

3.4.3.3 Conclusion

The costs of delivering an annual training program for the water sector could be covered by:

(i) tuition fees paid for by water utilities and the private sector,
(ii) tuition fees paid for by projects funded by development partners, and
(iii) tuition fees paid for by scholarships from various sources.

The costs of staffing and running a regional entity like PAC-WaT need to be financed by funding from one or more development partners. In the long run, one or more regional organizations may take over some of PAC-WaT's functions and be able to pay costs from its own resources.

4 PROPOSED ROADMAP

Establishing and implementing a regional framework for water sector training requires a multiyear, programmatic approach that is proposed to consist of two phases.

(i) The development phase, with a duration of 5 years, will focus on creating a regional framework for training, establishing PAC-WaT, and developing and delivering a comprehensive in-service training program to the water sector.

(ii) The consolidation phase will focus on preserving the achieved results and embedding the key functions of a regional training framework at the regional and national levels.

4.1 Development Phase (5 Years)

A roadmap for the first 5 years of the establishment and operationalization of a regional framework for water sector training in the Pacific will involve the steps outlined below. In the planning, it has been assumed that PAC-WaT will initially be established as a program or project within USP or SPC, with funding from one or more development partners. The key steps are:

(i) Reach agreement among all key stakeholders on the scope, structure, and governance arrangements for a regional framework for water sector training and the establishment of an advisory center for water training in the Pacific as a multiyear program located within USP, SPC, or another regional organization.

(ii) Agree on the financing arrangements for PAC-WaT and obtain formal approval from the funding agencies and the host organization.

(iii) Prepare terms of reference and tender or recruit the team of consultants for PAC-WaT. Appoint a steering committee. Mobilize the team, arrange for office space, and deal with other logistical issues. Communicate the establishment of PAC-WaT among water sector and TVET institutions and through other appropriate channels, and prepare a work plan.

(iv) PAC-WaT to arrange for a series of country workshops in PICs with the purpose of establishing national working groups, reviewing and updating training needs analysis, defining a tentative training program, and identifying future national trainers.

(v) PAC-WaT, in consultation with regional water sector organizations, to establish a framework for water industry recognition of its training program and courses, with clear and unambiguous standards and processes.

(vi) PAC-WaT to carry out a review of existing water sector courses and materials and implement the design and preparation of training courses under the guidance of the subsector training advisory committees. Start with preparing training courses which meet priority training needs and obtain industry recognition for approved courses.

(vii) Establish a workforce of qualified trainers by training national water sector trainers and familiarize them with the training courses endorsed by PAC-WaT.

(viii) Work with national water sector organizations in identifying the demand for courses and coordinate and communicate the delivery of a rolling, regional water sector training program, which is updated on a regular basis.

(ix) Monitor progress based on key indicators, including the number of training courses developed, the number of trainers trained, the number and quality of implemented courses, the number of persons trained and certified, and the impact of training on workforce performance for water sector organizations.

(x) Towards the end of the development phase, undertake a review and evaluation of project outcomes to inform the design of the consolidation phase for PAC-WaT.

The proposed time schedule of this roadmap is presented in Figure 4.1.

Table 4.1: Timeline of the Proposed 5-Year Roadmap

No	Activity	Lead	Year 0		Year 1		Year 2		Year 3		Year 4		Year 5	
			1	2	1	2	1	2	1	2	1	2	1	2
1	Reach Agreement among Stakeholders	PRIF	▀											
2	Arrange and approve funding	PRIF Partners		▀										
3	Establish PAC-WaT and recruit staff	PAC-WaT			▀									
4	Arrange country workshops in all PICs	PAC-WaT				▀								
5	Estabish Industry Training Recognition framework	PAC-WAT				▀								
6	Design and develop training courses	PAC-WaT					▀	▀	▀	▀	▀	▀	▀	▀
7	Establish and train a workforce of qualified trainers	PAC-WaT/APTC						▀			▀		▀	
8	Coordinate and communicate rolling training program	PAC-WaT						▀	▀	▀	▀	▀	▀	▀
9	Monitor progress on regional water sector training	PAC-WaT Board							▀		▀		▀	
10	Evaluate progress and prepare proposal for phase 2	PAC-WaT Board												▀

APTC = Australian Pacific Training Coalition, PAC-WaT = Pacific Advisory Centre for Water Training, PIC = Pacific island country, PRIF = Pacific Region Infrastructure Facility,
Source: Prepared by the Consultant

4.2   Consolidation Phase (3–5 Years)

The second phase of the project aims at consolidating the achievements of the development phase and at embedding the key functions of PAC-WaT at the regional level. During this phase, PAC-WaT will:

(i)   continue to develop improvements and innovations to the existing set of training courses;
(ii)   continue to stimulate, coordinate, and communicate the delivery of an annual training program;
(iii)   assist water sector and TVET institutions to improve planning and delivery of training;
(iv)   assist water sector organizations in connecting training with professional and career development programs;
(v)   monitor the effects of training on the performance of staff and impact on organizations in the sector;
(vi)   function as a center of excellence for water sector training in the Pacific; and
(vii)   prepare a proposal for embedding the key functions of PAC-WaT at the regional level, in close consultation with all key stakeholders and, after having obtained their approval, take actions necessary for implementation.

5 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

Priority training needs of the Pacific water sector consist of (i) strengthening the specific water sector competencies of operational staff for developing, operating, and maintaining water systems, and (ii) more advanced training in specific water sector fields for technical specialists, planners, and (young) managers.

Water sector organizations in the Pacific find it difficult to meet these training needs. Key constraints are the lack of suitable, in-country training programs and lack of training budget. TVET institutions in the Pacific are mostly delivering vocational training for school leavers and preservice students, with little provision for in-service workforce training. With few exceptions, water sector training only takes place with external funding, mostly in connection with investment projects funded by development partners. This training is limited in scope and geographical coverage and is generally not sustained over longer periods of time. Individual water organizations in PICs, in most cases, lack the scale and resources to develop and offer structured and systematic staff training.

To overcome the above constraints, a programmatic approach to water sector training needs to be developed and implemented in close collaboration with regional stakeholders. This report presents a regional framework and governance model for water sector training consisting of (i) a newly established Pacific Advisory Centre for Water Training (PAC-WaT) as the driving force and coordinating agency, (ii) national water sector organizations as the clients and beneficiaries of training, and (iii) national and regional TVET institutions to support the delivery of the training.

At the regional level, a center of excellence (PAC-WaT) is needed for (i) developing a comprehensive set of industry-recognized training courses and resource materials, (ii) training a workforce of national and regional trainers, and (iii) acting as a catalyst for coordinating and communicating the delivery of an ongoing annual training program. It is proposed that PAC-WaT will be hosted by USP or SPC.

At the national and subregional levels, water sector organizations and TVET institutions need to be encouraged and enabled to collaborate in planning and delivering a combination of low-cost, in-country, basic training courses for operational staff, along with a (smaller) program of more advanced, specialized subregional courses. The trained workforce of national and regional trainers will be utilized to deliver the training program.

Processes for developing and delivering industry-recognized training resources will be led by PAC-WaT and involve regional and national advisory groups consisting of local water sector stakeholders and TVET specialists. PAC-WaT will also organize training of a workforce of qualified national and regional trainers sourced from TVET institutions and water sector organizations in PICs.

Developing a programmatic approach for regional water sector training in the Pacific will take multiple years. It is proposed that development partners, in collaboration with regional water sector agencies, provide funding and support a first phase of operations for 5 years, which will focus on the development of training resources and establishing a system for training delivery. A subsequent 3-5 years is required, funded partly by development partners and partly by contributions from other stakeholders, with the goal of sustaining the outcomes achieved during the development phase and embedding the key functions of PAC-WaT at the regional level.

5.2 Recommendations

A well-trained workforce in water organizations will enhance the operation and maintenance of assets and the quality of water service delivery in the Pacific region. The importance of access to reliable water and sanitation has further escalated during the COVID-19 pandemic. The following recommendations aim at adopting a programmatic approach and establishing a collaborative partnership of stakeholders for training and, once implemented, are expected to have direct and measurable impact on the well-being of the people in the Pacific.

The key recommendations are as follows:

(i) Agree with key stakeholders that a regional, programmatic, interagency approach for training is required for developing and delivering a comprehensive and coordinated training program to the water sector in the Pacific. This is to be realized within a regional framework driven by PAC-WaT and involving water sector organizations and TVET institutions.

(ii) Establish PAC-WaT as a multiyear project with two phases and funded by development partners: a development phase of 5 years and a consolidation phase of 3–5 years. It is recommended that PAC-WaT is hosted by either USP or SPC and that, after the consolidation phase, the key functions of PAC-WaT will be continued by one or more Pacific regional agencies, in line with their mandate and fields of expertise.

(iii) During the first 5 years, the development phase, PAC-WaT will focus on:
   (a) the assessment and updating of training needs and the development of low-cost, industry-recognized in-service training programs and courses;
   (b) training a workforce of national and regional trainers from TVET institutions and water sector organizations skilled to deliver water training; and
   (c) working with water sector organizations and TVET institutions in PICs to plan and deliver a comprehensive training program that meets water sector training needs.

(iv) In its second phase, the consolidation phase, the focus of PAC-WaT will be to:
   (a) continue to develop improvements and innovations to the existing set of training courses;
   (b) continue to stimulate, coordinate, and communicate the delivery of an annual training program;
   (c) assist water sector and TVET institutions to improve planning of training and connection with professional and career development programs; and
   (d) monitor the effects of training on the performance of staff and impact on organizations in the sector.

(v) It is recommended that water sector organizations are actively involved in the development of training materials and that PAC-WaT establishes training advisory subsector committees for Urban W&S, Rural WaSH, and Water Resources Management. Training courses developed in this way will meet a set of standards and be formally recognized by water industry organizations to ensure the quality of the courses and training outcomes.

(vi) It is recommended that PAC-WaT will initiate and coordinate training of trainers with USP and the Australian Pacific Training Coalition, with the aim of establishing a workforce of skilled national and regional water sector trainers. PAC-WaT will develop and maintain a database of qualified trainers with water sector expertise for all PICs.

(vii) It is recommended that PAC-WaT initiates and supports the establishment of national working groups for water sector training in each PIC, consisting of water sector

organizations and relevant TVET institutions. These groups have a critical role in the regular assessment and updating of training needs, the identification of trainers, and the planning and coordination of training delivery.

(viii) It is recommended that PAC-WaT takes the lead in coordinating the implementation of a comprehensive, rolling training program for each or the subregions in the Pacific, to be delivered through national and regional TVET institutions in close consultation with water sector organizations.

(ix) It is recommended that, during the first phase of 5 years, PAC-WaT program funding will support an additional and dedicated training coordinator position within the PWWA. This position will support PAC-WaT functions, leveraging off the strengths of the PWWA and simultaneously building and strengthening the PWWA as a key reference point for urban water sector training initiatives and communications.

(x) It is recommended that as much as possible, tuition fees cover for the costs of delivering the training, especially fees from water utilities and from government and private sector organizations. Where revenue streams are nonexistent (for Rural WaSH and Water Resources Management), it is recommended that development projects make use of the programs developed by PAC-WaT and pay tuition fees for participants.

(xi) If there is insufficient support or funding for an integrated regional approach for the water sector as outlined, it is recommended to explore alternative arrangements, which may involve splitting up the project into regional projects per subsector. This could, for example, result in:
(a) a regional project for Urban W&S for training utility staff, coordinated by the PWWA;
(b) a regional project for Water Resources Management implemented by SPC;
(c) a regional project for Rural WaSH in Melanesia, supported by large ongoing Rural WaSH projects in that subregion and, for example, coordinated by UNICEF; and/or
(d) a regional project for Rural WaSH for outer islands focusing on smaller PICs led by SPC.

In the subsectoral approach, there are also benefits from regional coordination and support for activities such as training needs analysis, supporting TVET institutions, training of trainers, and the coordination and communication on the delivery of training. The form of such coordination will depend on the structure and operations in each of the subsectors.

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APPENDIXES

Appendix 1: List of Persons Consulted

Pacific Region Infrastructure Facility	Jane Romero, Technical Assistance Officer Nina Mines, Finance and Operations Officer
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World Bank	Stephane Dahan, Water and Sanitation Specialist Shona Fitzgerald, Water and Sanitation Specialist
New Zealand's Ministry of Foreign Affairs and Trade	Howard Markland, Senior Advisor, Water and Infrastructure Nick Holden, Consultant Lead, Water Security
Australia's Department of Foreign Affairs and Trade	Gerard Cheong, Assistant Director, Water, Sanitation, and Hygiene Celina Smith, Project Officer
Delegation of the European Union in the Pacific	Luis de Torres Bonaechea Jenny Brown
Pacific Water and Wastewater Association	Lusia Sefo-Leau, Chief Executive Officer (CEO) Jim Keary, Board Member Gary Aitchison, Board Member
Pacific Community	Rhonda Robinson, Director, Geoscience, Energy and Maritime Division Dave Hebblethwaite, Coordinator, Water Governance and Security Amelia Siga, Project Manager, European Union Pacific Technical and Vocational Education and Training Peter Sinclair, Water Resources Management Expert
International Water Centre	Regina Souter, Specialist, Water, Sanitation, and Hygiene and International Water Management
Eda Ranu, Papua New Guinea	Raka Taviri, CEO
Water Authority of Fiji	Barry Omundson, CEO
Solomon Water	Ian Gooden, CEO
Public Utility Board, Kiribati	Itienang Timona, Head of Water Division
University of the South Pacific	Isoa Korovulavula, Director of Applied Science
Engineers Without Borders, New Zealand	Dane Hart, Chief Executive
Australia Pacific Training Coalition	Gareth McGrath, Training Delivery Innovation Manager
UINCEF	Chandler Badloe, Chief Specialist, Water, Sanitation, and Hygiene, Suva

Water Industry Operators Association of Australia	George Wall, Managing Director
Water Industry Operators Group, New Zealand	Brett Marais, Consultant and Trainer

Appendix 2: Priority Training Needs

Table A2.1: Summary of Priority Pacific Water Sector Training Needs

Urban Water and Sanitation

General Area	Functions	Required skills and knowledge
Water Production and Purification	Water treatment plant operators	• O&M and monitoring of water intakes • O&M of WTPs • Water Quality Monitoring
Water Distribution	Water network managers	• Planning network operations • Planning network maintenance • Planning network expansions • Planning NRW Reduction
NRW Reduction	Water network managers Water network operators	• Understanding NRW • Distribution zones • Calculating a water balance • Leak detection techniques
Water Distribution	Water network operators	• O&M of water networks, valves • Pipelaying, welding, fitting, etc. • Installing, repairing water meters • (basic) hydraulic analysis
Electro-Mechanical O&M	Electro/mechanical operators and engineers	• Maintenance of pumps • Maintenance of valves • Maintenance of water meters
Wastewater Collection	Sewerage network operators	• O&M of sewerage networks, valves • Pipelaying, fittings, etc. • Installing, repair water meters • (Basic) hydraulic analysis
Wastewater Purification and Discharge	Wastewater treatment plant operators	• Removal of waste and minerals • O&M of WWTPs • O&M of wastewater discharge • Sludge management
Water Quality Monitoring	Plant operators Laboratory staff	• Water quality testing • Water sampling
Water System Management	Technical managers and specialists Customer relations staff Commercial managers	• Asset management • GIS and SCADA • Master planning • Customer relations • Commercial management
WaSH for Peri-Urban Areas and Informal Settlements	Water supply project managers and workers	• Approaches for water supply in peri-urban areas and informal settlements • Construct and maintain water tanks • Rainwater collection • Water trucking
	Sanitation project managers and workers	• Approaches for sanitation in peri-urban areas and informal settlements • Construct or maintain latrines and septic tanks • Wastewater drainage
Public Health	Hygiene promotors	• Hygiene promotion for adults • Hygiene promotion for children
Water Sources Management	Environmental engineers (Geo) Hydrologists	• Catchment management • Monitoring of water quality and quantity • Groundwater exploration and management • Climate change effects and resilience

General Area	Functions	Required skills and knowledge
		• Protection of water sources
		• Water safety planning
Urban Water Sector Policies and Regulation	Policymakers Regulators Utility board members	• Policy development • Sector Regulation • Sector monitoring

Rural Water, Sanitation, and Hygiene

Tasks, responsibilities	Functions	Knowledge and Skills
Governance, Policy Development, and Implementation of Rural WaSH at national and provincial and/or regional level	• National and provincial level government officials and project managers • Senior staff of related government agencies, utilities, NGOs, CSOs, etc.	• Skills for oversight, coordination and development of plans and policies • Understanding of roles and responsibilities within and between ministries and agencies at national and provincial level • Planning, budgeting, and project management • Procurement skills including tendering processes and financial management systems • Managing human resources, including recruitment and capacity building and training • Administration, logistics, and organizational skills • Information management for reporting and planning, collecting and using data effectively • Skills for monitoring, compliance and enforcement with relevant policies, laws, regulations, and standards • Integrating climate change mitigation and disaster risk reduction into WASH planning • Integrating gender and social inclusion in plans and programs
Community Mobilization and Organization for Rural WaSH	• Community mobilizers • Community facilitators • Community organizers	• Define and work with communities • Understand the role and responsibilities of a community organizer • Understand and implement community mobilization processes • Apply communication skills and techniques • Apply community organization skills • Apply gender equity and social inclusion skills
Public Health and Hygiene for Rural WaSH	• Public health officers at various levels • Community mobilizers and facilitators	• Public health, water-borne diseases • Public and personal hygiene, handwashing • Hygiene education and behavior change • WaSH education in schools • Gender, equity, and social inclusion
Rural WaSH Project Planning and implementation	• Project managers at provincial and local government level • WaSH engineers	• Project planning, budgeting, and implementation, coordinating with communities and other stakeholders

Tasks, responsibilities	Functions	Knowledge and Skills
	• Members of community groups • Project managers working with contractors and NGOs	• Skills to design Rural WaSH projects including water source assessments and choice of appropriate technologies for WaSH • Organizing and contracting of implementation (by contractor and/or communities) • Supervising and monitoring implementation • Commissioning and/or handover of completed works • Skills to assess training needs and organize training for O&M • Skill to undertake routine monitoring • Skills to undertake lifecycle costing and linking needs to annual budget and capital maintenance expenditure
Rural WaSH O&M	• Members of the community • Operators and other employees hired by the community	• Skills to operate and maintain rural WaSH facilities • Skills to set up and implement simple financial management systems to ensure sustainability and transparency • Skills to define and establish appropriate forms of organization for rural WaSH • Skills to coordinate with community and key stakeholders and ensure involvement and information flow

Water Resources Management

Tasks, responsibilities	Functions	Knowledge and Skills
Water Resources Management	• Water resource managers • Hydrologists • Project managers • Technicians	• Water resources assessment • Sustainable water resources management • Planning, monitoring, and implementation of catchment management • Water quality monitoring • Hydrometeorological data collection and installation • Training in advanced hydrography and processing • Water abstraction • Environmental and water resource protection • Forestry logging, land use and agricultural practices • Community engagement • Hydrology, hydrogeology, civil engineering, accounting, economics, sociology, and law • Disaster risk assessment and management

CSO = civil society organization; GIS = geographic information system; NGO = nongovernment organization; NRW = nonrevenue water; O&M = operation and maintenance; SCADA = supervisory control and data acquisition; WaSH = water, sanitation, and hygiene; WTP = water treatment plant; WWTP = wastewater treatment plant.
Source: Prepared by consultant

Appendix 3: Basic Water Sector Training Courses

Table A3.1: Water Sector Training in Urban Water and Sanitation

Course Title 1: Urban W&S	Operate, Maintain, and Control Water Distribution Networks
Objectives and learning outcomes	This course is for network operators and aims at developing the competencies required to operate, maintain, and control water distribution networks. Persons who complete this training course to an assessed competency standard should be able to: (i) demonstrate and describe the fundamental components of a water supply system; (ii) describe the characteristics of a water distribution network; (iii) operate (components of) a water network; (iv) maintain and repair components of a water network; (v) describe water quality criteria for water supply; and (vi) use applications and tools to operate and maintain a water network.
	Basic vocational training: This level of course is for water network operators working independently or in a small team in water distribution systems and with some level of supervision. This is a nonaccredited course, developed in alignment with the skills, knowledge, and attributes of graduates from Certificate levels 2 and 3 on the Pacific Qualifications Framework. **Course participants** are those currently working as water distribution network operators or have similar titles, with responsibilities for water distribution in urban water supply systems.
Quality assurance requirements	This training course has been developed by the Pacific Advisory Centre for Water Training, in close collaboration with Pacific water sector organizations, and is recognized by the Pacific Water and Wastewater Association as meeting the training needs to competently operate, maintain, control, and repair water supply distribution systems. It may only be delivered by a qualified trainer who must meet the national standards for vocational trainers in the relevant Pacific island country. A qualification for training is required in addition to a minimum of 2 years' relevant work experience in the water sector. This training course does not require formal assessment but after completing the course the trainer is required to confirm the competency of the trainees in meeting the course objectives.
Duration	This training course requires a minimum of 1 week's full-time training, comprising 40 hours of direct trainee learning. This learning may occur on or off the job, in accordance with the context and training sites available. This training course may be delivered over a longer period to achieve a total of 40 hours of direct training with a trainee and trainer or workplace supervision.

End of course skills and knowledge	At the end of the course, trainees should have acquired the following skills and knowledge: (i) knowledge of water supply system, components, and concepts; (ii) knowledge of water distribution systems, components, and concepts (iii) knowledge of network hydraulics and characteristics; (iv) knowledge of potable water quality management; (v) skills in various methods of water sampling planning and collection procedures; (vi) basic analytical skills applied to water sampling outcomes; (vii) knowledge of linkages of Urban W&S with other sectors (e.g., agriculture, health); (viii) knowledge of relevant and reliable information sources; (ix) communication and reporting skills to effectively convey information and seek advice as required for work functions; (x) selection and application of appropriate tools and materials for water supply and distribution systems; (xi) carry out basic operations, maintenance, and repairs; (xii) carry out simple tasks for excavations, pipelaying, replacement of water meters, and connecting new customers; (xiii) troubleshooting for flow and pressure problems and control; (xiv) testing of controls, valves, pipes, pumps, and switches; (xv) investigations and assessment of a range of operational problems and undertaking basic repairs; and (xvi) undertake a basic risk assessment on different jobs and implement a basic safety and risk mitigation plan.
Critical health and safety prerequisites	All training and assessment activities must be in accordance with health and safety legislation and related regulations of the relevant Pacific island country. This includes road safety procedures during maintenance and traffic management, proper handling and storage of chemicals, safe lifting procedures, and disaster risk assessment on facilities and job sites.

W&S = water and sanitation.
Source: Prepared by consultant

Training Methods:

A range of training methods should be used in a blended approach. Methods should allow flexibility to meet the needs of different groups and individuals and ensure an equitable and fair training environment where all trainees are given equal opportunities to learn and demonstrate their workplace skills.

This training course is not formally assessed. The trainer is, however, required to develop a brief competency assessment for each trainee and provide this to both the trainee and their employer on completion of the course. If a trainee is not competent for partial learning outcomes, they should be given a future opportunity to undertake further training and/or demonstrate competency.

Endorsement and Industry Recognition	
Pacific Advisory Centre for Water Training, Urban Water and Sanitation training advisory group	Date:
Pacific Advisory Centre for Water Training, Board endorsement	Date:
Industry Recognition: Pacific Water and Wastewater Association	Date:
Proposed review (every 2 years)	Date:

Table A3.2: Water Sector Training in Rural Water, Sanitation, and Hygiene

Course Title 2: Rural WaSH	**Communicate and Promote WaSH in Rural Communities**
Objectives and learning outcomes	This course describes skills and knowledge required to enable community members and those working in Pacific island countries to effectively communicate the importance of WaSH for public health and the environment. This training course is an introduction to the concepts and methods of effective promotion of the principles of WaSH in rural communities. Persons who complete this training course to an assessed competency standard should be able to: (i) demonstrate and describe effective WaSH behaviors; (ii) explain the impact of effective WaSH behavior in rural communities on waterborne diseases and COVID-19; (iii) select and use appropriate communication methods to interact effectively with community members; (iv) use cultural protocols and respectful communications with community members; (v) use cultural protocols and appropriate communication in planning and visiting communities and rural households; (vi) identify WaSH issues for a rural household; (vii) use probing questions to investigate the nature of influences on WaSH related behaviors of a rural household; (viii) identify, describe, and use appropriate behavior change strategies to address specific issues for rural WaSH in a community setting; (ix) describe and communicate methods for effective monitoring of behavioral change to achieve WaSH objectives; and (x) plan and collaborate with household members in rural communities to adopt suitable WaSH behaviors.
Level of training and course participants	**Basic vocational training**: this level of course applies to those working independently or with a small team in the water sector and some level of supervision. This is a nonaccredited course, developed in alignment with the skills, knowledge, and attributes of graduates from Certificate levels 2 and 3 on the Pacific Qualifications Framework. **Course participants** are those who may or may not be currently working in the water sector in a Pacific island country. (Rural) Community members who are in positions of influence and those working in agencies (government, private sector, nongovernment organizations) who are responsible for rural WaSH initiatives are the targeted participants.
Quality assurance requirements	This training course is industry-recognized and endorsed by the Pacific Advisory Centre for Water Training as meeting the training needs to competently communicate effectively with a rural community on the essential behaviors for community groups and individual households to engage consistently in suitable WaSH behaviors. This training course requires access to a community setting as either the training venue or field trip. If access to a community is not available a simulated learning environment must be created.

	This course may only be delivered by a qualified trainer who must meet the national standards for vocational trainers in the relevant Pacific island country. A qualification for training is required in addition to a minimum of 2 years' relevant work experience in the water sector. This training course does not require formal assessment but rather the trainer is required to confirm the competency of the trainees in meeting the course objectives.
Duration	This training course requires a minimum of 1 week's full-time training, comprising 40 hours of direct trainee learning. This learning may occur on or off the job, in accordance with the context and training sites available. This training course may be delivered over a longer period to achieve a total of 40 hours of direct training with a trainee and trainer or workplace supervision.
Critical health and safety prerequisites	All training and assessment activities must be in accordance with health and safety legislation and related regulations of the relevant Pacific island country. This includes public health and COVID-related rules for minimizing the risks of contracting and spreading disease. In the global pandemic of COVID-19, the participants in this course must demonstrate sound knowledge of global, regional, and national COVID developments.
End of course skills and knowledge	At the end of the course, trainees should have acquired the following skills and knowledge: (i) explain the principals of WaSH as the foundation of a healthy and dignified life; (ii) knowledge of concepts applicable to Rural WaSH; (iii) knowledge of the importance of WaSH for public health and the environment; (iv) knowledge on water contamination and waterborne diseases; (v) knowledge and skills on alternative water treatments (e.g., filtration, chlorine); (vi) skills in various methods of safe water storage and handling; (vii) knowledge of the "sanitation ladder" and use to reduce to reduce health risks; (viii) knowledge of the quality and alternative structures of latrines; (ix) skills in building basic latrines suitable for different settings in rural communities; (x) knowledge of the principles of menstrual health and hygiene; (xi) knowledge of alternative solid waste management processes; (xii) knowledge of gender roles and gender considerations for WaSH; (xiii) basic analytical skills applied to different rural community WaSH needs; (xiv) knowledge of linkages of Rural WaSH with other sectors (e.g., agriculture, health); (xv) skills in accessing reliable information sources using different technologies; (xvi) communication and reporting skills to effectively convey information to communities; (xvii) knowledge and skills on behavior change; (xviii) facilitating community participatory decision-making on motivating the community for action and prioritizing WaSH issues; and (xix) application of participatory consultation methods to gather information on WaSH from communities.

WaSH = water, sanitation, and hygiene.
Source: prepared by Consultants

Training Methods: Note this training course is not formally assessed. Competency of the trainees is recognized through trainer observation during the learning period.

A range of training methods should be used in a blended approach. Methods should allow flexibility to meet the needs of different groups and individuals, and ensure an equitable and

fair training environment where all trainees are given equal opportunities to learn and demonstrate their communication skills.

This training course is not formally assessed. The trainer is, however, required to develop a brief competency assessment for each trainee and provide this to both the trainee and, if relevant, an employer on completion of the course. If a trainee is not competent for partial learning outcomes, they should be given a future opportunity to undertake further training and/or demonstrate competency.

Endorsement and Industry Recognition	
Pacific Advisory Centre for Water Training, Rural Water, Sanitation, and Hygiene training advisory group	Date:
Pacific Advisory Centre for Water Training, steering committee endorsement	Date:
Industry recognition: (agency name)	Date:
Proposed review (every 2 years)	Date:

Table A3.3: Water Sector Training in Water Resources Management

Course Title 3: Water Resources Management	Conduct Water Safety Planning
Objectives and learning outcomes	This course describes skills and knowledge to carry out risk assessments of raw water treatment facilities and drinking water infrastructure (transport, distribution, storage) and to prepare drinking water safety plans. This training course is an advanced course and relevant for those working in the water sector, such as water engineers, water facilities managers, water treatment plant operators, and drinking water facilities supervisors. Persons who complete this training course to an assessed competency standard should be able to: (i) identify relevant information needed for a risk assessment affecting drinking water and related water resources; (ii) identify relevant information needed for a water safety plan; (iii) describe legal requirements, codes of practice, and guidelines impacting water resource planning and safety; (iv) identify hazards impacting safe water supply systems and services; (v) describe the current state of COVID-19 from a global, regional, and national perspective; (vi) explain the impact of COVID-19 on planning for safe water supply for urban and rural consumers; (vii) design and organize a risk assessment plan for water resources in a cost- and resource-effective manner; and (viii) analyze collected information and communicate it to relevant stakeholders.

Level of training and course participants	**Advanced vocational training**: this is a nonaccredited course (industry endorsed), developed in alignment with the skills, knowledge, and attributes of graduates from TVET Certificate level 4 on the Pacific Qualifications Framework.
	Course participants: this level of course is applicable for those working independently or with a small team in the water sector in a Pacific island country. Course participants are most likely to hold a senior position and/or a managerial or supervisory role. Participants require experience working with water supply services in Pacific island urban and/or rural areas.
Critical health and safety prerequisites	All training and assessment activities must be in accordance with health and safety legislation and related regulations of the relevant Pacific island country. This includes public health and COVID-related rules for minimizing the risks of contracting and spreading disease, in particular through the services of providing safe drinking water. In the global pandemic of COVID-19, the participants in this course must demonstrate sound knowledge of global, regional, and national COVID developments.

Quality assurance requirements	This training course is industry-recognized and endorsed by the Pacific Advisory Centre for Water Training as meeting training needs to competently undertake planning for water safety, either independently or working with a small team. This training includes designing and implementing a risk assessment matrix for providing safe water supply and services.
	This course may only be delivered by a qualified trainer who must meet the national standards for vocational trainers in the relevant Pacific island country. A qualification for training is required in addition to a minimum of 5 years' relevant work experience in the water sector. This training course does not require formal assessment but rather the trainer is required to confirm the competency of the trainees in meeting the course objectives.
Duration	This training course requires a minimum of 8 days of full-time training, comprising 60 hours of direct trainee learning. This learning may occur on or off the job, in accordance with the context and training sites available.
	This training course may be delivered over a longer period to achieve a total of 60 hours of direct training with a trainee and trainer or workplace supervision.

End of course skills and knowledge	At the end of the course, trainees should have acquired the following skills and knowledge:
	• skills and knowledge in planning for organization and project objectives; • skills and knowledge on design and implementation of a **risk assessment** matrix for water supply services; • knowledge of exposure parameters for water supply resources; • knowledge of **hazards** affecting water supply resources; • knowledge of **risk controls** for safe supply of water; • knowledge of vulnerability parameters for water supply resources; • skills to effectively communicate information accurately using clear verbal and written language; • knowledge of the components and processes for water supply systems; • knowledge of relevant and reliable information sources; • skills to use appropriate protocols to access data from international, regional, and national sources; • emergency preparedness and response skills for planning and implementation of water supply services; • project management skills incorporating a **gender** lens; and • skills in using technology for planning, monitoring, and collecting data and reporting on the results.

TVET = technical and vocational education and training.
Source: prepared by consultants

Training Methods: Note this training course is not formally assessed. Competency of the trainees is recognized through trainer observation during the learning period.

A range of training methods should be used in a blended approach. Methods should allow flexibility to meet the needs of different groups and individuals, and ensure an equitable and fair training environment where all trainees are given equal opportunities to learn and demonstrate their skills in planning for water safety using a risk assessment approach.

This training course is not formally assessed. The trainer is, however, required to develop a brief competency assessment for each trainee and provide this to both the trainee and current employer on completion of the course. If a trainee is not competent for a partial learning outcome, they should be given a future opportunity to undertake further training and/or demonstrate competency.

Endorsement and Industry Recognition	
Pacific Advisory Centre for Water Training, Water Resources Management training advisory group	Date:
Pacific Advisory Centre for Water Training, Board endorsement	Date:
Industry recognition: Secretariat of the Pacific Community	Date:
Proposed review (every 2 years)	Date:

Appendix 4: Developing Accredited Training Courses

Steps for Developing Accredited Water Sector Training Courses
1. Identify the need for the training and type of training.
(i) The training needs could be identified by a capacity needs or training needs and gaps assessment, national or regional leader direction, government planning, or business and/or sector demands.
(ii) Confirm the objectives of the training and align with the need for accredited training.
(iii) Agree on the type of training course required (qualification, microqualification, unit standards).
2. Identify if similar training courses exist and may be modified and contextualized.
(i) Research existing accredited and nonaccredited training courses relevant to the need (international, regional, local, donor agency, water authorities).
3. Establish, and/or consult with an industry standards advisory committee to provide content input.
(i) This requires coordination of meetings with industry representatives who volunteer time to discuss the proposed course development and what a course graduate should be able to know and do.
(ii) Identify and discuss the jobs and tasks associated with this working role.
4. Agree on technical and vocational education and training (TVET) performance levels.
(i) This requires input from both industry and TVET personnel.
(ii) The Pacific Qualifications Framework and frameworks in Pacific island countries describe the different certificate and diploma levels from 1 to 6.[22] Each level is described in terms of applied skills and knowledge in a problem-solving context, and autonomy that refers to the level of support and degree of judgement expected in the working role.
(iii) Obtain agreement on the level for the qualification, micro-qualification, unit standards.
5. Develop learning outcomes and competency statements.
(i) The jobs and tasks identified by the industry specialists (step 2) are written in competency language by TVET personnel.
(ii) Feedback and consultation with industry on draft competency statements.
6. Develop the draft training course.
(i) Industry and TVET personnel discuss and agree training methods; participant entry-level requirements; workplace role in supporting training; equipment, facilities, and resources required; assessment methods; trainer qualifications and experience.
(ii) TVET expertise is used to allocate credit points and propose clustering, unit sequencing, and structures for the qualification, micro-qualification or unit standards.
7. Distribute the training package to stakeholders for feedback, revision, and industry endorsement.
(i) A timeframe for feedback should be given to stakeholders to provide feedback.
(ii) Obtain endorsement from industry advisory groups on the draft training package.
8. Prepare and submit all documents to the accrediting authority.
(i) Pacific regional and national qualification authorities provide guidelines on the documents required in applications for TVET course accreditation.
(ii) Provider accreditation will require compliance with internal processes obtained from the provider training institute.
(iii) All guidelines for developing accredited courses should be referenced when developing the draft training course, to ensure all application documents are prepared (e.g., minutes of meetings, mapping documents).

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[22] The Pacific Qualifications Framework provides the regional benchmark for national qualifications frameworks.

Appendix 5: Potential Sources for Water Sector Training Courses and Resources

1. Water Industry Operators Association, Australia
2. Water Industry Operators Group, New Zealand
3. American Water Works Association, United States
4. Centre for Affordable Water and Sanitation Technology, Canada
5. International Resources Centre, the Netherlands
6. United Nations Children's Fund (UNICEF)
7. United Nations High Commission for Refugees
8. United Nations Educational, Scientific and Cultural Organization (UNESCO)
9. International Water Centre, Griffith University, Australia
10. Institute for Hydraulic Engineering, the Netherlands
11. Global WaSH Cluster
12. Maynilad Water Academy, Philippines
13. Water Aid
14. Akvopedia Water and Sanitation Systems and Technological Options

Appendix 6: Quality Assurance Frameworks

Table A6.1: Overview of Quality Assurance Frameworks in Pacific Island Countries

Pacific Island Country	National Qualifications and/or Quality Assurance Authority TVET	Aligned with Pacific Regional Quality Assurance Framework	Aligned with an International Quality Assurance Framework
Cook Islands	Incorporated in Ministry of Education	✘	New Zealand Qualifications Framework
FSM	Incorporated in Ministry of Education	✘	Western Association of Schools and Colleges of the United States
Fiji	Fiji Higher Education Commission	✔	Australian Qualifications Framework, New Zealand Skills Framework
Kiribati	Pacific Quality Assurance Framework	Adopted as national framework	Kiribati Institute of Technology delivers Australian accredited qualifications
Nauru	Incorporated in Ministry of Education	N/A	Australian Qualifications Framework
Niue	Incorporated in Ministry of Education	N/A	New Zealand Qualifications Framework
Palau	Incorporated in Ministry of Education	✘	Western Association of Schools and Colleges of the United States
PNG	PNG Qualifications Framework - TVET	✘	Some
RMI	Incorporated in the Ministry of Education	✘	Western Association of Schools and Colleges of the United States
Solomon Islands	Solomon Island Tertiary and Skills Authority	No	✘
Tonga	Tonga National Qualifications and Accreditation Board	✔	✘
Tuvalu	Pacific Quality Assurance Framework	Adopted as national framework	✘
Samoa	Samoa Qualifications Authority	✔	✘
Vanuatu	Vanuatu Qualifications Authority	✔	✘

FSM = Federated States of Micronesia, N/A = not available, PNG = Papua New Guinea, RMI = Republic of the Marshall Islands, TVET = technical and vocational education and training.
Source: Prepared by Consultants

Appendix 7: Key Training Institutions

Table A7.1 outlines key providers of technical and vocational education and training in PRIF Pacific member countries with capacity to support water sector training for in-service personnel. Rural training centers are particularly relevant for training in rural water, sanitation, and hygiene being accessible to remote areas.

Table A7.1: Overview of Training Institutions in Pacific Island Countries

Pacific Island Country	National TVET Institution	University Provider of TVET	USP Campus	Rural Vocational Training Centers*
Cook Islands	Cook Islands Tertiary Training Institution		v	v
FSM	College of Micronesia			
Fiji	USP Pacific TAFE	Fiji National University	v	
Kiribati	Kiribati Institute of Technology		v	
Nauru	TVET Facility, Nauru Secondary School		v	
Niue	Niue High School		v	
PNG	Port Moresby Technical College	University of PNG University of Technology - Lae	v	v
Palau	Palau Community College		v	
RMI	College of the Marshall Islands		v	
Solomon Islands	Don Bosco Technical Institute (Honiara)	Solomon Islands National University	v	v
Tonga	Tonga Institute of Science & Technology	Tonga Institute of Higher Education	v	
Tuvalu	Tuvalu Maritime Training Institution		v	
Samoa	National University of Samoa, Faculty of Technical Education	National University of Samoa, Oloamanu Centre	v	
Vanuatu	Vanuatu Institute of Technology		v	v

FSM = Federated States of Micronesia, PNG = Papua New Guinea, RMI = Republic of the Marshall Islands, TAFE = technical and further education, TVET = technical and vocational education and training, USP = University of the South Pacific.
Note: * Community-based initiatives that offer vocational education in remote and rural areas for provinces and outer islands.
Source: Prepared by Consultants

Appendix 8: Training Cost Estimates

Table A8.1: Cost Estimates for Water Sector Training in Pacific Island Countries

Costs of an in-country course without lodging and national trainer				
$				
No of particpants	15			
			Costs per	Total
Item	**Unit**	**No**	**Unit**	**costs**
Venue	days	5	200	1000
Refreshments	days	5	150	750
Trainer	days	7	300	2100
Resources	days	15	100	1500
Total				5350
Costs per participant				357
Costs of an in-country course with lodging and national trainer				
$				
No of particpants	15			
Per Diem	75			
			Costs per	Total
Item	**Unit**	**No**	**Unit**	**costs**
Venue	days	5	200	1000
Refreshments	days	5	150	750
Trainer	days	7	300	2100
Resources	days	15	100	1500
Per diem	days	6	1125	6750
Travel costs	Part	15	250	3750
Total				15850
Costs per participant				1057
Costs of an in-country course with lodging and international trainer				
$				
No of particpants	15			
Per Diem	100			
			Costs per	Total
Item	**Unit**	**No**	**Unit**	**costs**
Venue	days	5	300	1500
Refreshments	days	5	150	750
Trainer	days	7	650	4550
Miscellaneous	days	15	100	1500
Per diem	days	7	1500	10500
Travel costs	Part	15	1000	15000
Total				33800
Costs per participant				2253

Source: Consultants' estimates.