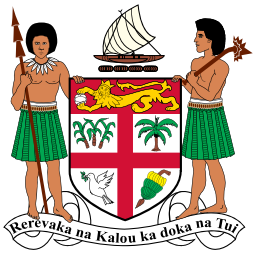


Fiji Rural Water Supply and Sanitation Master Plan

2026 - 2050



Fiji Rural Water Supply and Sanitation Master Plan

2026 - 2050



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Abbreviations

ADB	Asian Development Bank
AFD	Agence Française de Développement
AIEC	Average Incremental Economic Cost
AIIB	Asian Infrastructure Investment Bank
AWP	Australian Water Partnership
BCC	Behaviour Change Communication
BOD	Biochemical Oxygen Demand
CAPEX	Capital Expenditure
Capmanex	Capital Maintenance Expenditure
CBT	Compartment Bag Test
CIF	Climate Investment Fund
CRVA	Climate Risk and Vulnerability Assessment
CRWSF	Climate Resilient Water and Sanitation Fund
CW	Constructed Wetlands
CWM / CWM+	Community Water Management / Community Water Management Plus
DEWATS	Decentralised Wastewater Treatment System
DFAT	Department of Foreign Affairs and Trade (Australia)
DWS	Department of Water and Sewerage
DWSSSP	Drinking Water Safety, Security and Sanitation Plan
EIB	European Investment Bank
EIRR	Economic Internal Rate of Return
ENPV	Economic Net Present Value
EPS	Ecological Purification System
EU	European Union
FASEP	Fonds d'Étude et d'Aide au Secteur Privé (French Private Sector Study and Aid Fund)
FCCC	Fijian Competition and Consumer Commission
FREF	Fiji Rural Electrification Fund

FSM	Faecal Sludge Management
FSR	Feasibility Study Report
FSTP	Faecal Sludge Treatment Plant
GAP	Groundwater Assistance Programme
GCF	Green Climate Fund
GEDSI	Gender Equality, Disability and Social Inclusion
GIS	Geographic Information System
HH	Household
IEC	Information, Education and Communication
IFC	International Finance Corporation
IWC	International Water Centre
IWRM	Integrated Water Resources Management
JBIC	Japan Bank for International Cooperation
JICA	Japan International Cooperation Agency
JMP	Joint Monitoring Programme
KPI	Key Performance Indicator
LCC	Life Cycle Costs
M&E	Monitoring and Evaluation
MECC	Ministry of Environment and Climate Change
MIS	Management Information System
MiTA	Ministry of iTaukei Affairs
MoE	Ministry of Education
MoF	Ministry of Finance
MoHMS	Ministry of Health and Medical Services
MLMR	Ministry of Lands and Mineral Resources
MPWMST	Ministry of Public Works, Meteorological Services and Transport
MRD	Mineral Resources Department
MRMD	Ministry of Rural and Maritime Development and Disaster Risk Management
MiTA	Ministry of iTaukei Affairs
MTU	Mobile Treatment Units

NbS	Nature-based Solutions
NDP	National Development Plan
NIIP	National Infrastructure Investment Plan
NIWA	National Institute of Water and Atmospheric Research
NPC	Nature People and Climate Program
NRWPMS	National Rural Water Point Mapping Survey
NWRMSP	National Water Resources Management and Sanitation Policy
O&M	Operation and Maintenance
OPEX	Operational Expenditure
PaCWaM+	Pacific Community Water Management Plus research project
PPP	Public Private Partnership
RHT	Rainwater Harvesting Tanks
RWSS	Rural Water Supply and Sanitation
SDG	Sustainable Development Goals
SOP	Standard Operating Procedures
SSP	Sanitation Safety Plan
TOR	Terms of Reference
ToT	Training of Trainers
TNK	Turaga ni Koro
UNDP	United Nations Development Programme
UNICEF	United Nations Children's Fund
WAF	Water Authority of Fiji
WASH	Water, Sanitation and Hygiene
WC	Water Committee
WHO	World Health Organization
WISH Fiji	Watershed Interventions for Systems Health in Fiji
WB	World Bank
WSMP	Water Supply Management Plan
WWTP	Wastewater Treatment Plant

Minister's Foreword

The Fiji Rural Water Supply and Sanitation Master Plan represents a significant milestone in Fiji's commitment to achieving safe, sustainable and climate-resilient water supply and sanitation services for all rural communities.

Access to safe drinking water and improved sanitation is fundamental to public health, environmental protection, economic development, and the wellbeing of our people. As Fiji continues to respond to the challenges of climate change, natural disasters, population growth, and increasing service demands, this Master Plan provides a long-term framework to guide coordinated planning, investment, regulation, and service delivery across the rural water and sanitation sector.

The Master Plan aligns with Fiji's National Development Plan, the National Water Resources Management and Sanitation Policy, the Fiji Integrated Water Resources Management Plan,the Rural Water and Saniation Policy, the Water Sector Strategy 2050, and Sustainable Development Goal 6. It establishes a strategic framework that strengthens sector governance, enhances institutional coordination, promotes climate resilience, and supports evidence-based planning and investment.

A defining feature of this Master Plan is the proposed establishment of the National Water Resources Management Coordination Committee, which will provide the national platform for coordinating policy implementation, investment planning, and stakeholder collaboration across the water sector. The Committee will strengthen coordination between Government ministries, statutory authorities, development partners, civil society organisations, and other stakeholders, ensuring that investments are aligned with national priorities, resources are used efficiently, and duplication of effort is avoided. This collaborative governance framework will be fundamental to achieving integrated and sustainable water resources management throughout Fiji.

The Master Plan also reinforces the regulatory role of the Department of Water and Sewerage, strengthens planning through Water Supply Management Plans (WSMPs), promotes the use of digital information systems to support evidence-based decision-making, and establishes a dedicated Rural Water Supply and Sanitation Unit to provide technical support to communities. It further identifies the priority investments required to expand and improve rural water and sanitation services through to 2050.

Successful implementation of this Master Plan will depend on strong partnerships between Government ministries and agencies, provincial and community leaders, development partners, non-government organisations, the private sector, and, most importantly, the rural communities themselves. Through coordinated leadership, sustained investment, and shared responsibility, we can build resilient water and sanitation systems that protect public health, safeguard our natural environment, and improve the quality of life for all Fijians.

I acknowledge the valuable contributions of the Department of Water and Sewerage, the Water Authority of Fiji, the Ministry of Health and Medical Services, and our development partners, including UNICEF, the Agence Française de Développement (AFD), the Asian Development Bank (ADB), and the Government of the Netherlands through the AKVO Foundation, together with all stakeholders who contributed their expertise and commitment to the preparation of this Master Plan.

I commend the Fiji Rural Water Supply and Sanitation Master Plan to all stakeholders and call upon every partner to work together through the National Water Resources Management Coordination Committee to deliver its vision. By strengthening collaboration, improving governance, and investing strategically, we will ensure that every rural community has access to safe, reliable and climate-resilient water supply and sanitation services for the benefit of present and future generations of Fiji.



Honourable Ro Filipe Tuisawau
Minister for Public Works, Meteorological Services and Transport

Executive Summary

The **Fiji Rural Water Supply and Sanitation Master Plan (RWSS Master Plan)** provides the strategic framework for developing Fiji's rural water supply and sanitation sector. It outlines the sector's long-term vision, investment priorities, financing mechanisms, institutional arrangements, and implementation responsibilities required to deliver safe, sustainable, climate-resilient, and inclusive water supply and sanitation services for rural communities.

The RWSS Master Plan is aligned with the Government's broader policy and legislative framework, including:

- **The Fiji National Development Plan (NDP) 2025–2029 and Vision 2050**, which establishes national development priorities, sector performance indicators, and identifies the preparation of a Rural Water Supply and Sanitation Master Plan as a key strategic priority.
- **The National Water Resources Management and Sanitation Policy (2026)**, which provides the overarching policy framework for effective governance, regulation, and sustainable management of water resources and sanitation services.
- **The Fiji Integrated Water Resources Management (IWRM) Plan (2026)**, which establishes a national framework for the sustainable protection, allocation, and management of Fiji's freshwater resources while strengthening resilience to climate change, floods, droughts, and other water-related hazards.
- **The Draft Water and Sewerage Services Bill (2026)**, which defines the powers and functions of the Department of Water and Sewerage (DWS) as the national water sector regulator and coordinator. These functions include establishing and monitoring service standards, approving sector plans, and overseeing implementation and funding. Responsibility for tariff regulation in urban areas remains with the Fiji Competition and Consumer Commission (FCCC).
- **The Fiji Water Sector Strategy 2050**, which identifies the key challenges facing Fiji's water sector and highlights the need for a dedicated national strategy to guide rural water supply and sanitation development.

- **The Rural Water and Sanitation Policy**, which defines the roles and responsibilities of government agencies, service providers, implementing partners, and communities. It also establishes the requirements for preparing Water Supply Management Plans (WSMPs) as the basis for planning and financing rural water and sanitation projects. This policy is currently being reviewed to align with the institutional reforms and strategic directions contained in this Master Plan.

- **The National Groundwater Resources Development and Management Policy (2023)**, administered by the Ministry of Lands and Mineral Resources, which promotes the sustainable protection, development, and management of Fiji's groundwater resources.

In alignment with the National Development Plan and **Sustainable Development Goal 6 (SDG 6)**, the RWSS Master Plan adopts a phased implementation approach.

The **first phase (2026–2030)** focuses on achieving sustainable and climate-resilient rural water supply and sanitation coverage across Fiji's four administrative divisions. Water Supply Management Plans (WSMPs), prepared under the leadership of DWS, will serve as the principal planning and investment mechanism.

The **second phase (2031–2050)** focuses on strengthening the long-term sustainability, resilience, and quality of rural water and sanitation services. This phase will progressively operationalise DWS's regulatory and coordination functions while integrating WSMPs with Drinking Water Safety, Security and Sanitation Plans (DWSSSPs) to improve water safety, water security, sanitation, and climate resilience at community level.

The Master Plan represents a significant shift in Fiji's approach to rural water service delivery. Rather than concentrating primarily on the construction of new infrastructure, it promotes continuous investment in asset management, rehabilitation, system improvements, climate resilience, and long-term service sustainability. This transition moves the sector from an infrastructure-focused approach towards a service delivery model that ensures communities continue to receive reliable, safe, and resilient water and sanitation services.

The Master Plan also adopts an integrated approach that recognises the strong interrelationship between water supply, sanitation, water security, public health, climate resilience, and sustainable water resource management.

Successful implementation of the Master Plan will depend on a coordinated institutional framework supported by periodic planning and review, capacity building, technical assistance, sustainable financing, and performance monitoring of community Water Committees.

This framework will be supported by:

- ✓ The National Water Resources Management Coordination Committee;
- ✓ A dedicated Rural Water Supply and Sanitation (RWSS) Unit;
- ✓ A national Stakeholder Coordination Platform;
- ✓ An integrated digital information management system and database; and
- ✓ Sustainable financing mechanisms supporting new infrastructure, rehabilitation, expansion, emergency response, asset management, climate-proofing, and sanitation improvements.

To strengthen long-term sustainability, the Master Plan proposes establishing a **Climate Resilient Water and Sanitation Fund (CRWSF)** to finance recurrent asset management, climate adaptation measures, and priority sanitation investments.

A key feature of the Master Plan is the transition from traditional **Community Water Management (CWM)** to **Community Water Management Plus (CWM+)**. This enhanced approach strengthens community management through improved technical support, service standards, monitoring, accountability, and regulatory oversight. The CWM+ model reflects a more professional and sustainable approach to rural water service delivery while maintaining strong community ownership and participation.

Successful implementation of the Master Plan will require addressing several strategic challenges.

Institutional Capacity

Transitioning from a project-based investment model to one centred on planned maintenance and continuous service improvement requires significant institutional and cultural change. DWS will lead this transformation through targeted capacity building, technical assistance, and collaboration with development partners and non-government organisations.

Data Quality and Information Management

Reliable data is fundamental to effective planning, investment, and performance monitoring. While historical capital investment data is generally robust, the Fiji National Rural Water Point Mapping Survey (NRWPMS) represents the country's first comprehensive national baseline for rural water supply and sanitation services. This information will continue to be strengthened through the national digital platform, asset condition assessments, demand surveys, hazard mapping, and improved stakeholder coordination.

Implementation Capacity

Current financial and institutional resources are insufficient to achieve national rural water and sanitation targets within the required timeframe. The Master Plan addresses this challenge through a phased Investment Plan supported by strengthened governance arrangements, improved regulatory oversight, coordinated implementation mechanisms, and increased investment from Government, development partners, and other stakeholders.
The RWSS Master Plan and accompanying Investment Plan have been developed using findings from the Summary Situation Analysis Report and the National Rural Water Point Mapping Survey (NRWPMS), which together provide the evidence base for strategic planning and investment prioritisation.

Planning, Technology Options and Climate Resilience

Section 3 outlines Fiji's planning and investment framework for rural water supply and sanitation. It identifies WSMPs as the primary planning and investment mechanism for rural water and sanitation infrastructure, while DWSSSPs provide a complementary risk-based framework that strengthens water safety, water security, sanitation, and climate resilience at the community level. WSMPs are a mandatory requirement for all implementing agencies, including government agencies, development partners and non-government organisations. They provide the basis for planning, prioritising and financing rural water supply and sanitation investments through Government budget processes. DWSSSPs, introduced through UNICEF's climate-resilient WASH programme and further developed in Fiji with support from the International Water Centre (IWC) and the Ministry of Health and Medical Services (MoHMS), complement WSMPs by promoting continuous risk management and improved service delivery.

The Master Plan reinforces the importance of WSMPs in addressing long-standing sector challenges, including poorly designed infrastructure, inadequate construction standards, investment proposals that prioritise complete replacement over critical rehabilitation, and recurring project rollovers.

By requiring all implementing agencies to prepare WSMPs, DWS will ensure that investments are technically sound, financially efficient and directed towards priority service improvements.

Current investment in rural water supply and sanitation remains significantly below the level required to achieve national development objectives. Annual investment is estimated at less than **US$10 million**, with most funding channelled through the Water Authority of Fiji (WAF). At the same time, implementation capacity has declined, with fewer rural water schemes completed each year and a reduction in dedicated programme staff. Rural sanitation has also received limited investment and policy attention over the past decade.

The sector is further constrained by fragmented institutional arrangements, limited coordination among implementing agencies, the absence of a centralised asset register, and weak performance monitoring. These challenges have reduced the effectiveness of planning, investment and service delivery across the rural water and sanitation sector.

To address these issues, the **National Water Resources Management and Sanitation Policy** and the **Water and Sewerage Services Bill** strengthen the role of the Department of Water and Sewerage as the national sector coordinator and regulator.

A key institutional reform is the establishment of a dedicated **Rural Water Supply and Sanitation (RWSS) Unit** within DWS, supported by a national Stakeholder Coordination Platform, an integrated digital information management system, and a coordinated water quality monitoring and surveillance programme.

Under the Master Plan, WSMPs will remain the principal mechanism for planning, designing and procuring new infrastructure, network expansions and major rehabilitation works. Community Water Committees will continue to be responsible for routine operation and maintenance, while DWSSSPs will support asset management, climate resilience, water safety and sanitation improvements. Together, these complementary planning tools establish the foundation for sustainable, climate-resilient service delivery. The proposed **Climate Resilient Water and Sanitation Fund (CRWSF)** will provide the financial mechanism to support this approach.

The Master Plan also draws on regional experience, particularly from Vanuatu, highlighting the importance of:

- ✓ Accreditation of third-party implementing agencies;
- ✓ Standardised training and certification programmes;
- ✓ Strong compliance monitoring and quality assurance; and
- ✓ Continuous capacity building to maintain implementation standards.

Collectively, these reforms will strengthen institutional systems and practical implementation tools, enabling the sector to transition from an infrastructure-focused investment model to one centred on sustainable service delivery, supported community management, and continuous performance improvement.

Sections 4 and 5 present the strategic framework for selecting appropriate technologies for rural water supply, on-site sanitation and faecal sludge management. Each technology option is assessed according to its suitability, advantages and limitations, with accompanying flow diagrams illustrating the major system components.

The Master Plan identifies six principal rural water supply options:

- ✓ Rural gravity-fed water supply schemes supplied from streams, springs or creeks and upgraded with appropriate water treatment systems, including Ecological Purification Systems (EPS).
- ✓ Extension of existing WAF urban reticulated water supply systems where technically and economically feasible.
- ✓ Groundwater supply schemes developed through boreholes, including solar-powered systems where appropriate.
- ✓ Household and community rainwater harvesting systems to improve water security, particularly in water-scarce areas.
- ✓ Privately owned household water supply systems.
- ✓ Solar-powered desalination systems for remote maritime communities lacking reliable freshwater sources.

The Master Plan also promotes innovative technologies, including solar-powered packaged water treatment plants, upgraded desalination systems and renewable-energy-powered boreholes to improve service reliability, operational efficiency and climate resilience.

For rural sanitation, the preferred approach is based on safely managed on-site sanitation systems supported by an effective faecal sludge management chain, including collection, emptying, transport and treatment. Treatment options include co-treatment at existing wastewater treatment plants, dedicated Faecal Sludge Treatment Plants (FSTPs) and, where appropriate, Mobile Treatment Units (MTUs) for remote maritime communities.

The Master Plan recognises that different geographical settings require different solutions. Communities located beyond practical access to existing wastewater treatment plants may require decentralised treatment facilities, while remote maritime and isolated inland communities will require innovative technologies and additional research before large-scale implementation.

The immediate priority is to undertake comprehensive household sanitation surveys and prepare a **Sanitation Strategy** to guide future investment. This will provide the evidence base for feasibility studies, pilot projects and targeted investment by Government and development partners.

Section 6 outlines the climate resilience strategy for rural water supply and sanitation. The strategy aligns with the UNICEF Strategic Framework for WASH Climate Resilient Development and incorporates Climate Risk and Vulnerability Assessments (CRVAs), hazard mapping and climate-informed planning into rural water infrastructure design and management.

Consistent with international best practice, the Master Plan promotes strengthened asset management, climate-informed infrastructure planning and evidence-based investment decisions supported by improved public financial management.

The proposed **Climate Resilient Water and Sanitation Fund (CRWSF)** will finance climate adaptation measures, including:

- ✓ Strategic stores of critical pipes, fittings, pumps and spare parts;
- ✓ Retrofitting infrastructure to improve resilience to cyclones, floods and other climate hazards;
- ✓ Asset rehabilitation and reduction of water losses;
- ✓ Development of alternative and diversified water sources; and
- ✓ Other priority climate adaptation investments identified through WSMPs and DWSSSPs.

Climate-proofing measures will be incorporated into revised engineering design standards and appraisal guidelines, addressing hazards such as flooding, cyclones, drought, subsidence and extreme temperatures.

The Master Plan recognises that Fiji is already undertaking significant work to strengthen climate resilience through the AIIB-supported **Strengthening Climate Resilience of Rural Infrastructure in Fiji** programme. Hazard mapping developed under this initiative will support DWS in prioritising investments in the communities most vulnerable to climate change.

The Master Plan also promotes greater energy efficiency through the expanded use of renewable energy technologies, particularly solar-powered desalination plants, boreholes and packaged water treatment systems. DWS will continue to evaluate and pilot emerging technologies through its research and development programme to improve the sustainability, resilience and affordability of rural water services.

Investment Plan

Section 7 presents the **5-year (2026–2030)** and **long-term (2031–2050)** Investment Plans for rural water supply and sanitation. Together, these phased investment programmes provide the financial framework required to achieve universal, sustainable and climate-resilient rural water and sanitation services by 2050.

The Investment Plan is implemented in two phases:

- **Phase 1 (2026–2030):** Focuses on expanding access to sustainable and climate-resilient rural water supply and sanitation services across Fiji's four administrative divisions, consistent with the National Development Plan (NDP) and Sustainable Development Goal 6 (SDG 6) targets.

- **Phase 2 (2031–2050):** Builds on the infrastructure established during Phase 1 by progressively strengthening long-term service sustainability, resilience, asset management and regulatory oversight in line with the Vision 2050 objectives.

Investment requirements are grouped into four principal categories covering water supply and sanitation.

Water Supply

Division Rural Water Supply Programmes

These programmes comprise the core investment in rural water infrastructure identified through the Fiji National Rural Water Point Mapping Survey (NRWPMS). Investments include the construction of new schemes, network expansion, rehabilitation and renewal of existing infrastructure, upgrades to surface water sources, storage reservoirs, Ecological Purification Systems (EPS), and household rainwater harvesting systems. Routine repairs and maintenance of water sources and distribution networks are addressed separately under the asset management programme.

Rural Water Supply Technology

Innovations

The Master Plan also provides for investment in innovative technologies that improve service reliability, operational efficiency and climate resilience. These include solar-powered packaged water treatment plants, solar-powered desalination systems and solar-powered groundwater boreholes for suitable locations.

Sanitation

New and Upgraded Sanitation Systems

Investment includes the construction of new septic systems, rehabilitation of existing septic tanks and installation of communal septic systems where appropriate.

While the Master Plan estimates the cost of a comprehensive septic tank upgrade programme, responsibility for household on-site sanitation remains with individual households. Government financial assistance is proposed only for households experiencing extreme poverty through a targeted subsidy programme.

Faecal Sludge Management Programme

The Investment Plan provides for the development of an integrated faecal sludge management system, including Faecal Sludge Treatment Plants (FSTPs), vacuum trucks, mini-vacutugs and Mobile Treatment Units (MTUs) for remote and maritime communities.

Climate Resilient Water and Sanitation Fund

To support long-term sustainability, the Master Plan proposes the establishment of a **Climate Resilient Water and Sanitation Fund (CRWSF)**. The Fund will provide a dedicated financing mechanism for asset management, climate adaptation and resilience measures, priority sanitation investments, and other activities identified through Drinking Water Safety, Security and Sanitation Plans (DWSSSPs).

The proposed funding requirements include:

- **Asset management and climate resilience**: An allocation equivalent to 2% of the capital investment costs for new rural water supply and sanitation infrastructure during 2026–2030 is proposed to finance asset management and climate-proofing measures. This equates to US$15.124 million (FJ$34.271 million).

- **Targeted sanitation subsidy**: Government assistance is proposed for households living in extreme poverty through a targeted subsidy covering the full cost of upgrading septic systems. The subsidy is limited to the estimated 5% of eligible households below the national poverty line and will be administered through the CRWSF. The estimated cost over the 2026–2030 investment period is FJ$64.10 million (US$28.3 million).

- The governance arrangements for the CRWSF are modelled on the successful Fiji Rural Electrification Fund (FREF). Subject to Government approval, the Fund would operate under the strategic oversight of the **National Water Resources Management Coordination Committee**, with a dedicated CRWSF Board responsible for investment decisions and fund administration.

The Board would comprise representatives from relevant government ministries and agencies, while the broader Stakeholder Coordination Platform would provide technical and advisory support.

The Department of Water and Sewerage (DWS), in its role as the national water sector regulator and coordinator, would serve as the Secretariat to the Fund and oversee its administration. Implementation of approved programmes and projects would be supported by the Rural Water Supply and Sanitation (RWSS) Unit in collaboration with relevant implementing agencies and development partners.

Institutional Strengthening

The Master Plan also includes investment in strengthening the institutional capacity of the DWS and the Rural Water Supply and Sanitation (RWSS) Unit. These investments are essential to ensure that the sector has the technical, regulatory and operational capacity required to sustain both existing and future infrastructure.

Provision has been made within the Investment Plan for additional staffing, institutional support and capacity development over and above existing operational budgets.

The Master Plan further proposes a Behaviour Change and Communication (BCC) Programme to promote improved hygiene practices, increase demand for safely managed sanitation, and strengthen community ownership of rural water and sanitation services. This programme should be integrated with capacity-building activities undertaken through the DWSSSP process.

Summary of Investment Requirements

The estimated investment requirements are summarised below:

- **Division-based Rural Water Supply Programmes (2026–2030): US$176 million (FJ$398 million)** for new infrastructure, network expansion and rehabilitation.

- **Rural Water Supply Technology Innovations (2026–2030): US$13 million (FJ$30 million)** to support innovative technologies, including solar-powered packaged water treatment plants, desalination systems and groundwater boreholes.

- **Sanitation Subsidy Programme (2026–2030): US$28.3 million (FJ$64.10 million)** to provide targeted assistance to eligible households living in extreme poverty

- **Faecal Sludge Management Programme (2026–2030): US$1.6 million (FJ$3.6 million)** for treatment facilities, equipment and supporting infrastructure.

- **Institutional Support (to 2050): US$28 million (FJ$63 million)** for strengthening DWS, together with **US$6 million (FJ$14 million)** for the RWSS Unit. Existing DWS staffing costs to 2050 are estimated at **US$21 million (FJ$48 million).**

- **Climate Resilient Water and Sanitation Fund (2026–2030): US$15 million (FJ$34 million)** for asset management and climate adaptation measures.

Indicative operational expenditure (OPEX) requirements for rural water supply and sanitation through to 2050 are also presented in Section 7. These costs are expected to be met primarily through community contributions, user fees and local fundraising, with additional support provided where necessary.

Projected inflation has been incorporated into the Investment Plan to reflect anticipated cost escalation over the 2026–2030 implementation period. Capital costs are projected to increase by **12.7%** for expenditures denominated in Fiji dollars and **12.1%** for foreign currency expenditures denominated in US dollars.

Financial and Economic Analysis

Section 8 presents the financial and economic analysis of the Master Plan, including the cost-benefit analysis.

Financial and Economic Analysis, with the detailed cost-benefit analysis included as an appendix.

Financing Strategy

The proposed financing strategy adopts a blended funding approach involving Government, development partners, communities and other stakeholders.

- **Division-based Rural Water Supply Programmes** will be financed through Government appropriations and development partner support. This includes institutional strengthening for DWS and the RWSS Units.

- **Water Supply Technology Innovations** will primarily be financed by development partners.

- **Household On-site Sanitation** will remain the responsibility of individual households. However, households living in extreme poverty will be eligible for Government-funded subsidies administered through the CRWSF.

- **Faecal Sludge Management Infrastructure** will primarily be financed through development partner assistance.

- **The Climate Resilient Water and Sanitation Fund** will be financed through Government and development partner contributions, including opportunities to leverage climate finance and environmental trust funds.

- **Operation and Maintenance of Rural Water Supply and Sanitation Systems** will remain the responsibility of Community Water Committees under the Community Water Management Plus (CWM+) model. Where additional technical or financial support is required, the RWSS Unit will provide assistance, coordinated by DWS.

Economic Benefits

Investment under the RWSS Master Plan will generate substantial economic, social, environmental and public health benefits for rural communities and the nation as a whole.

The economic analysis quantifies benefits arising from:

Water Supply

- ✓ Increased access to reliable reticulated water supply.
- ✓ Increased household water consumption and improved service levels.
- ✓ Reduced household expenditure on water treatment and storage.
- ✓ Time savings associated with water collection.
- ✓ Improved public health through reduced incidence of waterborne diseases.
- ✓ Increased productivity and reduced income losses associated with illness.

Sanitation

- ✓ Reduced public health risks through improved on-site sanitation and faecal sludge management.
- ✓ Lower healthcare costs associated with improved sanitation services.

- ✓ The analysis also recognises a range of important non-monetised benefits, including environmental protection, employment creation, institutional capacity development, gender and social inclusion, tourism growth and broader economic development.

The economic assessment estimates an Economic Internal Rate of Return (EIRR) of 4.7% and an Economic Net Present Value (ENPV) of minus FJ$40.07 million, using an opportunity cost of capital of 5%. Although the EIRR is marginally below the benchmark discount rate, the analysis does not fully capture the substantial social, environmental, climate resilience and public health benefits generated by the programme, indicating that the overall economic value of the investment is likely to be significantly higher.

Institutional Functions of the Department of Water and Sewerage

Section 9 sets out the core regulatory and coordination functions of the Department of Water and Sewerage required to successfully implement the Master Plan.

These functions provide the institutional foundation for sustainable, climate-resilient service delivery and determine the staffing, skills and financial resources required to manage the sector effectively.

The six core functions are:

1. Management of the national digital platform, database and management information system.

2. National stakeholder coordination.

3. Oversight of planned periodic maintenance and investment programmes.

4. Review and approval of Water Supply Management Plans (WSMPs) and Drinking Water Safety, Security and Sanitation Plans (DWSSSPs).

5. Administration of performance-based financing, including technical support, capacity building and training for Community Water Committees.

6. Technical and financial auditing of Community Water Committees using the national digital platform.

Together, these functions establish a coordinated framework for planning, regulating and monitoring the rural water supply and sanitation sector.

The Master Plan proposes the following planning cycle:

Planning Cycle	Purpose
Annually (or as and when required)	Prepare and update Water Supply Management Plans (WSMPs) to guide capital investment in new infrastructure, system expansion and major rehabilitation.
Rolling programme	Prepare and regularly update Drinking Water Safety, Security and Sanitation Plan (DWSSSP) to strengthen asset management, climate resilience and sanitation improvements in all communities.
Annual	Update community action plans, monitor performance and implement routine improvement works through the DWSSSP process.
Emergency response	RWSS Unit provide rapid technical support for emergency repairs and service restoration, supported through dedicated contingency funding and stores inventories.

A comprehensive capacity-building programme will be required to enable DWS staff to effectively perform these functions. This should include professional development, specialised technical training and opportunities to learn from regional and international best practice.

Gender Equality, Disability and Social Inclusion

Gender Equality, Disability and Social Inclusion (GEDSI) should be integrated across all aspects of rural water governance, planning and service delivery.

DWS should ensure that women, persons with disabilities and other marginalised groups are meaningfully represented in decision-making processes at both the national and community levels. This includes participation in the **National Water Resources Management Coordination Committee**, the Stakeholder Coordination Platform, and all activities associated with the preparation and implementation of WSMPs and DWSSSPs.

Responsibility for mainstreaming GEDSI should be reflected within the organisational structure and staffing of DWS. In addition, a formal GEDSI assessment and risk management framework should be adopted to guide programme implementation.

Progress should be monitored through the national digital information platform using sex-, disability- and socially disaggregated data. The development of appropriate GEDSI indicators will strengthen monitoring, improve accountability and support evidence-based decision-making across the rural water supply and sanitation sector.

Implementation Arrangements, Stakeholder Coordination and Capacity Development

Section 10 outlines the functions of the Rural Water Supply and Sanitation (RWSS) Unit, which will play a central role in implementing the RWSS Master Plan and supporting the DWS in fulfilling its regulatory, coordination and capacity-building responsibilities.

RWSS Unit staff will work closely with sub-divisional health personnel from the Ministry of Health and Medical Services (MoHMS), implementing agencies, provincial authorities and other sector partners to strengthen rural water supply and sanitation service delivery.

A key priority for the RWSS Unit is to develop a comprehensive understanding of the WSMP and DWSSSP frameworks. This includes understanding the policy objectives for achieving safely managed, sustainable and climate-resilient water and sanitation services, the required service standards, and the principles for long-term operation, maintenance and cost recovery.

The RWSS Units will undertake four core functions:

1. **Planning, design and implementation** of rural water supply and sanitation projects.

2. **Capacity building and training** for communities, including supporting the preparation, implementation and periodic review of WSMPs and DWSSSPs.

3. **Technical support to Community Water Committees**, including guidance on operation and maintenance, asset management, emergency response and major maintenance works.

4. **Monitoring, inspections and reporting**, including undertaking field inspections, monitoring service delivery, and submitting performance reports to DWS to support regulatory oversight and evidence-based decision-making.

Successful implementation will require a cascading approach to capacity development. DWS will lead the orientation and training of RWSS Unit staff, who will in turn support implementing agencies, Community Water Committees and local communities. Targeted training programmes should focus on the practical application of the WSMP and DWSSSP frameworks, community engagement, technical support, monitoring and reporting.

Stakeholder Coordination Platform

Section 11 establishes the Stakeholder Coordination Platform, which will serve as the principal mechanism for coordinating implementation of the RWSS Master Plan and Investment Plan.

The Platform will promote collaboration across government agencies, development partners, non-government organisations and other stakeholders by facilitating strategic planning, information sharing, coordinated investment, capacity development and performance monitoring. It will be supported by the national digital platform, which will provide a common source of data, reporting and sector information.

The Platform will comprise three complementary governance arrangements:

- **National Water Resources Management Coordination Committee** – providing strategic leadership, policy oversight and sector coordination.

- **Climate Resilient Water and Sanitation Fund (CRWSF) Board** – responsible for governance and oversight of the Fund and investment decisions.

- **Stakeholder Advisory Committee** – providing technical advice, facilitating collaboration and strengthening engagement with development partners, civil society and other sector stakeholders.

Membership should include representatives from:

Core Government Agencies

- ✓ Department of Water and Sewerage (DWS)
- ✓ Water Authority of Fiji (WAF)
- ✓ Ministry of Health and Medical Services (MoHMS)
- ✓ Ministry of Lands and Mineral Resources
- ✓ Ministry of iTaukei Affairs
- ✓ Ministry of Rural and Maritime Development
- ✓ Ministry of Finance
- ✓ Ministry of Environment and Climate Change
- ✓ Ministry of Tourism
- ✓ Ministry of Multi-Ethnic Affairs and Poverty Alleviation
- ✓ Other relevant ministries and agencies with responsibilities for water resources, catchment management, disaster risk reduction and climate resilience.

Provincial and Local Government

- ✓ Provincial Administrations
- ✓ Roko Tui Offices
- ✓ Other local government representatives to strengthen community engagement and implementation.

Development Partners and Civil Society

- ✓ Bilateral and multilateral development partners
- ✓ United Nations agencies, including UNICEF
- ✓ Non-government organisations and Support Organisations, including Rotary Pacific
- ✓ Academic and research institutions, where appropriate.

The Stakeholder Coordination Platform will pursue the following objectives:

Develop a common understanding of the status and performance of Fiji's rural water supply and sanitation sector.

- ✓ Coordinate sector priorities and investment programmes.
- ✓ Promote joint approaches to capacity development and technical assistance.
- ✓ Improve coordination of Government budget allocations and development partner financing.
- ✓ Facilitate sharing of data, research, lessons learned and evidence-based decision-making.
- ✓ Monitor implementation of the RWSS Master Plan and Investment Plan.

As the national water sector regulator and coordinator, DWS will be responsible for convening meetings, preparing agendas, coordinating reporting and providing secretariat support to the National Water Resources Management Coordination Committee, the CRWSF Board and the Stakeholder Advisory Committee.

Digital Platform

Section 12 presents the national Digital Platform, comprising an integrated database, Management Information System (MIS) and asset management system to support evidence-based planning, regulation and sector coordination.

The Digital Platform will provide a single source of reliable information for Government, implementing agencies and development partners and will support:

- ✓ Management and analysis of the Fiji National Rural Water Point Mapping Survey as the national baseline.
- ✓ Preparation and monitoring of Water Supply Management Plans and Drinking Water Safety, Security and Sanitation Plans.
- ✓ Village and settlement level water demand assessments.
- ✓ A comprehensive national asset register using both survey data for existing assets and "as-built" information for newly commissioned infrastructure.
- ✓ Hazard mapping and climate risk assessments.
- ✓ Investment planning and expenditure tracking.
- ✓ Monitoring of service improvements and infrastructure performance.
- ✓ Tracking of key performance indicators and sector benchmarks.
- ✓ Development of standard reporting templates, applications and monitoring protocols.

This integrated information system will improve coordination, strengthen regulatory oversight and support monitoring and evaluation across the rural water supply and sanitation sector.

Capacity Development

Section 13 identifies the capacity-building requirements necessary to implement the RWSS Master Plan effectively.

The successful implementation of the WSMP and DWSSSP frameworks will require coordinated investment in institutional strengthening, technical training and community development.

DWS and the Ministry of Health and Medical Services have already established a strong foundation through the development of Training of Trainers programmes, Facilitator Guidelines and accreditation processes for training providers.

The next priority is to scale up these initiatives nationally through stronger partnerships with non-government organisations and other Support Organisations to deliver provincial training programmes.

For DWS, priority capacity needs include strengthening regulatory capability, policy implementation, data management, performance monitoring and sector coordination through recruitment and professional development of suitably qualified personnel.

For the RWSS Unit, training should focus on implementation of the WSMP and DWSSSP frameworks, technical support to Community Water Committees, emergency response, performance monitoring, reporting and benchmarking.

Implementation Priorities

Section 14 identifies the priority actions required to operationalise the RWSS Master Plan.

The immediate priorities are to:

1. Obtain Government approval of the RWSS Master Plan and Investment Plan.
2. Enact the Water and Sewerage Services Bill to establish DWS's regulatory and coordination functions.
3. Assign or recruit the staff required to implement the new institutional arrangements.
4. Establish the National Water Resources Management Coordination Committee.
5. Develop and implement a Monitoring and Evaluation Framework for the RWSS Master Plan.
6. Establish the dedicated Rural Water Supply and Sanitation Unit, including the transfer of the WAF Rural Water Programme where approved by Government.
7. Establish the Climate Resilient Water and Sanitation Fund and its governance arrangements.
8. Establish the Stakeholder Advisory Committee and operationalise the Stakeholder Coordination Platform.
9. Operationalise the national Digital Platform, including the national asset register and Management Information System.
10. Regularly update the Fiji National Rural Water Point Mapping Survey and expand it to include asset condition assessments, local water demand surveys and climate hazard mapping.

11. Mobilise Government funding, development partner assistance and climate finance to support implementation of the Investment Plan.

12. Implement comprehensive capacity-building programmes for DWS, RWSS Unit, Community Water Committees and implementing agencies.

13. Develop and implement a Gender Equality, Disability and Social Inclusion (GEDSI) Framework, including assessment guidelines, risk management procedures and monitoring indicators linked to the implementation of WSMPs and DWSSSPs.

These actions provide the foundation for implementing the RWSS Master Plan and establishing an integrated, well-coordinated and sustainable rural water supply and sanitation sector that delivers safe, resilient and inclusive services for all rural communities in Fiji.

1. Rationale for the Rural Water Supply and Sanitation Master Plan

1.1 Need for the RWSS Master Plan

The need for a RWSS Master Plan is recognised in Fiji's key national policies, strategies and development plans. These include:

- ✓ Fiji National Development Plan (2025–2029) and Vision 2050
- ✓ Fiji Water Sector Strategy 2050
- ✓ National Adaptation Plan

Collectively, these national frameworks recognise that while significant progress has been made in urban water supply and sewerage services through the Water Authority of Fiji (WAF), there remains a need for a dedicated strategic framework to guide investment, service delivery and institutional development for rural water supply and sanitation. They also emphasise the importance of integrating climate resilience into future planning and investment.

The RWSS Master Plan responds to this strategic need by providing a coordinated framework for planning, financing and implementing sustainable, climate-resilient rural water supply and sanitation services throughout Fiji.

The Master Plan builds upon Fiji's emerging institutional, policy and legislative framework, including:

- » **National Water Resources Management and Sanitation Policy (2026):** Establishes the overarching policy framework for water resources management, sanitation and sector governance, including the establishment of the **National Water Resources Management Coordination Committee**, convened by the Department of Water and Sewerage (DWS).

- **Rural Water and Sanitation Policy :** Defines the roles and responsibilities of government agencies, implementing partners and communities, and establishes the framework for planning, financing and implementing rural water supply and sanitation projects. The Policy is currently being revised to align with the reforms proposed under this Master Plan.

- **Draft Water and Sewerage Services Bill (2026):** Establishes DWS as Fiji's national water services regulator, with responsibility for sector coordination, approval of sector plans, monitoring of service standards and oversight of sector performance.

- **Fiji Integrated Water Resources Management (IWRM) Plan (2026):** Provides the national framework for the sustainable management, protection and allocation of Fiji's water resources, ensuring that water resource planning supports long-term water security and resilient service delivery.

- **Community Water Management:** Under the current policy framework, Community Water Committees are responsible for the routine operation and maintenance of rural water supply systems.

- **Planning and Investment Framework:** The sector currently utilises Water Supply Management Plans (WSMPs) and Drinking Water Safety, Security and Sanitation Plans (DWSSSPs) to guide planning, investment and service improvement at the community level.

- **Implementation Arrangements:** The Water Authority of Fiji (WAF) is currently the principal implementing agency for rural water supply infrastructure, working alongside the Ministry of Health and Medical Services (MoHMS), the Ministry of Lands and Mineral Resources (MLMR), non-government organisations (NGOs) and development partners.

The successful implementation of the RWSS Master Plan is closely linked to the enactment of the Draft Water and Sewerage Services Bill (2026). The Bill provides the legislative basis for DWS to perform its regulatory, coordination and oversight functions, which are fundamental to achieving sustainable, accountable and climate-resilient rural water and sanitation services. Without these institutional reforms, the long-term objectives of the Master Plan cannot be fully realised.

The Master Plan also recognises the need for stronger political commitment and increased investment in rural water supply and sanitation. Historically, national investment has been heavily concentrated on urban water and wastewater infrastructure delivered through WAF. Major infrastructure programmes, including the Fiji National Infrastructure Investment Plan and externally financed urban water projects, have focused predominantly on urban centres.

This investment pattern is reflected across the Pacific. UNICEF estimates that annual investment in water, sanitation and hygiene (WASH) across the Pacific Island Countries and Territories (PICTs) was approximately **US$230–270 million** in 2023. Excluding Fiji, total annual investment falls to approximately **US$90–120 million**, demonstrating Fiji's significant share of regional investment. However, much of Fiji's recent expenditure has been directed towards major urban infrastructure projects rather than rural service delivery.

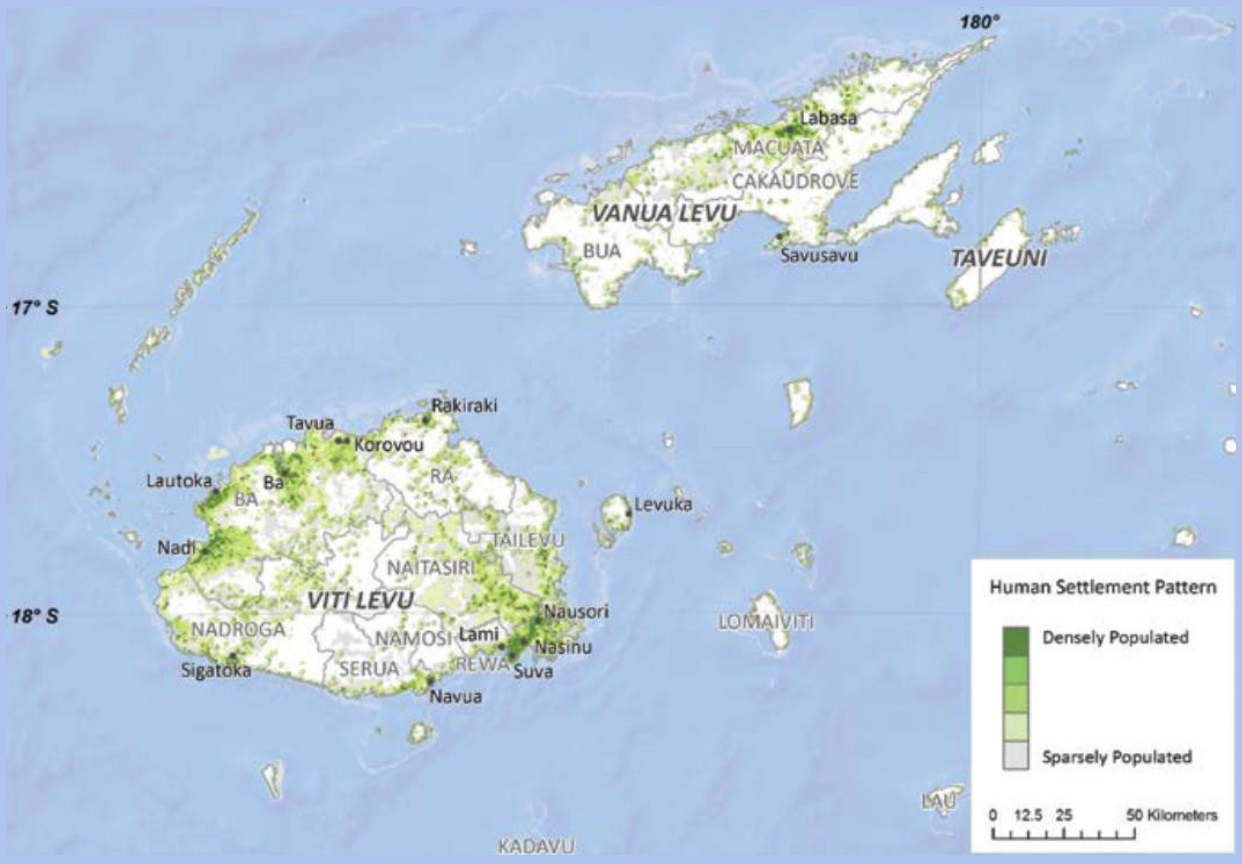
Investment in Fiji's rural water supply sector has remained below **US$10 million per year** and has declined in recent years. At the same time, there has been limited dedicated investment in rural sanitation, with no sustained budget allocation or coordinated advocacy for improving sanitation services.

This underinvestment has contributed to declining implementation capacity, including a significant reduction in staffing within WAF's Rural Water Programme. These challenges are discussed in greater detail in **Section 3**.

Access to safe water supply and sanitation also varies significantly across Fiji. According to the 2017 Population and Housing Census, Fiji had a population of approximately 884,887, of whom 44.1**%** lived in rural areas. Urban populations are concentrated primarily in the Central and Western Divisions of Viti Levu and around Labasa in the Northern Division, where services are largely provided by WAF.

By contrast, the Northern and Eastern Divisions have lower population densities but a much higher proportion of rural and remote communities. Many of these communities continue to experience limited access to reliable, climate-resilient water supply and safely managed sanitation services. These geographic disparities highlight the need for a coordinated national approach that ensures equitable investment and service delivery across all four administrative divisions.

The RWSS Master Plan provides this framework by establishing a nationally coordinated, evidence-based approach to planning, investment and service delivery that prioritises sustainability, climate resilience and equitable access for all rural communities in Fiji.



Source: Climate Vulnerability Assessment. Making Fiji Climate Resilient. World Bank, 2017
Figure 1: Human Settlement Patterns in Fiji

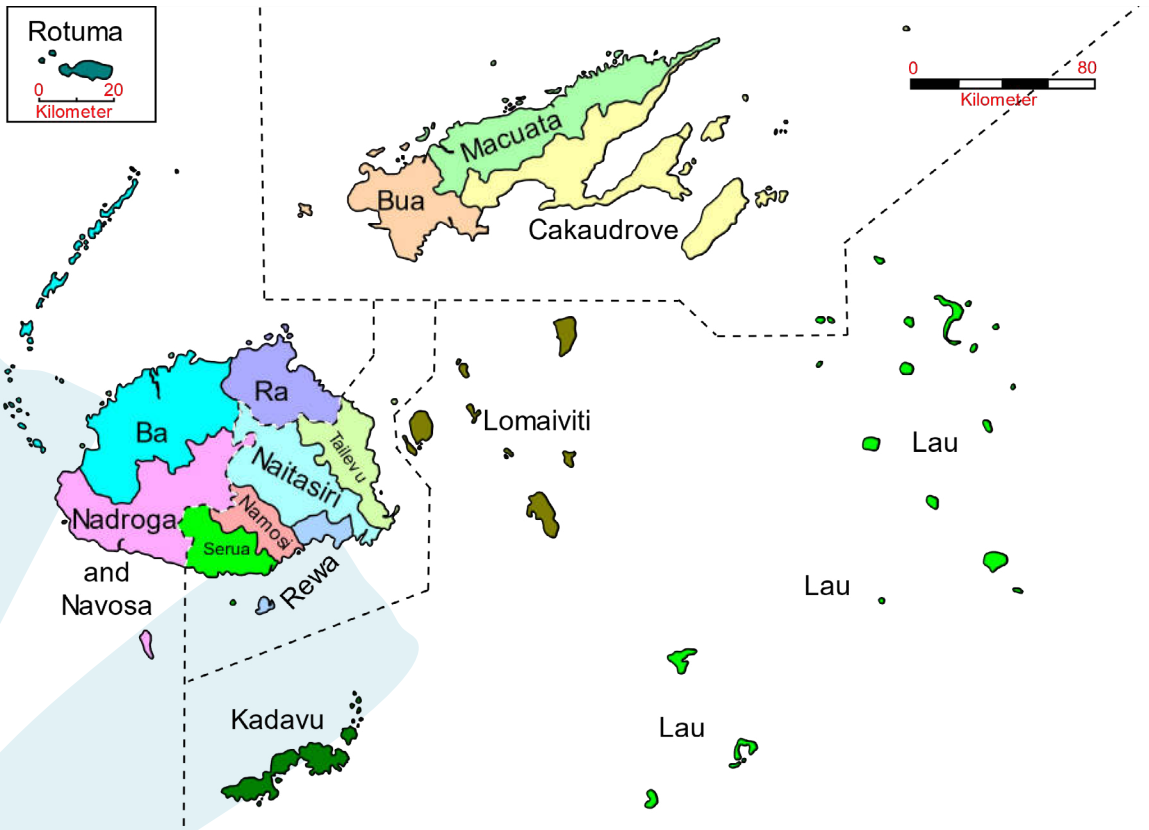


Figure 2 : 4 Divisions and 14 Provinces of Fiji

Considering that Fiji has approximately 1,600 rural villages and settlements. (see Chapter 2), the scale of the investment and implementation challenge is substantial. Of these communities, 436 are already connected to Water Authority of Fiji (WAF) reticulated water supply systems. Consequently, approximately 1,164 villages and settlements will require planning, investment or service improvements during the first implementation phase (2025–2030).

Achieving this target will require interventions in an average of 233 communities each year, representing a significant increase in the current rate of implementation and highlighting the need to strengthen national implementation capacity.

Current implementation levels illustrate this challenge. WAF completed 19 rural water supply schemes in 2023, 15 in 2024, and 9 in 2025, reflecting a declining rate of project delivery. The Ministry of Health and Medical Services (MoHMS) currently plans to implement approximately 20 Drinking Water Safety, Security and Sanitation Plans (DWSSSPs) annually as part of its operational programme. The Ministry of Rural and Maritime Development (MRMD) has also launched an ambitious programme to drill 1,700 boreholes over the next three years, supported by private drilling contractors, more than 50 newly recruited project officers, and a dedicated reticulation team to accelerate implementation.

Development partners and non-government organisations also make important contributions. For example, Rotary Pacific implements approximately 20 rural water supply and sanitation projects each year. While these initiatives are valuable, they remain insufficient to meet the scale of investment required under the RWSS Master Plan.

Addressing this implementation gap will require a coordinated, division-based delivery model supported by significantly increased investment, strengthened institutional capacity and sustained development partner engagement. As outlined in Section 7, successful implementation will depend on a combination of Government funding, development partner financing and technical assistance.

The Master Plan therefore proposes dedicated Rural Water Supply and Sanitation (RWSS) Units to coordinate implementation at the divisional level, supported by project management resources and accredited Support Organisations, including non-government organisations where appropriate. Strengthening the capacity of both the Department of Water and Sewerage (DWS) and the RWSS Units will be critical to improving sector coordination, regulatory oversight, project delivery and long-term service sustainability.

1.2 Community Water Management Plus (CWM+)

A key reform introduced under the RWSS Master Plan is the transition from traditional Community Water Management (CWM) to Community Water Management Plus (CWM+).

The CWM+ model recognises that while community ownership remains fundamental to the long-term sustainability of rural water supply systems, communities require ongoing technical, institutional and financial support to consistently deliver safe, reliable and climate-resilient services. Rather than relying solely on community management, CWM+ establishes a supported service delivery model that combines community ownership with stronger government oversight, technical assistance and performance monitoring.

Under the CWM+ approach, Community Water Committees will continue to be responsible for the routine operation and maintenance of local water supply systems. However, these responsibilities will be supported through structured capacity building, regular technical assistance, performance monitoring, asset management planning and access to emergency response mechanisms provided by the RWSS Units and coordinated by DWS.

The CWM+ model also introduces clearer service standards, stronger accountability mechanisms and improved regulatory oversight. WSMPs and DWSSSPs will provide the planning and risk management framework for continuous service improvement, while the national digital platform will support monitoring, reporting and evidence-based decision-making.

This approach is consistent with recommendations from the International Water Centre (IWC) under the Pacific Community Water Management Plus (PaCWaM+) research programme, which emphasise that sustainable rural water services require ongoing institutional support, strengthened governance arrangements, performance monitoring and continuous capacity development rather than reliance on community management alone.

The RWSS Master Plan operationalises the CWM+ model by clearly defining the regulatory, coordination and support functions of DWS, the implementation responsibilities of the RWSS Units, and the complementary roles of Community Water Committees and partner organisations. These institutional arrangements, described in detail in Chapter 10, provide the foundation for achieving safe, sustainable and climate-resilient rural water supply and sanitation services across Fiji.

2. Status and Needs for RWSS

2.1 National Rural Water Point Mapping Survey

The **National Rural Water Point Mapping Survey (NRWPMS)** provides the first comprehensive national baseline for rural water supply and sanitation in Fiji. It establishes the foundation for a national digital database, an asset register, and evidence-based planning to guide future investment and service improvements across the sector.

The NRWPMS is intended to be the starting point of a continuous data improvement process. Over time, the database will be progressively strengthened through:

- ✓ follow-up verification and clarification with individual villages and settlements;
- ✓ preparation and periodic updating of WSMPs and DWSSSPs;
- ✓ asset condition assessments, water demand surveys, hazard mapping and the development of a comprehensive national asset register;
- ✓ implementation of emergency works, asset management programmes and climate resilience measures;
- ✓ annual community reporting on the implementation of improvement plans and service performance;
- ✓ technical and financial audits undertaken by the DWS, in collaboration with the RWSS Unit and the MoHMS; and
- ✓ ongoing performance monitoring through the national digital information platform managed by DWS.

Together, these activities will ensure that the database remains current, reliable and fit for purpose, providing the evidence base for planning, investment prioritisation, regulatory oversight and performance monitoring.

A comprehensive report has been prepared based on the findings of the National National Rural Water Point Mapping Survey. This chapter summarises the key findings relating to rural water supply and sanitation technologies, service providers, infrastructure condition and gaps in service delivery.

The survey collected demographic information for each village and settlement, including geographic location, population and household numbers. It also assessed the status, functionality and condition of household and community water supply and sanitation facilities, including those serving schools, health facilities and other public institutions.

In addition, the survey collected water quality samples, undertook preliminary water safety risk assessments, and documented the condition of existing infrastructure through field inspections and community interviews. Information on infrastructure requiring repair, rehabilitation, upgrading or expansion was also recorded. The survey results and supporting data have been compiled into a national database to support detailed analysis, planning and investment.

The survey covered 1,600 rural villages and settlements across Fiji's four administrative divisions, all 14 provinces, and Rotuma, representing a total rural population of approximately 671,440 people living in 154,905 households. This represents approximately 76% of Fiji's total population, based on the 2017 Population and Housing Census (see Table 1). The surveyed locations comprise approximately 1,200 villages and 400 settlements, with an average household size of 4.33 persons.

Table 1: Summary of Population and Households by Division and Province

Division and Province	Population	Number of villages and settlements	Number of households
Central	**203,558**	**424**	**35,098**
Naitasiri	26,413	101	5,488
Namosi	8,001	27	1,743
Rewa	49,904	78	11,671
Serua	43,510	56	3,470
Tailevu	75,730	162	12,726
Eastern	**37,779**	**253**	**9,587**
Kadavu	11,795	83	2,918
Lau	9,412	72	2,747
Lomaiviti	14,606	81	3,419
Rotuma	1,966	17	503
Northern	**143,696**	**409**	**33,722**
Bua	16,271	76	3,306
Cakaudrove	50,880	183	11,095
Macuata	76,545	150	19,321
Western	**286,407**	**514**	**76,498**
Ba	193,017	190	55,112
Nadroga	40,705	127	9,391
Navosa	18,902	78	4,047
Ra	33,783	119	7,948
Grand Total	**671,440**	**1600**	**154,905**

Source: National Rural Water Point Mapping Survey

2.2 Rural Water Supply

The NRWPMS identified 2 principal types of water supply namely the Urban WAF supply and the rural water supply systems operating across Fiji. The rural water supply systems include the households connected from dames to reservoir to household, households connected from dams to household, MRD borehole schemes, rainwater harvesting systems, Ecological Purification Systems (EPS), and privately owned water supply systems.

The survey also recognises a number of emerging technologies with the potential to strengthen rural water security and climate resilience. These include solar-powered packaged water treatment plants, solar-powered groundwater boreholes and upgraded solar-powered desalination systems.

Surface water-fed rural water supply schemes remain the predominant service model for rural communities and continue to represent the preferred option where suitable water sources are available. These schemes can be upgraded through the installation of EPS to improve drinking water quality. In peri-urban areas, extending existing WAF reticulated systems should also be considered where this is technically and economically feasible.

Table 2 summarises the distribution of water supply systems identified through the NRWPMS.

Table 2: Types of Rural Water Supply System

Water Scheme Type	No. locations	Percent of total
WAF Urban Water Supply	436	26%
Rural Water Scheme	961	57%
MRD Borehole Scheme	62	4%
Rainwater harvesting system	141	8%
EPS - Ecological Purification System	33	2%
Privately owned/supply system	48	3%
Total	**1,681**	**100%**

Source: National Rural Water Point Mapping Survey

The survey recorded 1,681 water supply systems, although this exceeds the 1,600 villages and settlements surveyed because some communities are served by multiple water sources. The survey confirms that rural water supply schemes account for the majority of water systems (57%), followed by WAF reticulated systems (26%), with boreholes, rainwater harvesting, privately owned systems and EPS comprising the remainder. In the survey EPS is identified as a type of water supply system however in future data collection verification of numbers is required as EPS systems are treatment systems connected to to rural water systems of the communities.

Rural Drinking Water Service Levels

According to the WHO/UNICEF Joint Monitoring Programme (JMP) (2022), rural drinking water services in Fiji comprise:

- ✓ **Safely managed:** 27.0%
- ✓ **Basic service:** 64.1%
- ✓ **Limited service:** 1.3%
- ✓ **Unimproved:** 3.5%
- ✓ **Surface water:** 4.2%

Under the JMP framework, a safely managed drinking water service must satisfy three criteria:

- ✓ water is accessible on premises;
- ✓ water is available when needed; and
- ✓ water is free from contamination.

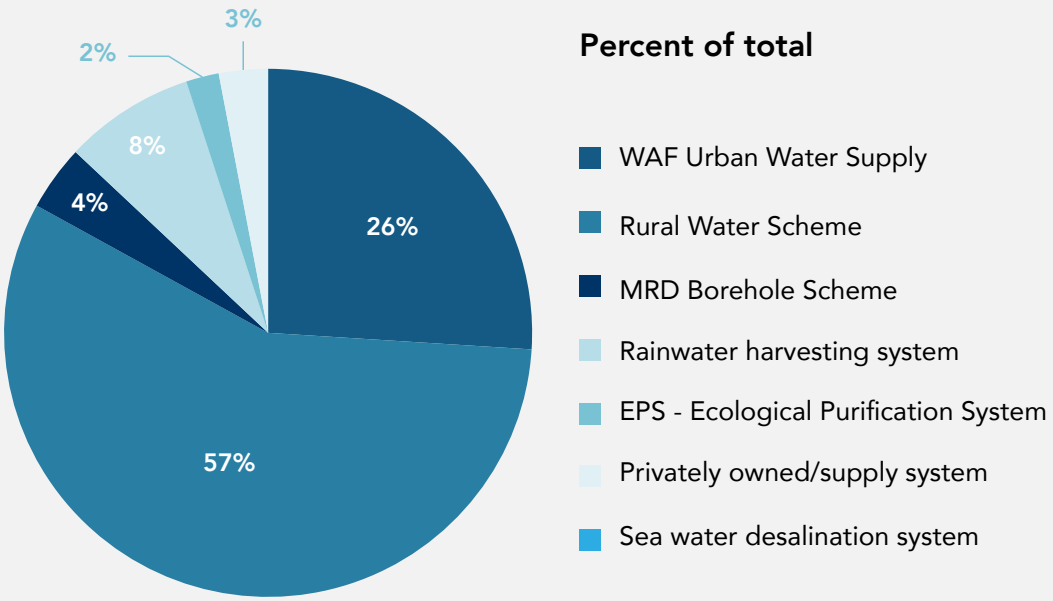


Figure 3 : Proportion of Different Types of Rural Water Supply System

In Fiji, most rural communities receive untreated piped water for domestic purposes, while treated drinking water is commonly collected from a nearby Ecological Purification System (EPS). Although treated water is not always piped directly to individual households, collection points are generally located within the community and can usually be accessed within a short walking distance.

Extending treated water connections to every household may not always represent the most practical or cost-effective solution. Such an approach could increase operational complexity, introduce additional risks of leakage and contamination within household distribution systems, increase water losses and exceed the design capacity of existing treatment facilities. Consequently, community-based drinking water collection points supported by well-maintained EPS facilities may continue to provide an appropriate and sustainable level of service for many rural communities.

Water Supply Reliability

The NRWPMS identified water supply reliability as one of the principal challenges affecting rural water services.

Approximately 61% of schemes reported interruptions during the dry season, while 50% experienced disruptions during the wet season. These findings indicate that many systems remain vulnerable to both drought and extreme rainfall events, highlighting the need for improved water source protection, system resilience, storage capacity and climate adaptation measures.

These results reinforce the importance of integrating climate-proofing measures into future planning and investment under the RWSS Master Plan.

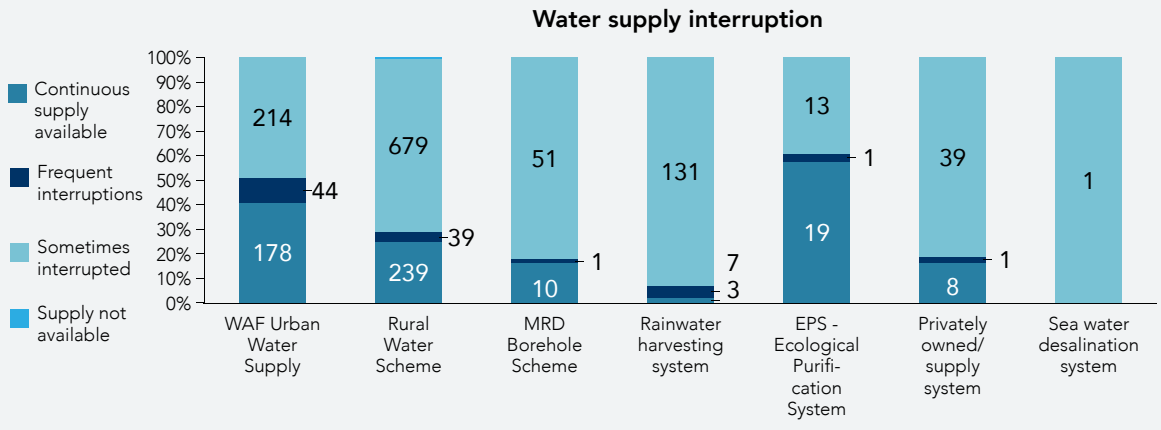


Figure 4 : Rural Water Supply Reported Interruptions

Water Treatment

The survey also identified significant gaps in drinking water treatment. Only 30% of surveyed water supply systems reported having some form of water treatment. Treatment coverage is highest within WAF systems, with approximately 94% of urban supplies receiving treatment. By comparison, treatment coverage remains substantially lower across rural water supply schemes.

The survey recorded 83 Ecological Purification Systems (EPS) serving approximately 961 rural water supply schemes, demonstrating considerable scope for expanding access to treated drinking water.

Table 3: Water Supply Treatment

Treatment Type	No. Of Locations
WAF Plain Chlorination System	54
WAF full Conventional Plant|WAF Plain Chlorination System	3
WAF full Conventional Plant|Nano Filtration System	1
WAF full Conventional Plant	351
Sand Filtration	8
Ecological Purification System	83
Bucket filtration	1
Total	**501**

Source: National Rural Water Point Mapping Survey

The Master Plan therefore identifies the expansion of water treatment infrastructure as a priority investment. Standardising the use of EPS technology where appropriate would simplify operation and maintenance, strengthen technical capacity, improve availability of spare parts and promote greater consistency in service delivery across rural communities.

Water Quality

As part of the NRWPMS, Compartment Bag Tests (CBTs) were undertaken to assess microbiological water quality, particularly the presence of *Escherichia coli (E. coli)*.

The results indicate that water quality remains a significant concern for many rural communities.

Approximately:

- ✓ 27% of water supplies were classified as high risk;
- ✓ 10% as intermediate risk;
- ✓ 11% as low risk; and
- ✓ 52% as presenting no significant risk.

Table 4: Results of the CBT Water Quality Risk Assessment

Risk Level	No. Locations	% of Total
High Risk	458	27%
Intermediate Risk	163	10%
Low Risk	181	11%
No Risk	878	52%
Total	**1680**	**100%**

Source: National Rural Water Point Mapping Survey.

WAF-managed urban water systems performed strongly, with approximately 91% classified as presenting no significant microbiological risk. In contrast, approximately 39% of rural water supply schemes were assessed as high risk, highlighting the need for improved treatment, source protection, routine monitoring and operational management.

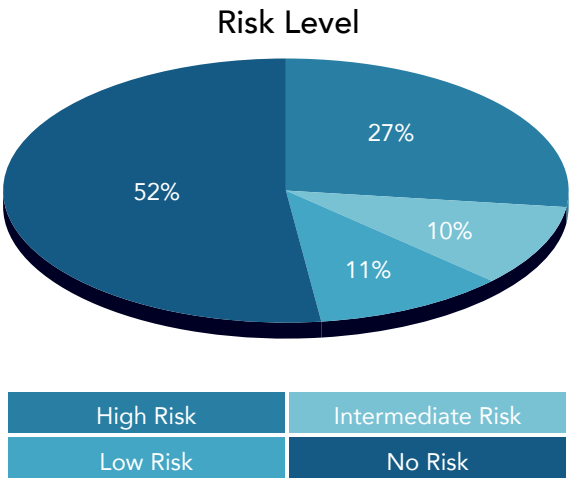


Figure 5 : Levels of Reported Risk from the CBT Tests

Sustainability of Rural Water Supply Systems

The NRWPMS also assessed the overall condition and sustainability of water supply systems.Only 13% of surveyed schemes were reported to have no significant operational issues or to be operating sustainably.

Performance varied considerably between service providers:

- ✓ WAF systems recorded the highest proportion of sustainable schemes (24%);
- ✓ MRMD borehole schemes achieved 20%;
- ✓ privately owned systems recorded 13%;
- ✓ rural water supply schemes recorded only 9%; and
- ✓ no rainwater harvesting or desalination systems were assessed as fully sustainable.

Table 5: Summary of No Issues and Sustainable Water Supply Reported

Main Water Supply Provider	No Issues	Sustain-able WS	Total	Total Schemes	% of all Schemes
Rural Water Scheme	46	35	81	930	9%
WAF Urban Water Scheme	79	30	109	446	24%
MRD Borehole Scheme	6	3	9	45	20%
Privately owned	5	0	5	39	13%
Rainwater harvesting	0	0	0	118	0%
Sea water desalination system	0	0	0	3	0%
Total	**140**	**68**		**1600**	**13%**

Source: National Rural Water Point Mapping Survey

The relatively low level of sustainability reflects a combination of ageing infrastructure, inadequate maintenance, insufficient treatment, limited technical support and increasing exposure to climate-related hazards.

Key Findings

The NRWPMS highlights several important findings for rural water supply planning and investment.

- **Access is generally not the primary constraint.** Most rural communities already have access to an improved water source, although treated drinking water is frequently provided through communal collection points rather than direct household connections.

- **Reliability remains a significant challenge.** Frequent supply interruptions during both the dry and wet seasons demonstrate the need for stronger asset management, improved source protection, increased storage capacity and climate-resilient infrastructure.

- **Water quality requires significant improvement.** Limited treatment coverage and the high proportion of schemes classified as high microbiological risk indicate the need to substantially expand drinking water treatment systems and strengthen routine water quality monitoring.

- **Ecological Purification Systems (EPS)** should continue to be promoted as the preferred treatment technology for rural surface water schemes, supported by standardised designs, maintenance procedures and technician training.

- **Long-term sustainability requires more than new infrastructure.** Future investment should balance the construction of new infrastructure with rehabilitation of existing systems, preventative maintenance, asset management, climate-proofing and ongoing technical support to Community Water Committees under the **Community Water Management Plus (CWM+)** approach.

Overall, the survey demonstrates that improving the sustainability and resilience of rural water services will require an integrated approach that combines infrastructure investment with stronger institutional support, improved operation and maintenance, enhanced water treatment and effective climate adaptation measures.

2.2 Rural Sanitation

The NRWPMS identified a range of sanitation facilities and wastewater disposal systems across rural Fiji. For the purposes of the survey, a flush toilet refers to a cistern flush toilet, while a water-seal toilet refers to a pour-flush pedestal toilet without a piped water connection. In practice, many households install cistern flush toilets but operate them as pour-flush systems due to limited or intermittent water supply.

The survey found that 94% of households have either a cistern flush or pour-flush toilet and water seal toilets, indicating that access to improved sanitation facilities is generally high. However, the principal challenge lies not with the toilet itself, but with the consistency in water supply and condition and performance of the onsite wastewater disposal system.

The survey recorded that 69% of households use septic tanks, while 31% rely on perforated plastic or metal drums for wastewater disposal. These findings provide an initial indication of the scale of investment required to replace or upgrade substandard disposal systems.

However, the survey did not assess the operational condition of septic tanks. Consistent with the assumptions used by UNICEF in reporting Fiji's Joint Monitoring Programme (JMP) data, the RWSS Master Plan assumes that approximately 50% of existing septic tanks are functioning effectively until a comprehensive asset condition assessment is undertaken. This highlights the need for detailed field-based inspections to establish the actual condition, functionality and remaining service life of onsite sanitation systems.

Table 6: Summary of Number of Households and Toilet Types

Toilet Type	No. Households	% of Total	Disposal Method
Flush toilet = cistern	133,979	86%	
Septic tanks		0%	87,296
Drums		0%	39,131
Water seal = pour flush	11,979	8%	
Cess pit	607	0%	
Pit toilet	5,546	4%	
Compost toilet	5	0%	
No toilet	3,585	2%	
Total	**157,901**	**100%**	**126,427**

Source: National Rural Water Point Mapping Survey

Faecal Sludge Management

The NRWPMS also examined current faecal sludge management practices and identified significant gaps across the sanitation service chain.

Only 11% of communities reported using vacuum trucks for desludging septic tanks, with 8% indicating that sludge is transported to Water Authority of Fiji wastewater treatment plants for treatment.

The remaining communities rely on a range of informal and environmentally unsustainable practices, including manual emptying, disposal at uncontrolled locations, or abandoning filled pits and constructing new ones.

Table 7: Summary of Faecal Sludge Disposal Methods

Faecal Sludge Disposal Method and Situation	No. locations	% of Total
Build a New Septic	125	8%
Collected by Bail Out trucks and disposed at the Wastewater Treatment Plants	123	8%
Collected by Bail Out trucks and disposed elsewhere	46	3%
Cover the pit with soil and dig new pit	763	49%
Pit hasn't filled up till now, so have not thought about it option	16	1%
Reuse septic after manual bail out and disposal	152	10%
Septic Tank hasn't filled up so haven't thought about it	346	22%
Total	**1571**	100%

Source: National Rural Water Point Mapping Survey

These findings demonstrate that faecal sludge management remains one of the weakest components of rural sanitation service delivery and requires substantial investment in desludging services, transport, treatment facilities and regulatory oversight.

Rural Sanitation Service Levels

According to the WHO/UNICEF Joint Monitoring Programme (JMP) (2022), rural sanitation services in Fiji comprise:

- ✓ **Safely managed:** 57.3%
- ✓ **Basic service:** 35.7%
- ✓ **Limited service:** 7.0%
- ✓ **Unimproved:** 0%
- ✓ **Open defecation:** 0%

A safely managed sanitation service requires the use of an improved sanitation facility that is not shared with other households and where excreta are safely contained, treated and disposed of, either onsite or offsite.

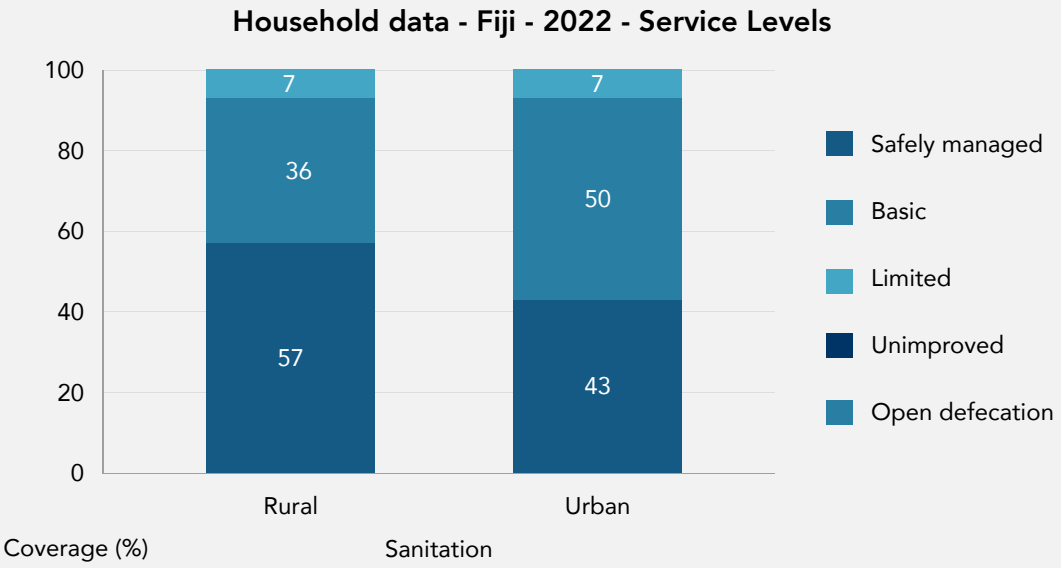


Figure 6 : JMP Data (2022) for Rural Sanitation

Key Findings

The NRWPMS highlights several important findings for rural sanitation planning and investment.

- Access to improved toilets is generally high, with approximately 94% of households using either cistern flush or pour-flush toilets.
- The greatest challenge lies in onsite wastewater management rather than toilet access. Many existing septic tanks and drum systems are likely to require upgrading or replacement, although their actual condition must be confirmed through detailed asset condition surveys.
- The consistency in water supply determines the type of toilet a particular household has which strongly calls for the improvmentment of water supply inorder to improve the sanation services across the rural communities of Fiji.
- Comprehensive sanitation asset assessments should therefore be incorporated into future Water Supply Management Plans (WSMPs), Drinking Water Safety, Security and Sanitation Plans (DWSSSPs), and the national asset register to accurately determine rehabilitation and replacement requirements.
- Faecal sludge management services are extremely limited. The low level of desludging, transport and treatment capacity presents significant public health and environmental risks, particularly to groundwater, rivers, coastal waters and sensitive ecosystems such as coral reefs.
- There is a strong justification for increased public investment in onsite sanitation improvements and faecal sludge management infrastructure, recognising the significant public health, environmental and climate resilience benefits that extend beyond individual households.
- In water-scarce communities, greywater reuse for toilet flushing should also be promoted where appropriate to improve water efficiency and strengthen climate resilience.

3. Existing Framework for Planning and Investment

This chapter outlines the current planning, institutional and investment framework for rural water supply and sanitation in Fiji. It describes the existing planning mechanisms, implementation arrangements, funding pathways and institutional responsibilities, while identifying the reforms required to support implementation of the RWSS Master Plan.

Particular emphasis is placed on WSMPs as the primary planning mechanism for rural water infrastructure and DWSSSPs as the principal community-based framework for managing water safety, water security, sanitation and public health risks.

3.1 Water Supply Management Plans

The WSMP is the primary planning and investment instrument for rural water supply and sanitation projects. The planning process is community-driven and follows a bottom-up approach through the Ministry of iTaukei Affairs and the Ministry of Rural and Maritime Development, with technical planning and implementation undertaken by WAF and other implementing agencies.

Under the proposed institutional framework, the Department of Water and Sewerage (DWS) will review and approve WSMPs to ensure that proposed projects meet national technical standards before Government funding is committed.

The WSMP is a critical governance tool. It provides the mechanism through which DWS can ensure that projects are technically sound, appropriately prioritised and aligned with community needs before implementation proceeds.

Experience has shown that weaknesses in the current planning process have resulted in projects being implemented with inadequate technical designs, investment proposals focusing on complete system replacement rather than priority rehabilitation works, and recurring rollover of capital works into subsequent budget cycles.

The ongoing revision of the Practical Guidelines for the Rural Water Supply Management Plan provides an opportunity to strengthen project appraisal, technical standards, prioritisation and regulatory oversight within the new institutional framework established under the RWSS Master Plan.

Currently, there is no nationally consistent framework for prioritising rural water supply and sanitation investments. The Master Plan therefore proposes that project prioritisation be coordinated through the National Water Resource Managment Coordination Committee, using transparent, evidence-based criteria supported by the national digital platform.

Water supply and sanitation planning should also be integrated with Integrated Village Development Plans and climate-resilient local development initiatives, including the Governance for Resilient Development programme supported by UNDP. Future WSMPs should incorporate Gender Equality, Disability and Social Inclusion (GEDSI) considerations by assessing whether all community members including women, persons with disabilities, older persons and other vulnerable groups have equitable access to water and sanitation services and meaningful participation in planning and decision-making.

Existing Investment Arrangements

Government funding for rural water supply and sanitation is currently distributed across several agencies.

In 2022, total Government investment was approximately **FJ$20 million**, including:

- approximately **FJ$9.4 million** allocated to WAF for new rural water infrastructure and rehabilitation;
- DWS funding for project inspections, Ecological Purification Systems (EPS), water quality monitoring, policy development and research into new technologies;
- approximately **FJ$2.1 million** allocated to the Ministry of Rural and Maritime Development for rural water supply, rainwater harvesting and sanitation initiatives;
- **FJ$2.7 million** allocated to the Ministry of Mineral Resources (MRD) for groundwater development, increasing to **FJ$5.7 million** in 2024 to support expanded borehole drilling and reticulation programmes. MRD has strengthened implementation capacity through additional technical staff and engagement of private drilling contractors; however, further investment may be required to achieve its target of drilling **1,700 boreholes** over the next three years;
- contributions from non-government organisations and development partners, including Rotary Pacific and Habitat for Humanity, for new and upgraded rural water supply schemes; and
- funding for the Ministry of Health and Medical Services to implement DWSSSPs, including approximately **FJ$435,000** in 2024.

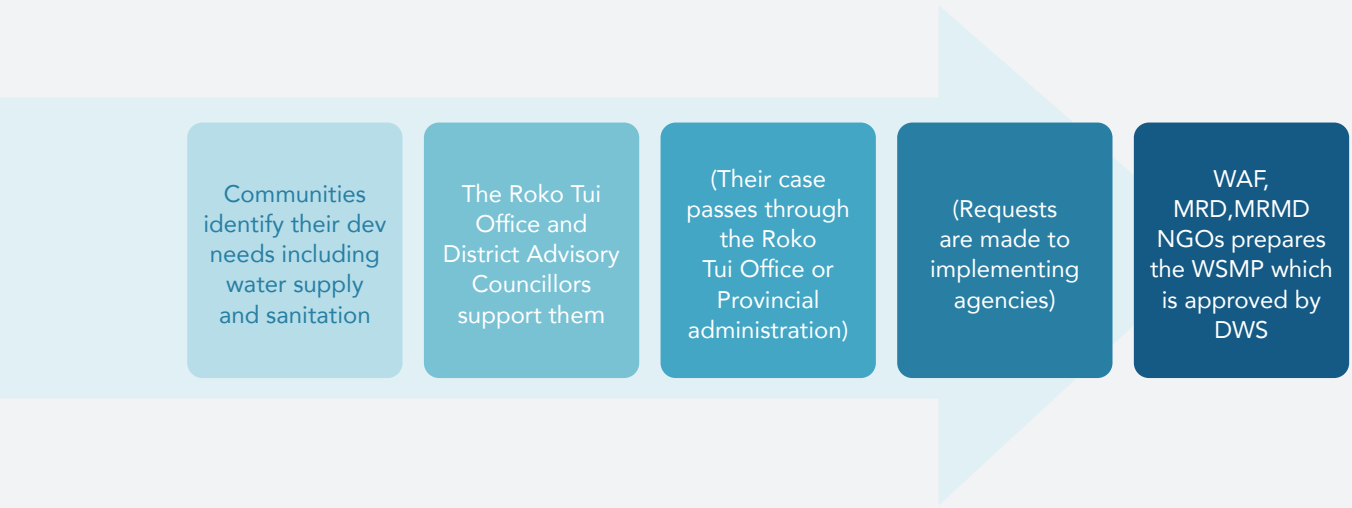


Figure 7 : The Administrative Process for WSMP

Despite these investments, rural water supply and sanitation programmes continue to operate largely independently, with limited coordination, no comprehensive national asset register and no integrated framework for monitoring service delivery or investment outcomes.

These institutional gaps reinforce the need for the governance reforms proposed under the RWSS Master Plan, including establishment of the National Water Resource Management Coordination Committee, a national digital platform incorporating an asset register and management information system, and a coordinated monitoring and evaluation framework.

Current Role of WAF

WAF remains the principal implementing agency for rural water supply and currently undertakes:

- ✓ construction and rehabilitation of rural water supply systems;
- ✓ distribution of rainwater harvesting tanks;
- ✓ emergency water carting;
- ✓ installation of Ecological Purification Systems (EPS); and
- ✓ operation and maintenance support for desalination plants.

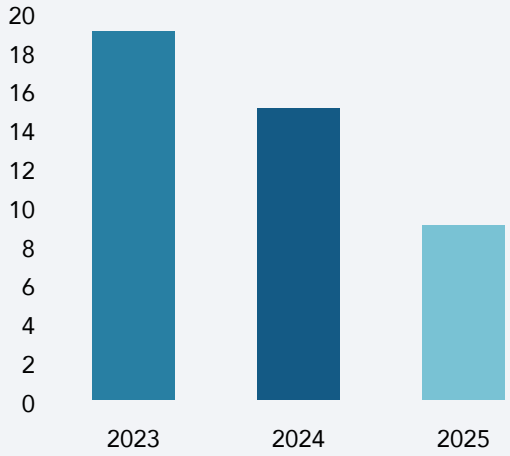


Figure 8 : Number of Rural Water Schemes Implemented by WAF 2023-2025

Between 2017 and 2023, WAF completed 353 rural water supply projects, benefiting an estimated 73,832 people, while also distributing 12,565 rainwater harvesting tanks to rural communities.

However, implementation has declined significantly in recent years, falling from 19 projects in 2023, to 15 in 2024, and 9 in 2025. This decline has coincided with a reduction in staffing dedicated to the rural water programme and the absence of dedicated Government funding for rural sanitation since 2010.

The RWSS Master Plan therefore proposes a strengthened institutional model in which DWS assumes responsibility for sector coordination, regulation and performance monitoring, while a dedicated Rural Water Supply and Sanitation (RWSS) Unit becomes the principal implementation and technical support agency.

This will be supported by a Stakeholder Coordination Platform, a national digital information system and an integrated water quality monitoring and surveillance programme to improve planning, investment coordination and long-term service sustainability.

3.2 Drinking Water Safety, Security and Sanitation Plans (DWSSSP)

UNICEF prepared the Pacific WASH Resilience Guidelines for DWSSP in 2018. The approach is based on the original WHO/IWA Water Safety Planning Guidelines but now modified to include climate-resilience including consideration of source sustainability. In Fiji, MoHMS with support from the International Water Center (IWC) has expanded the concept to include sanitation and watershed management, i.e. DWSSSP. The approach has a focus on capacity building and training at community level and health-based risk informed planning.

Communities prepare an Action Plan which they implement themselves, with larger works implemented with technical support from implementation agencies like WAF. Improvements are linked to improved public health as the output, with the improved infrastructure a means to that end. The Action Plan is mainly for small works and maintenance tasks, rather than large capital works or rehabilitation.

In addition to water availability and water quality the approach also includes assessment of sanitation risks and upgrades. The main surveillance activities carried out by MoHMS are for waterborne disease and drinking water quality surveillance.

Dengue fever, leptospirosis and typhoid fever along with diarrhoea are the major communicable public health concerns in Fiji. Each is also climate sensitive. Dengue outbreaks are linked to wet conditions that favour mosquitos breeding. Leptospirosis is thought to be a higher risk following floods due to closer proximity to leptospirosis vectors (infected animals or soil and water contaminated by faeces of infected animals). Typhoid is endemic in Fiji and outbreaks are noted following floods and cyclones with close proximity of people in evacuation centres and compromised sanitary and hygiene facilities. Diarrhea is known to be linked to poor water and sanitation which are compromised during droughts and floods.

These public health risks can also affect the tourist industry.

In terms of the budget for DWSSSP, this is included in the MoHMS business plan. Currently the target is for 20 DWSSSP for the year with at least one from each of the 14 provinces. The annual budget is FJ$150,000 although for 2025, FJ$300,000 was requested. Funds can be boosted by using underutilized funds from other MoHMS programmes. In 2024 the total funding was boosted to FJ$435,000.

The funds cover the training programme as well as small works and maintenance tasks implemented by the communities themselves as set out in their Action Plan. Training is normally five days spread over several weeks typically on a Monday and Tuesday so as not to impact farming and marketing livelihood activities. The WASH programme does not just focus on DWSSSP but also covers the water quality testing, treatment technologies and the Clean Healthy Water WASH Manual, etc.

In addition to MoHMS environmental health workers, training is provided by several partner NGOs: WISH Fiji, Live and Learn, PCDF Fiji, Habitat for Humanity, and Wildlife Conservation Society.

The number of training events is set out in the business plan which is currently 20 per year. There is no limit if the budget and resources are available.

The training modality allows for both single and clustered communities to be trained. It is proposed that a Training of Trainers programme will help to scale up the dissemination the approach. NGOs can register under MoHMS and use the available Facilitator Guidelines and Training Materials to standardise the training.

Communities are encouraged to follow up on their Action Plans. However, there is a need to strengthen the follow up monitoring programme e.g. of disease outbreaks and water quality monitoring and surveillance with field test kits. This could support a process of communities updating their DWSSSP and Action Plan which may require some refresher training.

Under the RWSS Master Plan it is proposed that the DWSSSP can become embedded as a requirement for all Water Committees to access TA, funding and performance monitoring to incentivise implementation of improvement programmes on a periodic basis.

Important lessons will be taken from experience around the Pacific, e.g. Vanuatu such as.

- ✓ Accreditation of third party implementors is critical – experience from Vanuatu with Training of Trainers and ensuring they are accredited is important
- ✓ Every adjustment to DWSSSP requires new ToT which may be expensive, and
- ✓ Compliance monitoring of third party implementors is critical

3.3 An opportunity to improve asset management and sustainability of services

3.3.1 Assumptions

The WSMP is already established as the mechanism for villages/settlements to access technical support and funding to implement rural water supply and sanitation projects. The WSMP provide the "evidence" DWS needs to make the case for its annual budget allocation from MoF. While there is provision for sanitation, in practice it has mainly focused on development of rural water schemes and larger capital works.

While it is technical in nature it does provide a working mechanism to reach scale to 1,600 villages and settlements within a reasonable timeframe, i.e. the five-year period between 2025 to 2030. It should also be noted that The WSMP is a requirement under the existing rural water supply and sanitation programme. All implementing agencies are required to develop a WSMP for the project and submit to DWS for vetting and approval.

The DWSSSP approach is developed out of the original risk-based water safety planning methodology (WHO/IWA) which now also considers climate risk and vulnerability. This encourages a multi-barrier approach to reduce risks of contamination and damages by extreme weather events and natural hazards exacerbated by climate change.

The effectiveness of these "control measures" is verified through water quality monitoring and surveillance with a focus on health-based outcomes and other metrics to monitor resilience. The control measures can be implemented through community action plans, but more challenging work / emergency work requires technical support from external agencies.

The RWSS Master Plan makes the following assumptions for planning and investment:

Table 8: Assumptions for planning and investment

» The WSMP focuses mainly on rural water schemes and large capital works
» The DWSSSP focuses on water safety, water security and sanitation
» The DWSSSP is a good instrument for asset management and climate proofing
» Both the WSMP and DWSSSP provide capacity building and training
» MoHMS provides support to communities to implement their own action plans
» Other more challenging work / emergency work needs external support

3.2.2 Life-cycle costing

The overall objective for the Fiji RWSS Master Plan is to meet the NDP and SDG targets for safely managed water supply and sanitation and to ensure sustainable, resilient service delivery. This can be considered in two phases. Firstly, to achieve physical coverage to meet the 2030 NDP and SDG timeframes. Secondly, to ensure that the assets are sustainably managed. This requires consideration of all life-cycle costs.

The main considerations are for capital expenditure (CAPEX) for new infrastructure and expansion, capital maintenance (CAPMANEX) for rehabilitation (renewal and replacement) and asset management, and operational expenditure (OPEX) for day-to-day operations and minor repairs. In addition, there is the need to implement climate proofing measures.

To achieve these objectives requires that life-cycle costs are accounted for in the planning and investment process.

Table 9: Accounting for life-cycle costs

- **Capital works:** for new infrastructure and expansion - these are covered by the WSMP
- **Capital maintenance:** for rehabilitation (renewal and replacement) – larger works can be covered by the WSMP; asset management can be covered by DWSSSP
- **Operation and maintenance:** for day-to-day operations and minor repairs - is the responsibility of the WC
- **Climate proofing:** climate proofing is a part of the WSMP (for larger works), and included under the DWSSSP (for ongoing identification of risks and control measures)

Table 10: Key Questions for the implementation phases of the RWSS Master Plan

- WSMP should be carried out every 5 years for new infrastructure and expansion. This is usually prepared when projects are to be implemented.
- There should be one round of WSMP based on the NRWPMS (i.e. 2026 to 2030 to achieve physical coverage for SDG objectives)
- The periodic planning review should be based on a five-year cycle (comprehensive update of the NRWPMS and new WSMPs)
- DWSSSPs should be updated every year to reflect progress with community action plans
- WCs should update DWSSSPs annually (as part of management responsibilities) and submit annual reports to the MIS
- Rapid support for emergency works should be mobilised from RWSS Unit (also to be reported to the MIS)

4. Rural Water Supply Evaluation Framework and Technology Options

This section evaluates the technology options available for rural water supply in Fiji, drawing on current practices and emerging innovations. The objective is to identify solutions that are cost-effective, climate-resilient, easy to operate and maintain, and capable of being implemented at scale across diverse rural settings.

While affordability and long-term sustainability remain the primary considerations, the Government of Fiji is also committed to providing more equitable levels of water service across urban and rural communities. Advances in technology now present opportunities to improve rural service delivery through innovative solutions such as solar-powered desalination systems, solar-powered boreholes, and modular packaged water treatment plants. These technologies can strengthen both water security and water quality while enhancing resilience to climate change and natural hazards.

The assessment presented in this section is based on findings from the Fiji National Rural Water Point Mapping Survey (NRWPMS), ensuring consistency with the national baseline dataset. The survey results also underpin the investment costing model used to estimate the financial requirements for achieving the National Development Plan (NDP) and Sustainable Development Goal (SDG) targets for rural water supply and sanitation. The corresponding investment estimates are presented in Section 7.

Each technology option is evaluated against technical, operational, financial, environmental, and institutional considerations. The accompanying flow diagrams illustrate the key components of each system and the assumptions used in the assessment. Together, these provide a structured evaluation framework to support evidence-based planning and investment decisions.

4.1 Evaluation Framework for Rural Water Supply

The WHO/UNICEF Joint Monitoring Programme (JMP) service ladder defines rural drinking water services as follows:

- **Safely managed:** Drinking water from an improved source that is located on the premises, available when needed, and free from faecal and priority chemical contamination.

- **Basic:** Drinking water from an improved source that can be collected within a 30-minute round trip, including queuing time.

Achieving safely managed drinking water services is a key objective of the DWS. The principal challenge is to extend sustainable, climate-resilient services to approximately 1,600 rural villages and settlements by 2030 in line with the NDP and SDG targets. The suitability of different water supply technologies to achieve this objective is assessed throughout this section.

The NRWPMS identifies the following categories of rural water supply systems:

- **Rural water schemes** – Typically supplied from streams, creeks or springs, with a small number using wells, boreholes or rainwater harvesting.

- **WAF urban water supply extensions** – Communities connected to, or supplied through, the Water Authority of Fiji's existing urban reticulation networks.

- **MRD borehole schemes** – Boreholes developed by the Mineral Resources Department (MRD). While reticulation systems have traditionally been delivered by WAF and other implementing agencies, MRD now has funding and implementation capacity to undertake both borehole development and reticulation works.

- **Rainwater harvesting systems** – Predominantly household systems used for drinking water, although some community-scale installations also exist.

- **Ecological Purification Systems (EPS)** – These are not stand-alone water supply systems, but treatment facilities used to improve the quality of water supplied by existing rural water schemes.

- **Privately owned water systems** – Community or privately managed systems that require further assessment to determine their long-term suitability and service standards.

- **Desalination systems** – Used primarily in remote maritime communities where reliable freshwater surface or groundwater resources are unavailable.

An additional technology option considered under the RWSS Master Plan is the use of modular packaged water treatment plants. These systems are particularly suitable where communities have a reliable raw water source, relatively high population density (such as clusters of villages), and the capacity to contribute towards ongoing operation and maintenance through community water levies or user charges. Packaged treatment plants also provide an opportunity to deliver higher service standards comparable to urban water systems while maintaining operational efficiency in rural settings.



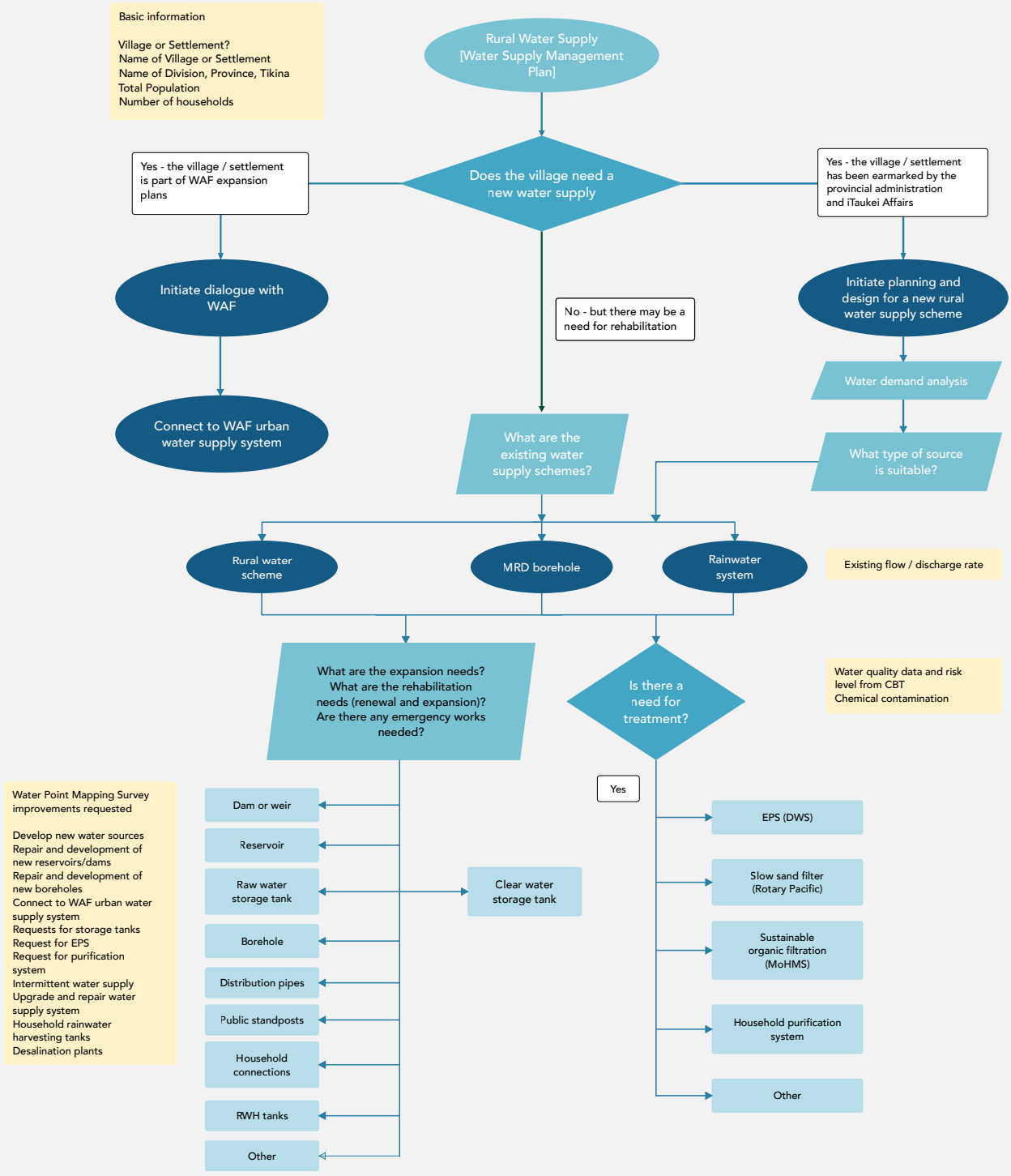


Figure 8 : Evaluation Framework for Rural Water Supply

4.2 Rural water supply systems and technology options

4.2.1 Rural Water Schemes

To achieve the criteria for safely managed drinking water services, water must be adequately treated and made available without collection placing an unreasonable burden or safety risk on households. For standard rural water schemes, this requires:

- ✓ Installation of an appropriate water treatment system, such as an Ecological Purification System (EPS); and
- ✓ Locating the EPS or supplementary treated water storage tanks within a reasonable walking distance of all households.

Rotary Pacific has successfully promoted a village-wide approach using slow sand filtration with treated water distributed directly to each household. Under the RWSS Master Plan, however, the EPS is proposed as the standard treatment technology because it is well suited to Fiji's rural context, is cost-effective, and can be readily standardised and scaled across communities.



Table 11: Advantages and Limitations of the Standard Rural Water Scheme

Advantages	Limitations
Proven and widely accepted technology with established operational experience in rural Fiji.	Requires two separate distribution systems—one for untreated raw water and one for treated drinking water.
Standardised design simplifies procurement of spare parts, operation, maintenance, and post-construction technical support.	Extending treated water from the EPS to every household can be technically challenging and costly.
Low capital and operating costs, with most routine maintenance undertaken by trained local technicians or Water Committees.	Household collection of treated water from the EPS remains necessary in most communities. However, where collection distances are short and safe, this is considered consistent with the intent of safely managed services in the rural Fiji context.
Existing rural schemes can be readily upgraded through installation of an EPS without replacing the entire system.	Concerns have been raised regarding long-term EPS maintenance. These risks can be substantially reduced through standardised designs, routine maintenance schedules, and strengthened technical support from the RWSS Unit.
The quantity of raw water available is primarily dependent on the reliability and sustainability of the source.	

Standard "rural water scheme" with surface water source (typically a stream, creek or spring). Now being upgraded with EPS treatment by DWS. Majority of villages will have this

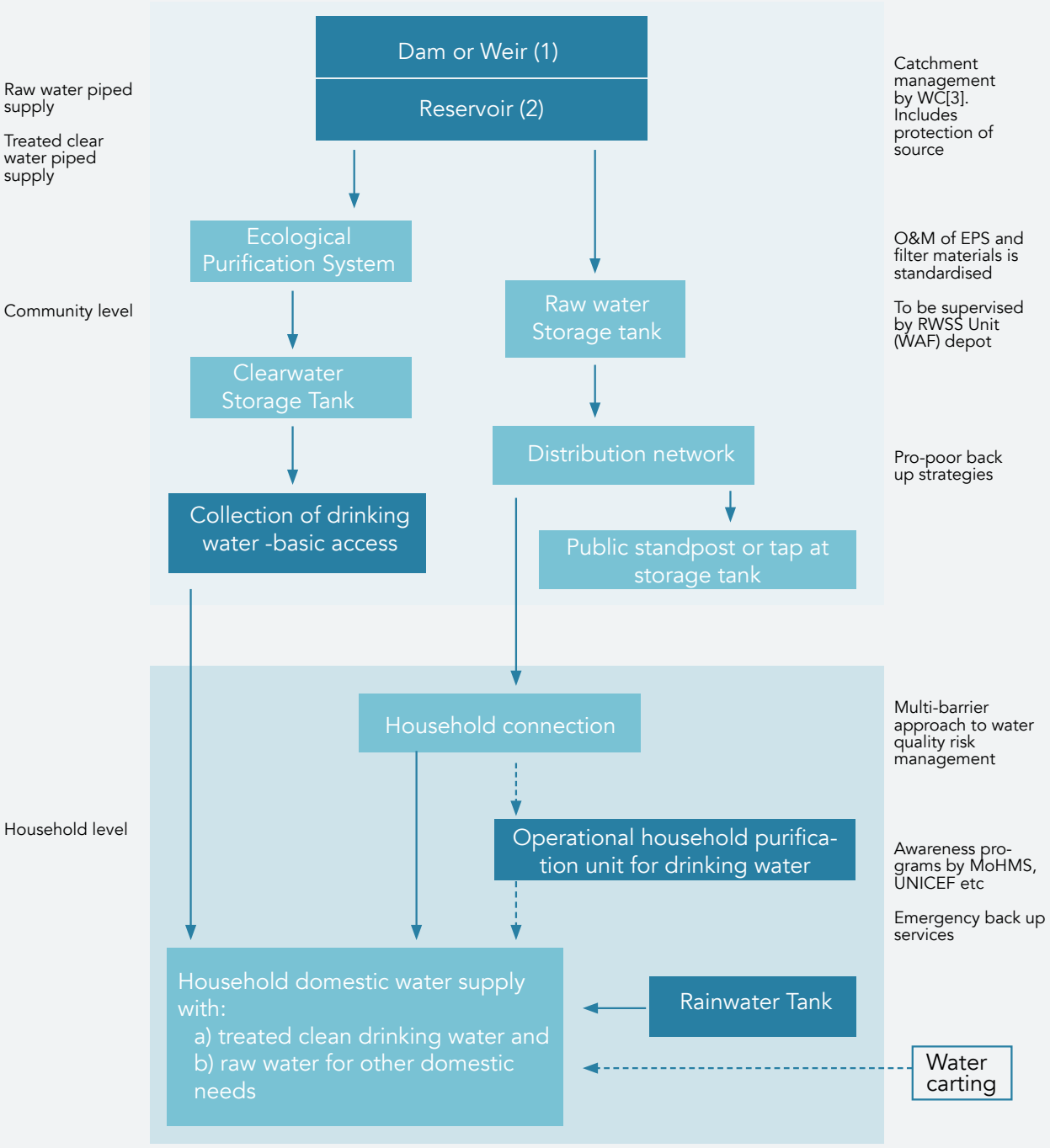


Figure 9 : Components of a Rural Water Supply Scheme

Notes:

1. a dam is large enough to establish a reservoir of water behind it; a weir diverts water but water flows over and does not establish a reservoir
2. in some cases there may be a need for low level pumps from reservoir to the village
3. raw water quality will determine if the sources is suitable or needs remediation works or an alternative source is needed

4.2.2 WAF Urban Water Supply

Water supplied through the Water Authority of Fiji (WAF) urban networks is treated and delivered through metered household connections, meeting the criteria for safely managed drinking water services under the WHO/UNICEF Joint Monitoring Programme (JMP).

The RWSS Master Plan does not propose additional investment in WAF urban water supply or sewerage infrastructure, as these systems are covered under WAF's own capital investment and asset management programmes. However, where urban networks are expanding into peri-urban and adjoining rural communities, opportunities to extend WAF services should be considered where technically, financially and operationally feasible.

Table 12: Advantages and Limitations of Connecting to WAF Urban Water Supply

Advantages	Limitations
Provides a high standard of treated, piped water with metered household connections.	WAF continues to face challenges related to ageing infrastructure, service reliability and financial sustainability.
Supports Government policy objectives under the National Development Plan and National Infrastructure Investment Plan to expand urban water services.	Existing systems may require capacity upgrades before additional communities can be connected.
Can facilitate improved sanitation services through sewerage networks, faecal sludge collection and wastewater treatment where available.	Household willingness and ability to pay WAF tariffs may influence the viability of network expansion.

4.2.3 Rainwater Harvesting Systems

Rainwater harvesting forms an important component of Fiji's rural water security strategy by providing an additional source of safe drinking water, particularly during periods of drought or interruptions to primary water supplies. DWS promotes household rainwater harvesting systems as part of a multiple-source approach to improving water resilience.

Eligible households in water-scarce areas or communities experiencing unreliable water supply may receive Government-supported rainwater harvesting tanks. However, all households are encouraged to invest in rainwater harvesting where practical.

When properly designed, installed and maintained, household rainwater harvesting systems provide drinking water directly on the premises and can contribute to achieving the criteria for safely managed drinking water services. Water quality depends on regular maintenance of roofs, gutters, first-flush devices, storage tanks and associated fittings, together with appropriate household hygiene practices.

Table 13: Advantages and Limitations of Rainwater Harvesting Systems

Advantages	Limitations
Provides a convenient source of drinking water at the household.	Water quality depends on regular maintenance of roofs, gutters, tanks and associated fittings.
Supports the Government's multiple-source water security strategy.	Construction of suitable tank foundations and associated infrastructure may be unaffordable for some households.
Well-established Government programme with existing implementation experience.	Continued education and awareness are required to ensure proper operation and maintenance.
Provides an alternative source of water during supply interruptions.	Water availability is seasonal and may be insufficient during prolonged dry periods unless adequate storage capacity is available.

4.2.4 MRD Borehole Schemes

Groundwater development has become an increasingly important component of rural water supply in Fiji, particularly in communities where reliable surface water sources are unavailable or vulnerable to drought. Since 2015, the Mineral Resources Department (MRD) has progressively expanded its role in groundwater development and reticulation, a function previously undertaken by the Rural Water Unit within the Public Works Department and the Ministry of Rural and Maritime Development.

By the end of the 2024–2025 financial year, MRD had completed reticulation works for 75 boreholes nationwide. More recently, MRD has been tasked with implementing the Groundwater Assistance Programme (GAP), funded through the Ministry of Finance, with a target of drilling 1,700 boreholes over the next three years. To support this programme, MRD has expanded its workforce by recruiting additional project officers, establishing dedicated reticulation teams, and engaging private drilling contractors to accelerate implementation.

Water from boreholes may be supplied through communal standpipes or direct household connections. However, groundwater quality varies across Fiji and may require treatment where naturally occurring constituents, such as iron or manganese, exceed acceptable drinking water standards.

Other organisations, including Rotary Pacific, have also expanded their groundwater development programmes by investing in drilling equipment to improve water access in underserved rural communities.

The RWSS Master Plan recognises groundwater as an important strategic water source and promotes borehole systems powered by solar energy where appropriate to improve operational sustainability, reduce operating costs and strengthen climate resilience.

Table 14: Advantages and Limitations of MRD Borehole Schemes

Advantages	Limitations
Appropriate where reliable surface water sources are unavailable.	Suitable groundwater is not available in all locations, and hydrogeological investigations are required before drilling.
Can provide a supplementary or backup water source for existing rural water schemes.	Groundwater quality may require specialised treatment where naturally occurring contaminants are present.
Solar-powered boreholes improve long-term operational sustainability and reduce energy costs.	Pumps, electrical equipment and control systems require specialised maintenance beyond the capacity of many Water Committees.
The Groundwater Assistance Programme has significantly expanded MRD's implementation capacity through additional staff and private sector contractors.	Long-term operation and maintenance arrangements require strengthening to ensure sustainability after construction.
Private drilling companies and development partners provide opportunities to scale up implementation.	Effective coordination between groundwater development, reticulation design and community management remains essential.
Borehole systems can improve water security and climate resilience in drought-prone communities.	Household service lines and plumbing remain potential sources of contamination if poorly installed or maintained.
Overall, groundwater development represents a significant opportunity to expand rural water access in Fiji.	However, its long-term success will depend on appropriate site selection, water quality management, sustainable operation and maintenance arrangements, and effective coordination between DWS, MRD, implementation partners and community Water Committees.

Boreholes developed by MRD should be upgraded with solar power

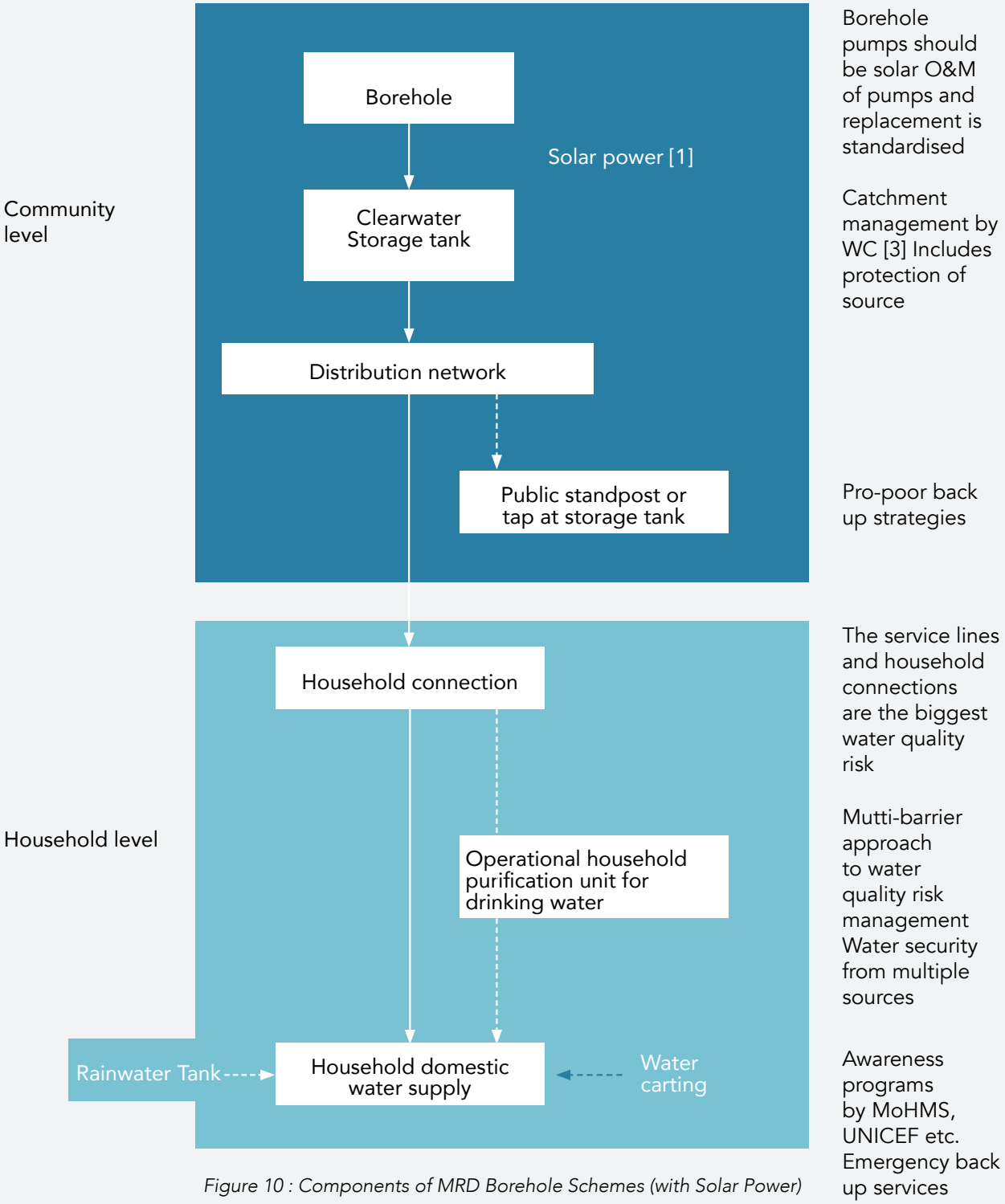


Figure 10 : Components of MRD Borehole Schemes (with Solar Power)

Notes:

[1] Solar power now promoted by DWS

Assumptions: Development of the bore and planning and construction of the reticulation system are well coordinated Groundwater is free of chemcial contamination (or suitable treatement technologies are readily available)

4.2.5 Seawater Desalination Systems

Recent advances in small-scale desalination technology have made seawater desalination a practical and increasingly cost-effective option for remote maritime communities where conventional freshwater sources are limited or unavailable. These systems are particularly suitable for islands where surface water is absent, and groundwater is saline, depleted or unsuitable for drinking.

Technological improvements including energy-efficient reverse osmosis systems, solar-powered operation, improved pre-treatment, and climate-resilient plant housing with air-conditioned enclosures have significantly enhanced system reliability while reducing operating costs. In addition, spare parts, including membranes and cartridge filters, together with operator training and technical support, are now more readily available through regional suppliers and manufacturers.

Desalination systems typically produce treated water that is stored in clear-water tanks before being distributed through public standpipes or household reticulation systems. To maximise resilience and reduce operating costs, desalination should be integrated with complementary water sources, such as rainwater harvesting, as part of a multiple-source water security strategy.

The RWSS Master Plan recognises seawater desalination as a strategic technology option for remote maritime communities where no viable alternative freshwater source exists.

Table 15: Advantages and Limitations of Seawater Desalination Systems

Advantages	Limitations
Provides a reliable drinking water source for remote maritime communities where surface water is unavailable and groundwater is saline, depleted or contaminated.	Capital and operating costs remain higher than most conventional rural water supply systems.
Modern systems can be powered by solar energy, reducing fuel costs and improving long-term sustainability.	Requires trained operators to manage reverse osmosis membranes, intake systems, pumps and water quality monitoring.
Can be integrated with rainwater harvesting to improve water security and reduce energy demand during the wet season.	Systems relying on diesel generators incur high fuel and transport costs, particularly in remote islands.
Spare parts, technical support and operator training are increasingly available through regional suppliers and manufacturers.	Replacement membranes and specialised spare parts can be costly and may not always be readily available in remote locations.
Attractive technology for development partner investment and public-private partnership (PPP) opportunities.	Distribution networks and household plumbing require ongoing maintenance to minimise water losses and prevent contamination.
Provides a climate-resilient solution where conventional freshwater resources are unreliable or unavailable.	Sustainable financing and long-term operation and maintenance arrangements are essential to ensure continued service delivery.

Overall, seawater desalination offers a viable and climate-resilient solution for Fiji's remote maritime communities. While it requires higher upfront investment and specialised technical support than conventional rural water supply systems, recent technological advances particularly in solar-powered systems have substantially improved its operational viability.

Under the RWSS Master Plan, desalination should be considered where hydrogeological assessments confirm that no sustainable freshwater source is available and where long-term arrangements for operation, maintenance and financing can be secured.

To be provided to remote maritime villaged or settlements facing water scarcity. To ensure that these neglected arears have the same standard of services as other areas. Complemented by rainwater harvesting in the wet season

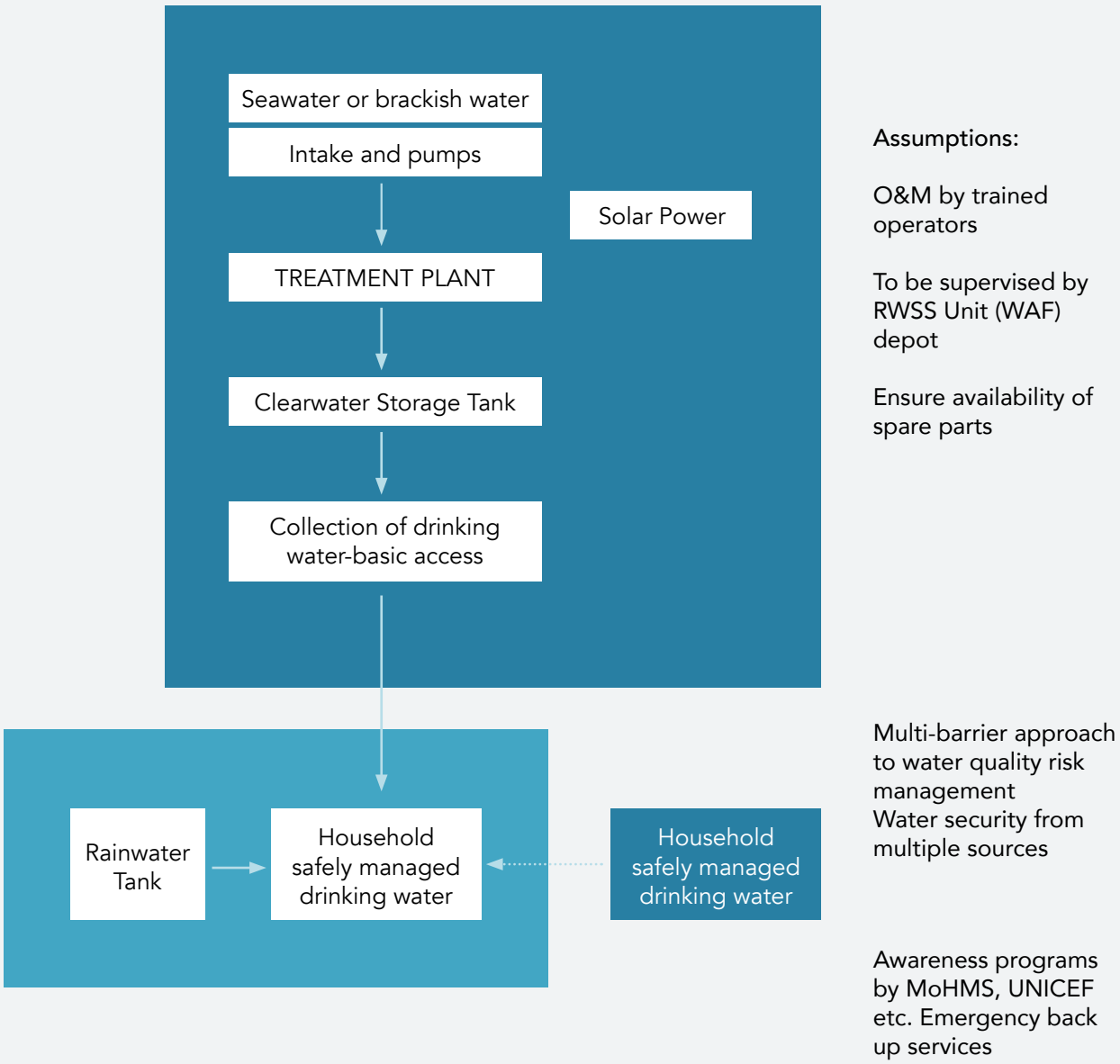


Figure 11 : Components of a Small-Scale Desalination Plant

4.2.6 Packaged Water Treatment Plants

A packaged water treatment plant is a compact, pre-engineered treatment system that integrates all essential water treatment components into a single modular unit, typically housed within a shipping container or skid-mounted frame. These systems are factory-built, tested prior to delivery, and designed for rapid installation with minimal on-site construction and commissioning. Their modular "plug-and-play" design also reduces operational complexity and facilitates easier maintenance.

Under the RWSS Master Plan, packaged water treatment plants represent a viable alternative where expansion of the WAF urban water supply network is not technically or economically feasible.

They are particularly suitable for larger rural or peri-urban communities, or clusters of villages, where there is a reliable raw water source, sufficient demand to justify the investment, and community willingness to contribute towards operation and maintenance through user charges or water tariffs.

Packaged treatment plants can deliver water that meets urban drinking water standards and provide an opportunity to pilot innovative service delivery models in rural Fiji. They may also be attractive to development partners and private sector investors interested in supporting climate-resilient and high-quality rural water infrastructure.



Table 16: Advantages and Limitations of Packaged Water Treatment Plants

Advantages	Limitations
Provides treated drinking water to urban service standards where extension of the WAF network is not feasible.	Capital and operating costs are generally higher than conventional rural water supply systems.
Factory-built, modular systems enable rapid installation and commissioning with minimal site works.	Requires sufficient population density and water demand to ensure operational and financial sustainability.
Technology is commercially available with established supplier support and warranty arrangements.	Communities must be willing and able to contribute to operating costs through water tariffs or user charges.
Local operators can be trained by equipment suppliers or experienced service providers.	Requires skilled operation and regular maintenance to ensure consistent water quality and system reliability.
Supply contracts often include commissioning, training, warranties and post-installation technical support.	Distribution networks and household plumbing remain potential sources of water loss and contamination if not properly maintained.
Well suited for development partner investment, demonstration projects and public-private partnership (PPP) models.	Long-term institutional arrangements for ownership, management and asset replacement must be clearly defined.
Can be deployed as pilot projects to demonstrate high-quality rural water services and innovative delivery models.	Reliable raw water sources and adequate energy supply are essential for sustainable operation.

Overall, packaged water treatment plants offer a promising option for delivering high-quality drinking water services to larger rural and peri-urban communities where conventional rural water systems may no longer be sufficient but extension of the WAF network is not feasible.

Under the RWSS Master Plan, these systems should be considered for strategic locations where population size, water demand, financial sustainability and long-term management arrangements support their successful operation.

Option for pilots at demonstration sites: the highest level of water supply service. Packaged plants: pipes treated water directly to the property.
This is a significant upgrade but too costly to provide to all villages.

The packaged plants can also be linked to emergency water service to ensure water security in the province.
Location criteria includes: a secure long-term source, willingness to pay the WAF connection fee and water tariffs, and economies of scale e.g. multi-village schemes.

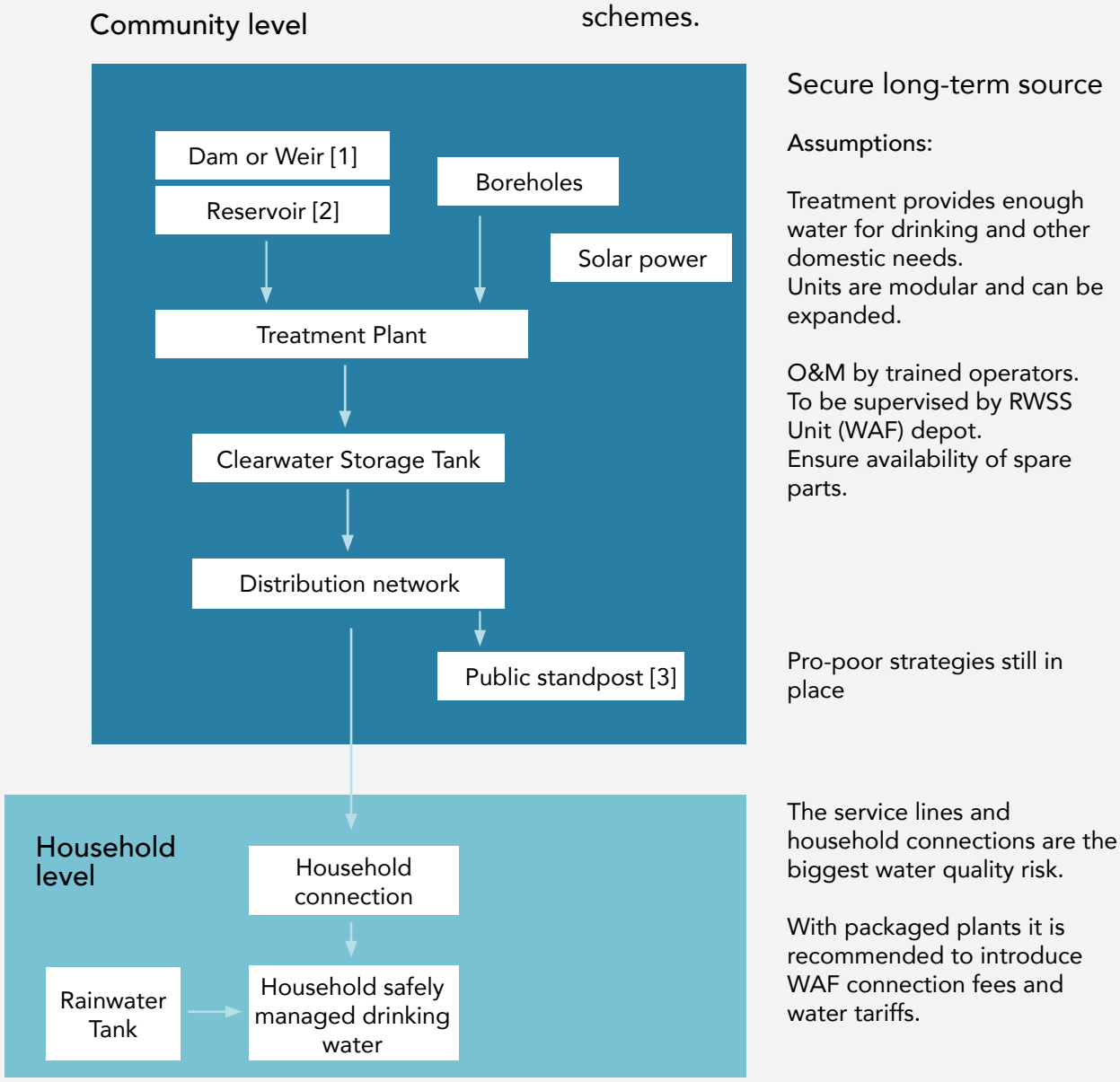


Figure 1: Components of a Packaged Water Treatment Plant

Notes:

[1] Household water purification is not needed.
[2] Water carting is not needed.
[3] If stored water is available for drinking, and for other domestic uses.

5. Sanitation and Faecal Sludge Management Evaluation Framework and Technology Options

Improving rural sanitation and faecal sludge management (FSM) is a national priority and is widely recognised by stakeholders as essential to protecting public health, water resources and the environment.

While significant progress has been made in improving access to household sanitation facilities, the safe collection, treatment and disposal of faecal sludge remain major challenges across rural Fiji.

The need to strengthen FSM is driven by several key factors, including:

- ✓ The poor condition and limited performance of many existing septic systems and other on-site sanitation facilities.
- ✓ Increasing access to piped water supplies, resulting in higher volumes of wastewater entering sanitation systems that were not designed for these flows.
- ✓ Inadequate drainage infrastructure, including open stormwater drains within many villages, which increases the risk of environmental contamination.
- ✓ Climate change impacts, including more frequent flooding, storm surges, sea-level rise and extreme rainfall events, which can damage sanitation infrastructure and cause untreated wastewater to contaminate surrounding environments.

These factors increase the risk of faecal contamination of groundwater, rivers, coastal waters and soils, with associated impacts on public health, drinking water quality, fisheries, tourism and sensitive ecosystems such as coral reefs. Although establishing a comprehensive rural faecal sludge management programme will require significant investment in infrastructure, institutional capacity and service delivery systems, the long-term costs of inaction are likely to be substantially greater.

The RWSS Master Plan adopts a differentiated approach to faecal sludge management based on settlement characteristics, population density, accessibility and proximity to existing wastewater infrastructure. Three broad service categories are proposed.

Type 1: Communities within Existing Wastewater Service Areas

These communities are located within, or close to, the service catchments of existing wastewater treatment plants (WWTPs), primarily in coastal areas of Viti Levu and Vanua Levu where population densities are relatively high.

For these communities, the preferred approach is the scheduled collection and transport of faecal sludge for co-treatment at existing WWTPs. This approach makes use of existing treatment infrastructure while reducing the risks of groundwater, surface water and coastal pollution.

Implementation will require:

- ✓ defining practical service catchments for vacuum truck operations;
- ✓ assessing the hydraulic and treatment capacity of existing WWTPs to receive additional faecal sludge; and
- ✓ developing sustainable service delivery and cost-recovery arrangements.

Type 2: Inland Rural Communities

These communities are generally dispersed and located inland, often along rivers and streams where access is more difficult and population densities are lower.Further technical investigations are required to better understand local hydrogeological conditions, soil characteristics and environmental risks associated with existing sanitation systems. These assessments should inform the selection of appropriate, locally suitable faecal sludge management solutions.

Under the RWSS Master Plan, detailed feasibility studies are recommended to identify cost-effective and environmentally appropriate service models for these communities, recognising that solutions may vary according to local conditions.

Type 3: Remote Maritime Communities

Remote islands and isolated coastal communities are typically located well beyond the practical service areas of existing wastewater treatment plants. These locations often rely entirely on on-site sanitation systems and are particularly vulnerable to groundwater contamination, coastal pollution and climate-related hazards.

For these communities, the RWSS Master Plan proposes the development of decentralised faecal sludge treatment facilities strategically located at, or near, DWS (formerly WAF) rural operational depots to serve defined service catchments. Where transport distances are excessive or access is limited, mobile sludge treatment technologies should also be considered to reduce sludge volumes before transport or final disposal.

This decentralised approach offers a practical and climate-resilient solution for improving sanitation services in Fiji's remote maritime communities while reducing environmental impacts and protecting fragile island ecosystems.

Across all three service categories, sanitation investments should be guided by risk-based planning, lifecycle asset management and public health outcomes. Consistent with the principles of the RWSS Master Plan, all new sanitation infrastructure should incorporate climate-resilient design and universal accessibility principles to ensure facilities are safe, inclusive and accessible for women, children, older persons and people with disabilities. This approach supports the Government's commitments to Gender Equality, Disability and Social Inclusion (GEDSI) while improving the long-term sustainability and resilience of rural sanitation services.

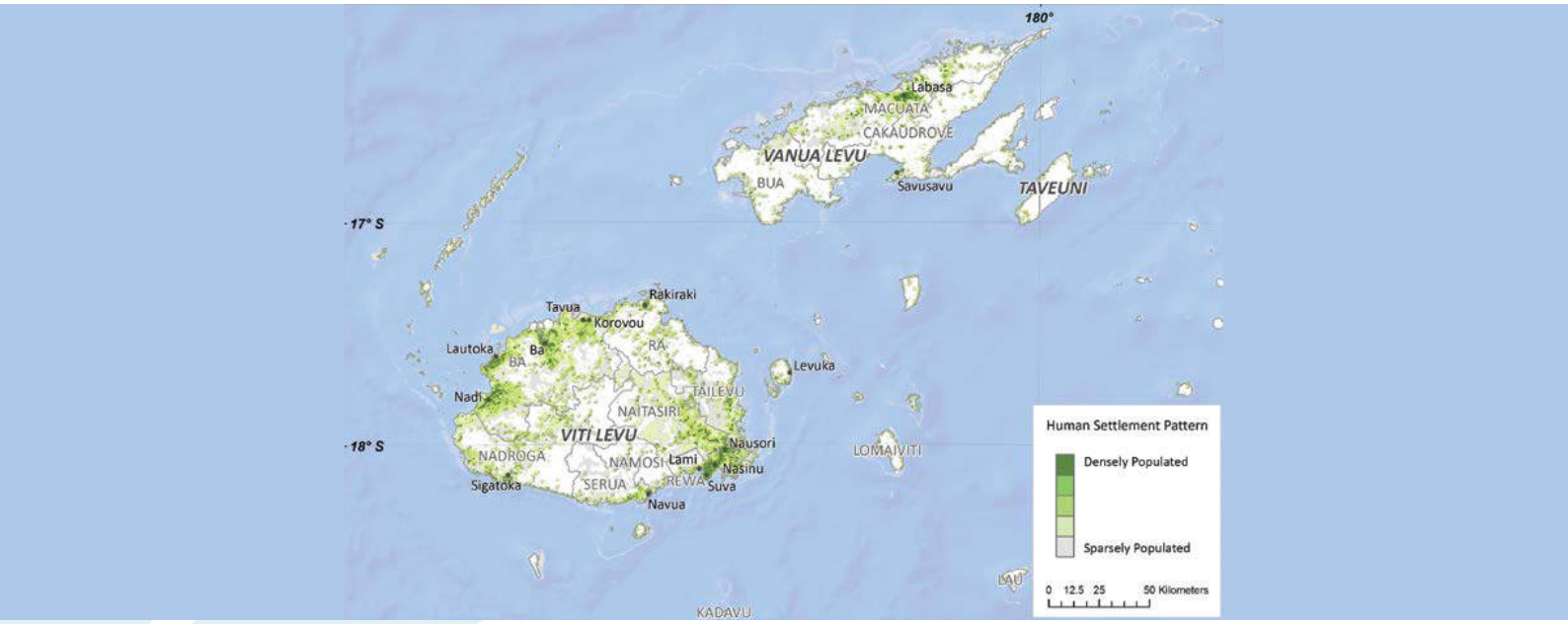


Figure 12 : Human Settlement Patterns in Fiji

5.1 Evaluation Framework for Sanitation and Faecal Sludge Management

Developing a sustainable rural faecal sludge management (FSM) system in Fiji requires consideration of the entire sanitation service chain from containment through to treatment and safe end use or disposal. The following principles underpin the RWSS Master Plan:

- ✓ **Containment:** Septic tanks with appropriate soak away systems for liquid effluent should be adopted as the standard on-site sanitation solution.
- ✓ **Emptying:** A scheduled desludging programme should be established to replace the current reactive or ad hoc approach.
- ✓ **Conveyance:** Investment is required in vacuum trucks and smaller vacuum units (vacutugs) capable of accessing narrow village roads and footpaths.
- ✓ **Treatment:** Further technical assessment is required to determine the most appropriate treatment options, including co-treatment at existing wastewater treatment plants (WWTPs) and the development of decentralised Faecal Sludge Treatment Plants (FSTPs).
- ✓ **End Use and Disposal:** Additional research is required to identify safe and economically viable reuse and disposal options, including biogas production, soil conditioners, and agricultural fertilisers.

Beyond infrastructure, the successful implementation of rural FSM will depend on strengthening institutional arrangements, establishing sustainable financing mechanisms, accurately quantifying sludge volumes and characteristics, and using spatial planning to optimise service areas and treatment facility locations.

A sustainable operating model must clearly define institutional responsibilities for the management and operation of FSTPs, vacuum trucks and vacutugs, together with the financing mechanisms required to support long-term service delivery. The Master Plan also recognises the potential role of the private sector in providing desludging, transport and treatment services through appropriate public-private partnerships.

It is proposed that staff based at WAF (or the future DWS Rural Water Supply and Sanitation Unit) rural depots be trained to operate decentralised FSTPs. In addition, as reliance on emergency water carting declines with improvements in rural water supply systems, water tanker operators could be progressively re-skilled to operate vacuum trucks and vacutugs, thereby retaining valuable operational capacity within the sector.

Reliable estimates of faecal sludge volumes and characteristics are essential for planning treatment capacity, determining the number and deployment of vacuum trucks, and assessing any modifications required for existing WWTPs to safely co-treat faecal sludge. Preliminary estimates have been prepared for the purposes of the RWSS Master Plan and Investment Plan; however, these should be refined through detailed technical studies during implementation.

Spatial analysis will also be required to establish an efficient area-based operational model for provincial FSM services. The proposed approach is to develop service areas centred on WAF (or the future DWS Rural Water Supply and Sanitation Unit) rural depots, enabling surrounding villages and settlements to be served through coordinated desludging and treatment programmes.

While indicative service areas have been identified for planning purposes, these will require further refinement through detailed engineering, logistical and financial assessments.

The strategies presented in this Master Plan provide the basis for estimating investment requirements for rural water supply, sanitation and faecal sludge management under the Investment Plan (2026–2030) and the Vision 2050 framework. As with water supply infrastructure, detailed project planning and investment decisions will ultimately be informed through WSMPs, which include site-specific engineering designs and Bills of Quantities (BOQs). A comparable planning framework should also be developed for faecal sludge management to support detailed implementation planning and investment programming. Consequently, the FSM strategy and associated cost estimates presented in this Master Plan should be regarded as indicative and refined progressively through detailed planning at community, provincial and national levels.

The preparation of the FSM Strategy under the RWSS Master Plan has followed the following key steps:

1. Identify sanitation systems requiring upgrading or replacement, using information from the NRWPMS together with supporting research, including studies undertaken by WISH Fiji.

2. Estimate faecal sludge generation based on household numbers, population data and existing sanitation infrastructure.

3. Assess desludging and transport requirements, including indicative schedules for emptying and collection. These estimates should be refined using Ministry of Health and Medical Services (MoHMS) septic tank design standards and household occupancy data.

4. Identify suitable sites for treatment facilities, prioritising land located within or adjacent to WAF (or future DWS Rural Water Supply and Sanitation Unit) rural depots to optimise operational efficiency.

5. Evaluate appropriate treatment technologies, including decentralised FSTPs and co-treatment at existing WWTPs, based on technical, environmental, operational and financial considerations.

This evaluation framework provides a structured basis for developing a sustainable, climate-resilient and financially viable rural faecal sludge management system that protects public health, safeguards the environment and supports the long-term objectives of the RWSS Master Plan.

5.2 Detailed Evaluation Framework for Faecal Sludge Management

The RWSS Master Plan recommends that a Faecal Sludge Management (FSM) Evaluation Framework be developed as an early implementation priority. While this Master Plan provides a strategic direction and indicative investment requirements, detailed technical, institutional and financial assessments will be required to support implementation.

The proposed FSM Evaluation Framework should be guided by the following principles:

1. **Risk-based planning:** Undertake sanitary risk assessments to determine the location, quantity and characteristics of faecal sludge requiring collection and treatment. Assessments should consider soil type, groundwater vulnerability, proximity to surface waters and coastal ecosystems to determine the most appropriate management approach. These assessments should form part of feasibility studies for decentralised Faecal Sludge Treatment Plants (FSTPs) and co-treatment at existing Wastewater Treatment Plants (WWTPs).

2. **Equitable service delivery:** Ensure all rural households have access to safe, reliable and affordable faecal sludge management services, recognising that effective sanitation is essential for protecting public health and the environment.

3. **Affordable financing:** Household charges should remain affordable, with Government support provided where necessary to encourage regular desludging and prevent environmental contamination.

4. **Efficient collection and transport:** Establish scheduled desludging services supported by appropriately sized vacuum trucks and vacutugs capable of accessing rural communities. Provincial operations should be coordinated through strategically located WAF (or future DWS Rural Water Supply and Sanitation Unit) depots.

5. **Appropriate treatment infrastructure:** Develop FSTPs based on detailed feasibility studies, ensuring facilities are climate-resilient, fit for purpose, operated by trained personnel and adequately maintained.

6. **Sustainable financing:** Capital investment should be mobilised through Government and development partners, while long-term operation and maintenance costs should be incorporated into Government budget planning, supported by appropriate cost recovery mechanisms where feasible.

7. **Regulatory oversight:** Develop a regulatory framework covering licensing of desludging operators, standard operating procedures, environmental standards, monitoring, reporting and compliance to ensure safe collection, transport, treatment and disposal.

8. **Climate resilience and future adaptability:** Design services and infrastructure to accommodate population growth, climate change, sea-level rise and increasing frequency of extreme weather events.

Scheduled Desludging Programme

Current practice in rural Fiji generally relies on households arranging septic tank emptying only after systems overflow or fail. This reactive approach poses significant public health and environmental risks, particularly through contamination of groundwater, rivers and coastal ecosystems.

The RWSS Master Plan therefore proposes the introduction of a scheduled desludging programme, managed at the provincial level and coordinated through WAF (or the future DWS Rural Water Supply and Sanitation Unit) rural depots. Communities would be serviced according to planned schedules rather than on demand, improving operational efficiency, reducing transport costs and ensuring regular maintenance of sanitation systems.

Technology Options for the FSM Service Chain

The technology options presented in Table 17 provide strategic guidance for selecting appropriate treatment solutions. Final technology selection should be based on detailed technical, environmental, financial and operational feasibility studies.

Table 17: Appropriate Treatment Options

Option	Recommended Strategy
1. **On-site burial or abandonment of sludge**	Discontinue this practice in areas that can be serviced by WWTPs or decentralised FSTPs. It should only be considered, following sanitary risk assessment, in low-risk inland areas where soil conditions minimise groundwater contamination.
2. **Deep row entrenchment**	Not recommended due to significant public health, environmental, land management and long-term operational risks. Temporary disposal methods should be avoided as they often become permanent practices.
3. **Co-treatment at existing WWTPs**	Preferred option for rural communities located within practical transport distance of existing WWTPs, subject to confirmation of available treatment capacity and operational suitability. This approach should align with the proposed National FSM Strategy.
4. **Decentralised FSTPs with planted drying beds**	Suitable for clusters of villages where co-treatment is not feasible. Offers improved sludge stabilisation and lower maintenance requirements but requires careful consideration of Fiji's high rainfall conditions during design.
5. **Decentralised FSTPs with unplanted drying beds**	A proven and robust technology suitable for decentralised treatment. Appropriate where adequate land is available and operational safety measures can be maintained.
6. **Mobile Treatment Units (MTUs)**	A promising solution for remote maritime communities and outer islands. MTUs significantly reduce the volume of sludge requiring transport by treating liquid effluent on-site, with residual solids transported for further treatment or disposal. This option warrants pilot testing in Fiji.

Strategic Direction

The RWSS Master Plan adopts a risk-based, decentralised and service-oriented approach to rural faecal sludge management. The preferred strategy combines:

- ✓ Co-treatment at existing WWTPs for communities within practical service areas;
- ✓ Decentralised FSTPs for more remote inland and maritime clusters of villages;
- ✓ Mobile Treatment Units for isolated outer islands where conventional treatment facilities are not economically viable; and
- ✓ Scheduled provincial desludging services coordinated through rural depots to ensure equitable, sustainable and climate-resilient service delivery.

This integrated approach provides the foundation for improving rural sanitation, protecting public health and safeguarding Fiji's freshwater and coastal environments while supporting the long-term objectives of the RWSS Master Plan.



Standard household septic system with soakaway. Majority of households will have this Septic tanks may be individual or shared but every household should have a soakaway for grey water.

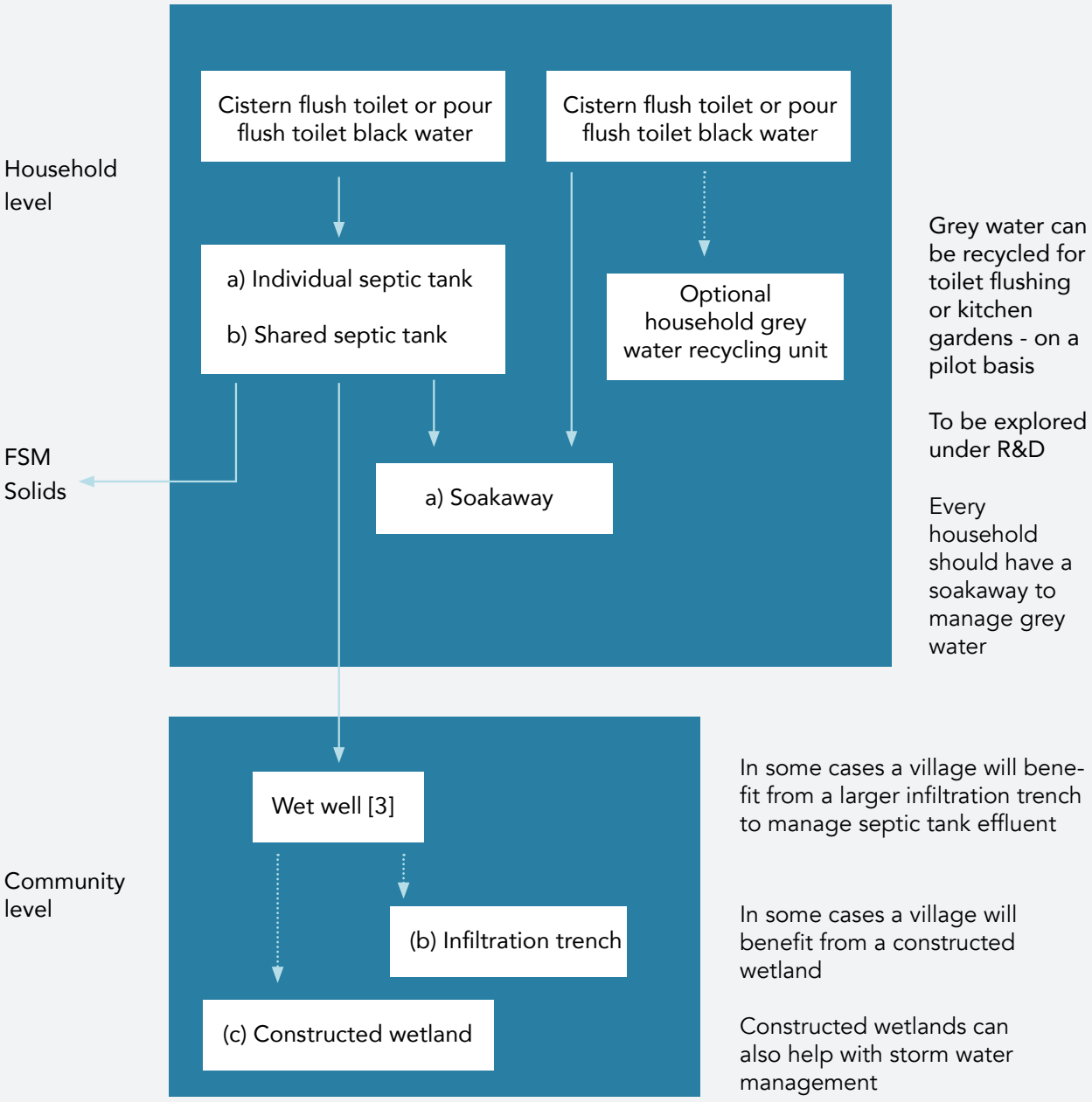


Figure 13 : Standard Household Septic System with Soakaway

(with Optional Constructed Wetland or Infiltration Trench)

1. Septic tank effluent will flow by gravity to nearby soakaways and infiltration trenches but in some cases there may be a need for a wet well and low level pumping to the constructed wetland
2. A constructed wetland can be part of a village plan to manage drainage and storm-water
3. In most cases the wet well will discharge under gravity but there may be cases when low level pumps are needed

Faecal sludge management addressing full sanitation service change

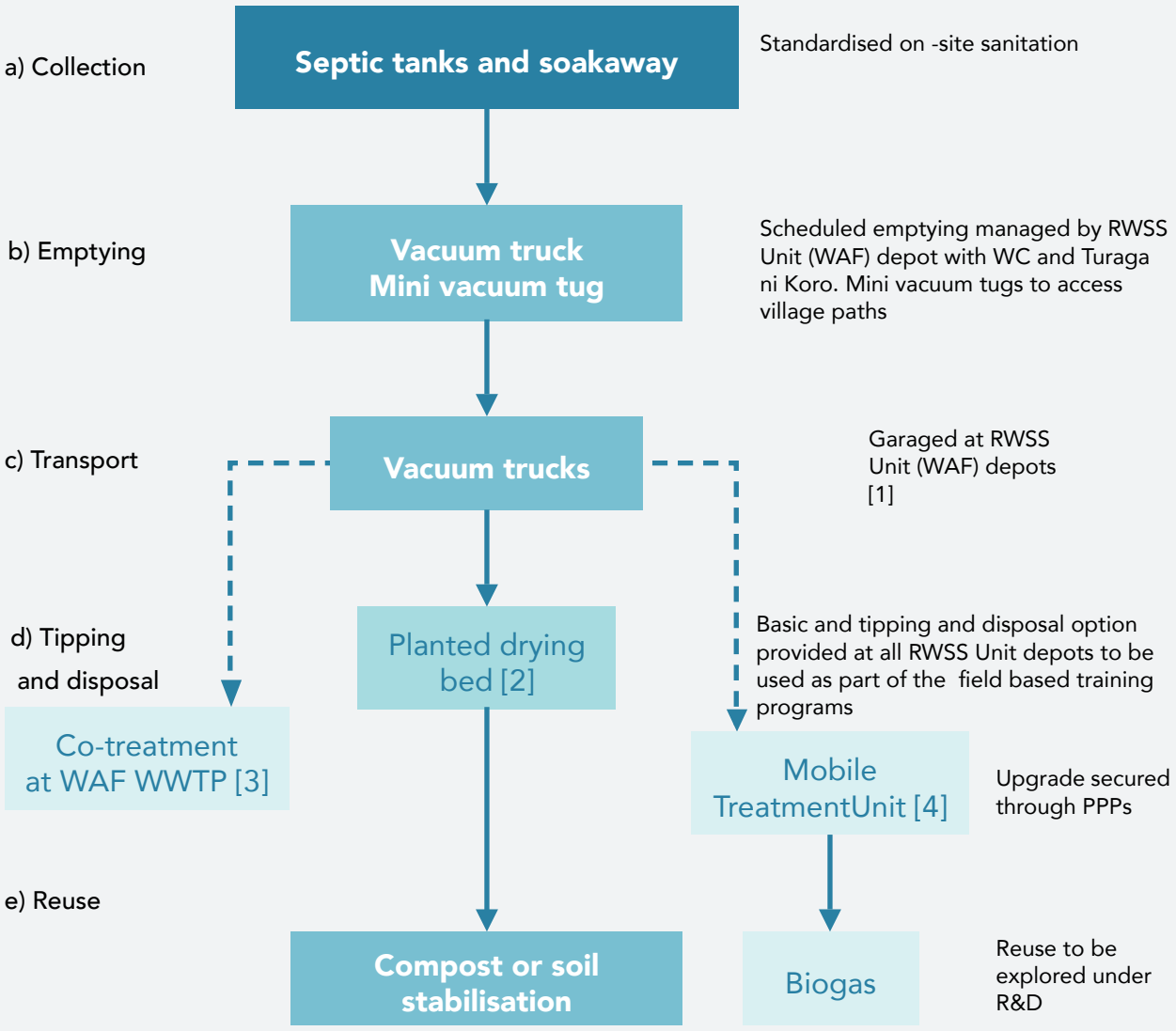


Figure 1: Faecal Sludge Management Options

Notes:

1. The current water carting program demonstrates that this system can work for vacuum trucks
2. Low cost low maintenance option based on planted drying beds
3. In areas within the proximity of WAF WWTPs
4. For remote maritime communities

5.3 Roles and Responsibilities for Faecal Sludge Management

Successful implementation of a **province-based Faecal Sludge Management (FSM) Programme** requires clearly defined roles and responsibilities across the Department of Water and Sewerage (DWS), the Ministry of Health and Medical Services (MoHMS), local government and provincial administration, and community Water Committees. The proposed institutional responsibilities are outlined in **Table 18**.

Table 18: Proposed Roles and Responsibilities for a Province-Based Faecal Sludge Management Programme

Institution	Proposed Roles and Responsibilities
Department of Water and Sewerage	Lead the planning, regulation and coordination of the provincial FSM programme. Responsibilities include developing FSM policies and technical standards; upgrading priority septic systems; procuring and managing desludging equipment; licensing and regulating private desludging operators; developing standard operating procedures (SOPs) for desludging, transport, treatment and disposal; planning and overseeing the development of Faecal Sludge Treatment Plants (FSTPs); coordinating scheduled desludging programmes to ensure all villages are covered; and monitoring service performance, compliance and reporting in collaboration with MoHMS and provincial authorities.
Ministry of Health and Medical Services and Water Committees	Undertake community awareness and behaviour change programmes on sanitation and FSM; conduct village and household sanitation surveys; identify septic systems requiring rehabilitation or replacement; support health surveillance and environmental monitoring; and promote hygiene, information, education and communication (IEC) activities to encourage safe sanitation practices.
Provincial Administration, Local Government and the Ministry of iTaukei Affairs (including Tikina and Village Leadership)	Coordinate implementation at the provincial and community levels; facilitate engagement between communities, Water Committees, DWS and MoHMS; support the clustering of villages into practical FSM service areas linked to designated treatment facilities; assist in establishing desludging schedules and cost recovery arrangements; and promote community participation to ensure that all households receive regular FSM services.

This collaborative governance framework provides clear institutional accountability while promoting coordinated planning, efficient service delivery, and sustainable management of rural faecal sludge services. It also reinforces DWS's role as the national water services regulator while recognising the complementary responsibilities of MoHMS, provincial administrations and community institutions.

5.4 Rural Sanitation Systems and Technology Options

5.4.1 Overview of Technology Options

The *Compendium of Sanitation Systems* identifies System 6 as the most appropriate sanitation service chain for rural Fiji. This system comprises a cistern flush (or pour-flush) toilet, septic tank with soak away, scheduled desludging using vacuum trucks, and off-site treatment and safe disposal or reuse of faecal sludge.

For remote maritime communities where conventional transport and treatment are impractical, Mobile Treatment Units (MTUs) offer a promising alternative by enabling on-site treatment and reducing the volume of sludge requiring transport.

The principal technology options are summarised below.

Cistern Flush / Pour-Flush Toilets

Cistern flush toilets are the preferred household sanitation technology in Fiji. In practice, many are operated as pour-flush toilets where piped water is unavailable or unreliable. These systems provide a hygienic user interface but depend on an adequate water supply and appropriate downstream treatment.

Septic Tanks

Septic tanks are the standard on-site containment system. When properly designed, constructed and maintained, they remove approximately 50% of suspended solids, 30–40% of biochemical oxygen demand (BOD), and achieve limited pathogen reduction. However, they are not designed to remove nutrients or fully treat pathogens and therefore require periodic desludging, typically every 2–5 years, together with safe treatment of collected sludge.

Anaerobic Baffled Reactors (ABRs)

ABRs are an enhanced form of septic tank that uses multiple baffled chambers to improve wastewater treatment. They can reduce BOD by up to 90% and produce more stable sludge than conventional septic tanks, making them suitable where higher treatment performance is required.

Anaerobic Filters (AFs)

Anaerobic filters provide secondary treatment by passing wastewater through fixed filter media supporting biological growth. They achieve high organic matter removal but require effective primary treatment upstream and careful design to minimise clogging.

Anaerobic Digesters (Biogas Reactors)

Anaerobic digesters stabilise sludge while producing biogas that can be used for cooking or electricity generation. They also produce nutrient-rich digestate that may be beneficially reused where appropriate. These systems are most suitable where organic waste streams can be combined, and long-term operation can be supported.

Constructed Wetlands

Constructed wetlands provide tertiary treatment following primary or secondary treatment processes. Horizontal and free-water surface wetlands are suitable for polishing wastewater, while vertical-flow wetlands may also be adapted for sludge dewatering. Their suitability depends on land availability, climate, and maintenance capacity.

Unplanted Drying Beds

Unplanted drying beds dewater faecal sludge through drainage and evaporation. They are simple, robust, and relatively inexpensive but require significant land area and further treatment of both dried sludge and leachate.

Planted Drying Beds

Planted drying beds operate similarly to unplanted systems but use vegetation to improve drying and sludge stabilisation. They reduce desludging frequency and improve long-term operation, although they require careful design, routine maintenance, and continued management.

Table 19. Summary of Technology Options for Rural Sanitation

Technology	Advantages	Limitations
Cistern Flush / Pour-Flush Toilet	Hygienic and widely accepted; minimises odours; suitable for household use.	Requires reliable water supply; relatively high construction cost; cannot easily be built or repaired using local materials.
Septic Tank	Simple, robust and low maintenance; low operating costs; long service life; compact footprint.	Limited pathogen and nutrient removal; requires scheduled desludging; effluent and sludge require further treatment.
Anaerobic Baffled Reactor (ABR)	High BOD removal; low sludge production; energy efficient; long service life.	Requires specialist design and construction; limited pathogen removal; effluent requires further treatment.
Anaerobic Filter (AF)	Effective secondary treatment; high BOD removal; low energy and operating costs.	Requires specialist design; susceptible to clogging; limited nutrient and pathogen removal; effluent requires further treatment.
Anaerobic Digester (Biogas Reactor)	Produces renewable energy; stabilises sludge; conserves nutrients; low operating costs.	Requires specialist design and management; limited pathogen removal; gas production depends on climate; digestate may require further treatment.
Free-Water Surface Constructed Wetland	Effective polishing treatment; low operating costs; can be built using local materials; visually attractive.	Requires large land area; long establishment period; potential mosquito breeding; specialist design required.
Vertical-Flow Constructed Wetland	High removal of BOD, solids and pathogens; smaller footprint; reduced clogging.	Requires electricity and mechanical dosing; higher maintenance; specialist design and imported components may be required.

Technology	Advantages	Limitations
Unplanted Drying Bed	Simple operation; effective sludge dewatering; low capital and operating costs; can be locally constructed.	Large land requirement; odours and flies; labour-intensive sludge removal; limited pathogen reduction; leachate requires treatment.
Planted Drying Bed	Improved sludge stabilisation; handles higher loading; lower desludging frequency; potential biomass production; low operating costs.	Large land requirement; long storage periods; labour-intensive sludge removal; specialist design required; leachate requires treatment.

Summary

The preferred rural sanitation service chain for Fiji remains the cistern flush or pour-flush toilet connected to a septic tank with scheduled desludging and safe off-site treatment of faecal sludge. While alternative technologies such as ABRs, anaerobic filters, digesters, constructed wetlands, and drying beds can improve treatment performance, their application should be determined through site-specific feasibility studies considering population density, land availability, climate, operational capacity, lifecycle costs, and long-term sustainability. This technology framework provides the basis for selecting appropriate sanitation solutions under the Rural Water Supply and Sanitation Master Plan and supporting progress towards safely managed sanitation services.

5.4.2 Co-treatment at Existing Wastewater Treatment Plants (WWTPs)

Co-treatment of faecal sludge at existing Water Authority of Fiji (WAF) wastewater treatment plants (WWTPs) presents a practical option for rural communities located within a feasible transport distance of existing sewerage infrastructure.

Domestic sewage collected through sewer networks is typically composed of approximately 99% water, with relatively consistent concentrations of solids, organic matter, nutrients and pathogens. In contrast, faecal sludge collected from septic tanks has already undergone partial anaerobic digestion and contains significantly higher concentrations of solids, biochemical oxygen demand (BOD), chemical oxygen demand (COD), nutrients and pathogens. Although faecal sludge remains predominantly water (approximately 97%), its composition is far more variable and depends on septic tank design, age and desludging frequency.

Because of these differences, faecal sludge cannot be discharged directly into sewer networks or treatment processes without appropriate management. Uncontrolled disposal into sewer manholes can result in blockages, excessive grease accumulation, overloading of pump stations, and disruption of biological treatment processes.

Successful co-treatment requires careful assessment of each WWTP's available capacity and may involve one or more of the following measures:

- ✓ Limiting the volume of faecal sludge accepted by each WWTP.
- ✓ Pre-treating faecal sludge to reduce solids and organic loading before discharge.
- ✓ Upgrading or retrofitting WWTP infrastructure to accommodate faecal sludge.

Typical upgrades may include enhanced screening, grit and grease removal, sludge conditioning, odour control, and dewatering facilities. Depending on the treatment process, liquid and solid fractions may either be treated separately or integrated into the plant's existing sludge treatment system.

Within the RWSS Master Plan, co-treatment is recommended as the preferred solution for rural communities located within practical transport distance of existing WWTPs, subject to confirmation of treatment capacity, operational requirements and lifecycle costs through detailed feasibility studies.

5.4.3 Existing WAF Wastewater Treatment Plants and Proposed Service Areas

Fiji currently operates 11 wastewater treatment plants managed by the Water Authority of Fiji. These facilities are located across the Central, Western and Northern Divisions and provide varying treatment processes and capacities.

For the purposes of the RWSS Master Plan, each WWTP has been assessed as a potential regional hub for receiving faecal sludge from surrounding rural communities. A preliminary 15 km service radius has been adopted to identify communities where scheduled desludging and co-treatment may be operationally and economically feasible. The final service areas will be refined through detailed feasibility studies, taking into account:

- ✓ available treatment capacity at each WWTP;
- ✓ road access and transport logistics;
- ✓ population density and sludge generation;
- ✓ operating costs and travel time; and
- ✓ future population growth and service demand.

Communities located beyond the practical service radius of existing WWTPs will require alternative solutions, including decentralised faecal sludge treatment plants (FSTPs) or other appropriate treatment technologies.

Table 20 summarises the location, treatment process and design capacity of Fiji's existing WAF wastewater treatment plants, while Figures 17–19 illustrate the proposed service areas and their relationship to provincial population distribution.

This phased approach enables existing wastewater infrastructure to be utilised where feasible while guiding investment in decentralised treatment facilities for rural and remote communities, thereby supporting a cost-effective and sustainable national faecal sludge management system.



Table 20: WAF WWTPs

SN	Plant Location	Province	Treatment Process	Flow (MLD)	Current capacity (EP)	Plant capacity (EP)
1	Kinoya (Suva)	Naitasiri, Central	High-rate trickling filter - SBR	30	180,000	120,000
2	ACS	Naitasiri, Central	Low rate trickling filter	0.2	1,000	800
3	Nadali	Naitasiri, Central	Extended aeration	0.7	2,500	6,000
4	Wailada	Rewa, Central	Extended aeration	0.13	350	800
5	Naboro	Rewa, Central	Extended aeration	0.8	1,600	1,000
6	Deuba	Serua, Central	low rate trickling filter	0.7	2,500	10,000
7	Olosara	Nadroga-Navosa, Western	Oxidation ponds	0.5	2,700	10,000
8	Navakai	Ba, Western	Activated sludge	6.5	25,000	35,000
9	Natabua	Ba, Western	Oxidation ponds	9.6	48,000	45,000
10	Votua	Ba, Western	Oxidation ponds	2.6	13,000	8,000
11	Namara	Macuata, Northern	Oxidation ponds	2	10,800	5,000

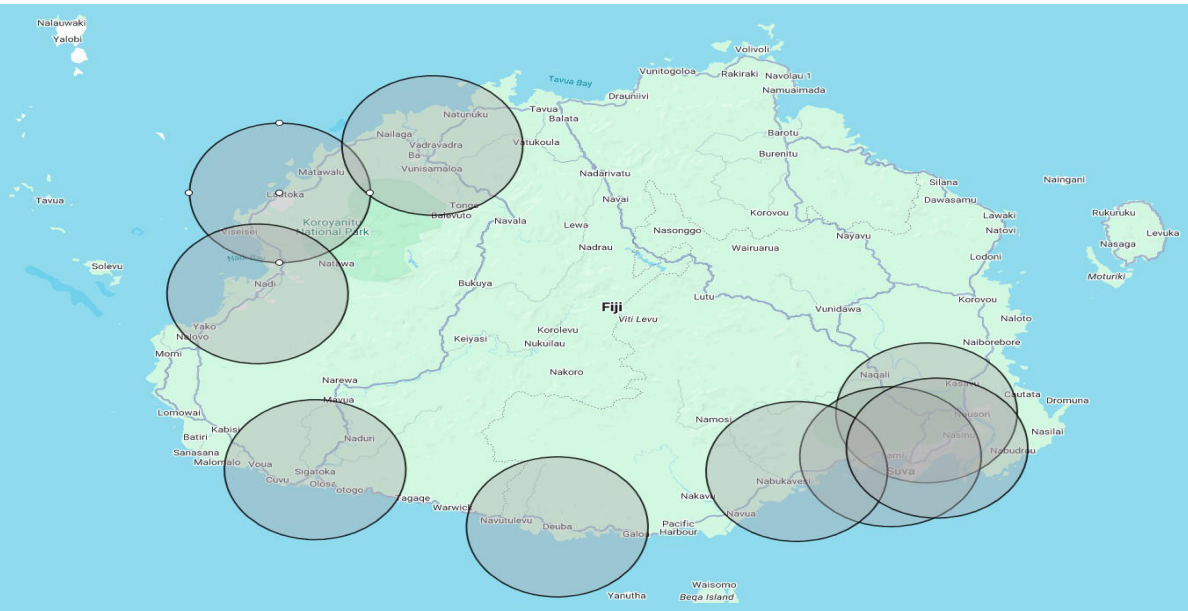


Figure 14: WAF WWTPs on Vanua Levu with 15km service areas marked

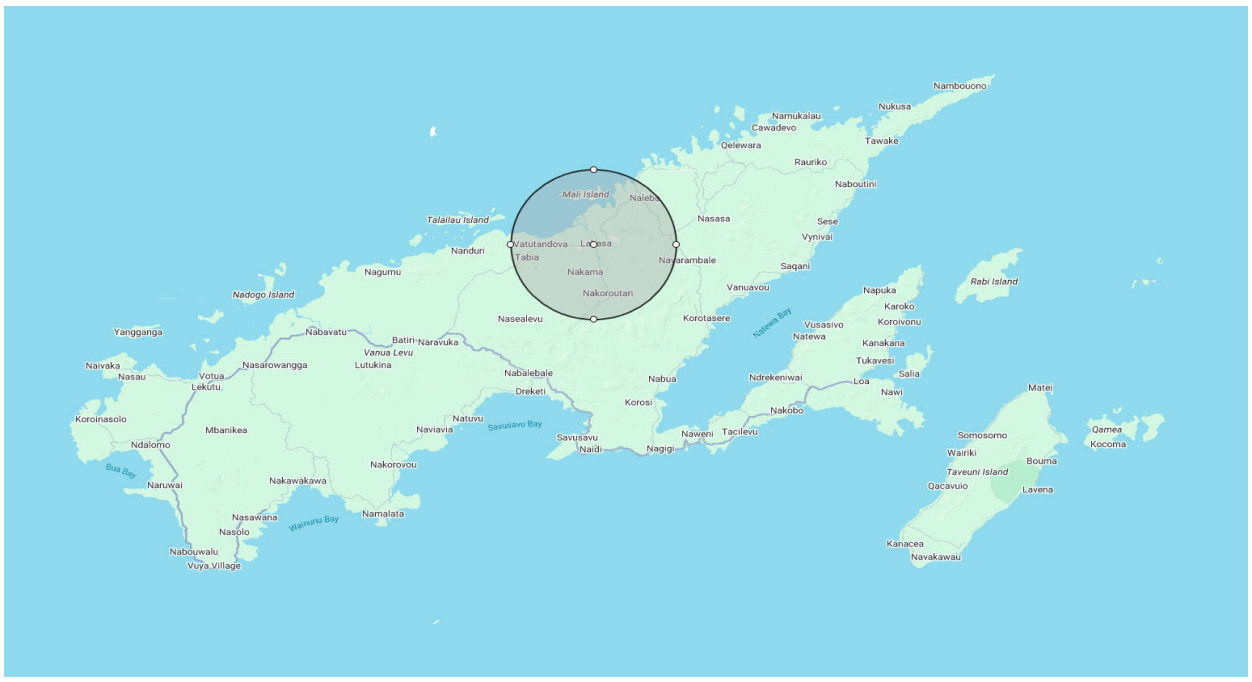


Figure 1 : WAF WWTPs on Viti Levu with 15km service areas marked

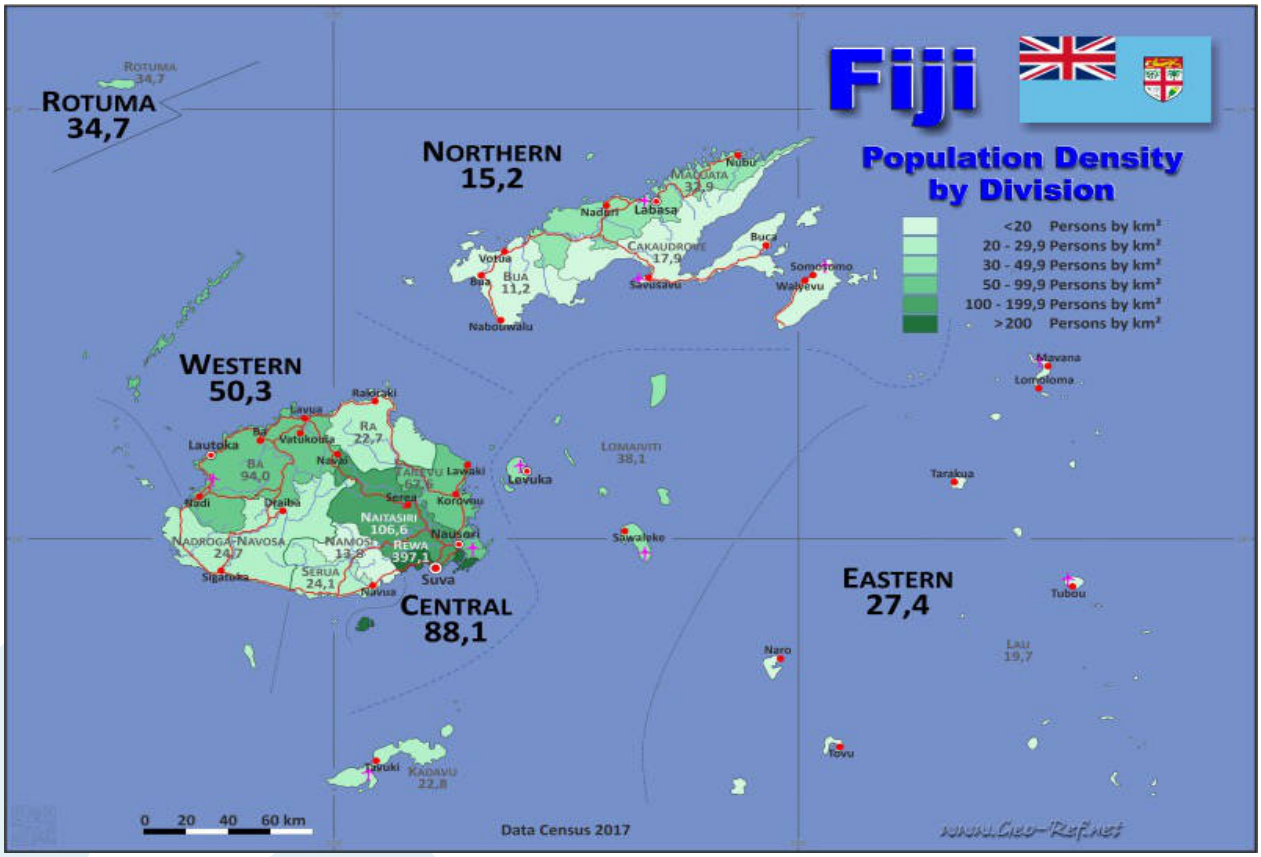


Figure 15 : Fiji Population Densities in Fiji by Division (2017 census data)

Table 21: Population densities in Fiji by Province (2017 census data)

SN	Province	Division	Population	Population density Person/km2	Proposed Treatment
1	Ba	Western	247,708	94.0	WAF WWTP
2	Bua	Northern	15,466	11.2	1xFSTP
3	Cakaudrove	Northern	50,469	17.9	2xFSTP
4	Kadavu	Eastern	10,897	22.8	MTUs
5	Lau	Eastern	9,602	19.7	MTUs
6	Lomaiviti	Eastern	15,657	38.1	MTUs
7	Macuata	Northern	65,983	32.9	WAF WWTP + 2xFSTP
8	Nadroga-Navosa	Western	58,931	24.7	WAF WWTP
9	Naitasiri	Central	177,678	106.6	WAF WWTP
10	Namosi	Central	7,871	13.8	WAF WWTP
11	Ra	Western	30,432	22.7	WAF WWTP
12	Rewa	Central	108,016	397.1	WAF WWTP
Dependency	Rotuma	Rotuma	1,594	34.7	MTU
13	Serua	Central	20,031	24.1	WAF WWTP
14	Tailevu	Central	64,552	67.6	WAF WWTP + 1xFSTP
			884,887		

Review of the data suggests that the only Province with a relatively high population density that is currently not covered by a WAF WWTP is Tailevu in the north-eastern area of Viti Levu. Although the northern area of Vanua Levu to the west and east of Labasa also needs to be assessed.

In addition, the World Bank is planning to finance a WWTP at Savusavu under its support for tourism project. Once the timeframe for this is clarified there may be some adjustments needed to the location of one of the proposed FSTPs. The project at Savusava can serve as a model for other wastewater management projects in Fiji.

5.4.4 Decentralised Faecal Sludge Treatment Plants (FSTPs)

Decentralised Faecal Sludge Treatment Plants (FSTPs) are increasingly recognised as an effective and affordable solution for managing faecal sludge in areas not served by conventional sewerage systems. International experience, including projects implemented by BORDA and other development partners, demonstrates that decentralised FSTPs can provide safe, sustainable and scalable faecal sludge management (FSM) services, particularly for rural and peri-urban communities.

For Fiji, planted sludge drying beds are considered one of the most suitable treatment technologies. These systems use layers of gravel and sand planted with vegetation to dewater and stabilise faecal sludge through drainage, evaporation and evapotranspiration. Compared with conventional drying beds, they require less land, lower operating costs and minimal mechanical equipment. Sludge typically requires removal only every 2–3 years, and the treated biosolids can potentially be reused as a soil conditioner, subject to compliance with environmental and public health standards.

The main advantages of planted drying beds include:

- ✓ simple construction using locally available materials;
- ✓ low capital and operating costs;
- ✓ no requirement for mechanical or electrical equipment;
- ✓ ability to accommodate variable sludge loading; and
- ✓ reduced desludging frequency through continuous operation.

Limitations include the need for treatment of the liquid effluent, routine vegetation management, and potential odour and fly nuisance if not properly operated.

A successful example is the Leh FSTP in India, commissioned in 2017, which serves approximately 45,000 people with a treatment capacity of 12 m^3/day. The facility comprises screening, planted drying beds, a planted gravel filter and a polishing pond. Sludge is removed every 3–5 years, while treated effluent is reused for landscaping. The plant demonstrates that decentralised FSTPs can operate efficiently with relatively modest land requirements and staffing.

5.4.5 Proposed Locations and Indicative Costs

Based on the National Rural Water Point Mapping Survey and the proposed service areas, the RWSS Master Plan identifies the need **for up to six decentralised FSTPs strategically located near existing DWS rural depots to maximis**e service coverage and operational efficiency. Priority locations include:

- ✓ Tailevu (Korovou Depot);
- ✓ Bua (Nabouwalu Depot);
- ✓ Cakaudrove (Savarekareka and Waiyevo Depots); and
- ✓ Macuata, with facilities servicing communities east and west of Labasa.

These facilities would provide scheduled desludging and treatment services for surrounding villages while complementing co-treatment at existing WAF wastewater treatment plants where practical.

Indicative costs, based on international case studies and adjusted for planning purposes, suggest that implementation would require:

- ✓ **Six decentralised FSTPs:** approximately US$470,000;
- ✓ **Six vacuum trucks:** approximately US$270,000;
- ✓ **Six mini vacutugs:** approximately US$30,000; and
- ✓ **Annual operation and maintenance:** approximately US$220,000.

These figures are preliminary planning estimates and should be refined through detailed feasibility studies, site investigations and engineering design during implementation of the RWSS Master Plan. The proposed decentralised FSTP network provides a practical, scalable and cost-effective approach for extending safe faecal sludge management services to rural Fiji while protecting public health and the environment.



Table 22: Indicative costs for the FSTPs

SN	Province	Pop from the NWPMS	Urban Pop (2017 census)	Est pop served by FSTPs	Cap cost of FSTP	Annual O&M cost
1	Bua	16,271		16,271	56949	26847
2	Cakaudrove	50,880		50,880	178080	83952
6	Macuata	76,545	27,949	48,596	170086	80183
14	Tailevu	75,730	57,866	17,864	62524	29476
				133,611	467639	220458

Notes:

- ✓ Urban populations of Labasa and Nausori taken from the 2017 census
- ✓ Cost per capita of FSTP US$3.50
- ✓ Cost per capita of annual O&M US$1.65

5.4.6 Proposed Locations for Mobile Treatment Units (MTUs) and Indicative Costs

Mobile Treatment Units (MTUs) offer a practical solution for **remote maritime communities** where transporting faecal sludge to mainland treatment facilities is not economically or logistically feasible. MTUs treat the liquid fraction of faecal sludge on-site, significantly reducing the volume of solids requiring transport or disposal. The remaining solids can be managed through co-composting with biodegradable organic waste, safe burial, or other approved reuse or disposal methods.

Priority locations for MTU deployment include larger island communities (generally populations exceeding 500 people) with existing government service centres that can support operations and maintenance. Potential locations include:

- ✓ Rotuma (Ahau);
- ✓ Kadavu (Vunisea);
- ✓ Lau Group (including Tubou, Naroi, Lomaloma, Lovoni, Kabara and Moce);
- ✓ Lomaiviti Group (including Levuka, Sawaieke, Nakodu, Nasauvuki, Nairai and Wakaya);
- ✓ Mamanuca Islands (Solevu);
- ✓ Vanua Levu offshore islands (Kocoma and Tabwewa);
- ✓ Viti Levu offshore islands (Dakuibeqa, Nanuku and Taunovo); and
- ✓ Yasawa Group (including Nabukeru, Nacula and Somosomo).

Each MTU has an indicative treatment capacity of **6** m³/hour (144 m³/day), making it suitable for servicing clusters of small island communities.

For planning purposes, the indicative capital cost of an MTU is approximately US$47,000, with annual operation and maintenance costs of around US$10,000 for a fleet of ten units. Based on an initial deployment of 10 MTUs, the estimated capital investment is approximately US$470,000.

As part of RWSS Master Plan implementation, DWS should undertake a detailed feasibility assessment to identify the most suitable 10–15 priority locations. The assessment should also examine:

- ✓ opportunities for local assembly or regional supply of MTUs;
- ✓ training and long-term support for local operators; and
- ✓ options for beneficial reuse of treated solids, including integration with community biogas or composting initiatives.

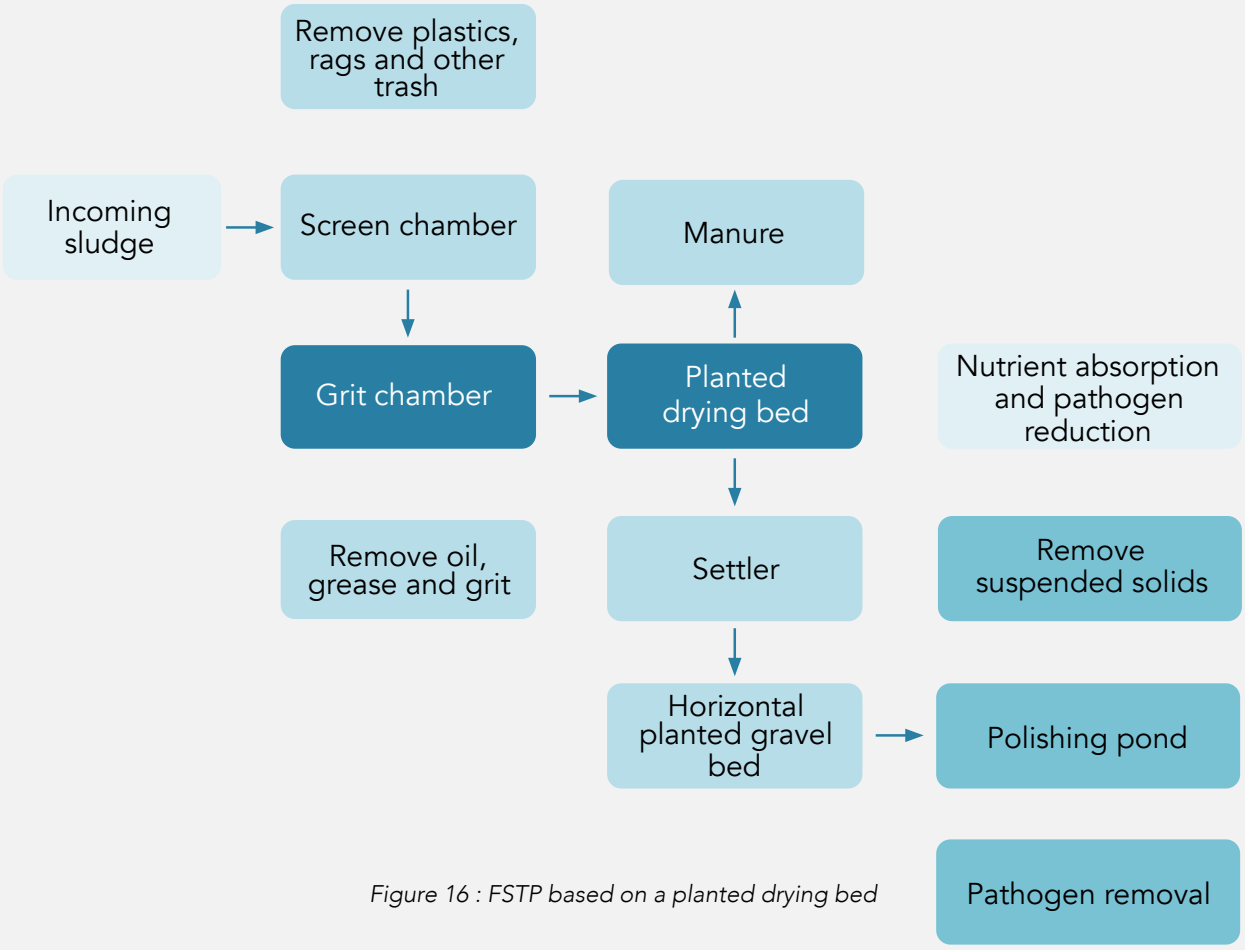


Figure 16 : FSTP based on a planted drying bed



Figure 17 : Government Station on Rotuma

MTUs provide a flexible and scalable solution for extending safe faecal sludge management services to Fiji's remote islands while reducing transport costs and protecting public health and fragile coastal environments.

Liquid treatment is via the settler (sedimentation and sludge stabilization), horizontal planted gravel filter (like a constructed wetland, reduced BOD and pathogens, plants take up nutrients) and polishing pond (removes pathogens and odour)

6. RWSS Climate Change Strategy

Climate change is a cross-cutting priority for the Rural Water Supply and Sanitation (RWSS) Master Plan. Fiji's approach is guided by a hierarchy of national policies and legislation, including the National Development Plan, National Climate Change Policy (2012), Green Growth Framework (2014), National Disaster Management Act and Plan, and the Climate Change Act 2021. Together, these provide the strategic framework for strengthening the resilience of water and sanitation services against climate-related hazards.

The RWSS Master Plan adopts the UNICEF Climate Resilient WASH Framework (2017), which promotes four key implementation stages:

1. Understanding climate risks through Climate Risk and Vulnerability Assessments (CRVAs).

2. Identifying and prioritising resilient WASH solutions based on assessed risks.

3. Delivering climate-resilient infrastructure and services, including integrating climate considerations into Drinking Water Safety, Security and Sanitation Plans (DWSSSPs).

4. Monitoring and evaluating climate resilience outcomes to support adaptive management.

The Master Plan also recognises UNICEF guidance on climate financing and the importance of accessing international climate finance to support resilient rural water and sanitation investments.

To strengthen climate resilience, the RWSS Master Plan proposes that all community water and sanitation planning incorporate:

- ✓ Climate Risk and Vulnerability Assessments (CRVAs);
- ✓ Climate-resilient Drinking Water Safety, Security and Sanitation Plans (DWSSSPs);
- ✓ Hazard mapping to guide infrastructure planning and investment; and
- ✓ Gender Equality, Disability and Social Inclusion (GEDSI)-responsive vulnerability assessments to ensure climate adaptation measures address the different needs and risks faced by women, men, children, older persons and persons with disabilities.

- ✓ Gender and Disability Equality and Social Inclusion (GEDSI)-responsive vulnerability assessments to ensure climate adaptation measures address the different needs and risks faced by women, men, children, older persons and persons with disabilities.

6.1 Climate Risk and Vulnerability Assessments

The World Bank Climate Vulnerability Assessment (2017) estimates that Fiji requires approximately FJD 9.3 billion in climate adaptation and mitigation investments, including around FJD 1.1 billion for strengthening resilience within the water sector. The assessment identifies rural water supply and sanitation as priority areas due to their vulnerability to climate change and natural hazards.

The principal climate risks affecting rural water and sanitation systems include:

- ✓ Tropical cyclones and high winds;
- ✓ Riverine and flash flooding;
- ✓ Sea level rise, coastal erosion and storm surges;
- ✓ Drought and prolonged dry periods;
- ✓ Landslides and soil erosion; and
- ✓ Water pollution and increased incidence of waterborne diseases

These hazards threaten water sources, treatment facilities, pipelines, sanitation infrastructure and service continuity, particularly in rural and maritime communities.

The assessment also highlights several sector vulnerabilities, including:

- ✓ Flooding of water treatment plants, pumping stations and wastewater facilities;
- ✓ Erosion and landslides affecting transmission pipelines and water sources;
- ✓ Saline intrusion into coastal groundwater supplies;
- ✓ Limited source diversification and water security; and
- ✓ Weak asset management, maintenance and infrastructure resilience.

To address these risks, the RWSS Master Plan prioritises:

- ✓ Climate-resilient planning and design for all new water and sanitation infrastructure;
- ✓ Protection of water sources, catchments and watersheds;
- ✓ Development of comprehensive asset management systems and digital infrastructure databases;
- ✓ Diversification of water sources, including rainwater harvesting and groundwater where appropriate;
- ✓ Integration of climate risks into DWSSSPs and local planning processes; and
- ✓ Strengthened evidence-based planning supported by monitoring, data management and coordinated institutional decision-making.

The Master Plan further recognises the importance of inclusive climate adaptation. Climate risk assessments and emergency preparedness planning should incorporate gender-responsive and disability-inclusive approaches, ensuring that the different vulnerabilities, protection needs and recovery capacities of all community members are considered during planning, implementation and disaster response.

Overall, the proposed climate resilience measures align with Fiji's national climate policies and provide a practical framework for protecting rural water and sanitation services against current and future climate risks while supporting sustainable, resilient and inclusive service delivery.

Table 23 : Proposed Interventions (World Bank) and RWSS Plan Responses

Key	Institutional Governance Technical

Proposed intervention	Potential response
✓ Endorsement of the draft National Water Resources Management and Sanitation Policy	Endorsed
✓ Revised design and appraisal guidelines	Identify design and appraisal guidelines that need to be updated
✓ Revision of ongoing Master Plans	Underway
✓ Introduction of water tariffs for water conservation	Underway by FCCC for WAF
✓ Awareness campaigns and incentives for water conservation	Include under BCC working with MoHMS, UNICEF and NGOs
✓ Formulation and adoption of national WASH resilience standards indicators	Include in the MIS UNDP Governance for Resilience Programme with MRMD
✓ Inclusion of climate change adaptation-related indicators to the WSWP indicators and national WASH indicators	Include in the MIS
✓ Improved water asset management	Underway
✓ Investment in back up pumps and critical spares	Technical point to be addressed Consider expanding stores inventory at rural depots

Key	Institutional Governance Technical

Proposed intervention	Potential response
✓ Elaboration of Drought Management Plans	Include as a follow up recommendation
✓ Finalization of power generation backup capacity upgrade	For WAF
✓ Drinking Water Safety, Security and Sanitation Planning for rural communities	Underway with MoHMS and IWC
✓ Awareness campaigns encouraging investment in rainwater harvesting, review of building codes and financial incentives	Underway with DWS and WAF
✓ Improved monitoring of water resources	Include for R&D for future action
✓ Revision of wind proofing design standards and retrofitting of existing infrastructure	Technical point to be addressed
✓ Investments in mobile water desalination plants	Underway for remote small islands
✓ Landslide protection measures	Technical point to be included for future action
✓ Infrastructure retrofitting	Technical point to be addressed
✓ Supporting integrated catchment management	Technical point to be included for future action
✓ Development of freshwater allocation mechanisms between sectors	Underway with various policy developments
✓ Relining of sewers and treatment ponds in coastal areas	For WAF
✓ Strengthening rural and peri-urban water scheme monitoring mechanisms, awareness campaigns, and technical assistance	Include in the MIS
✓ Reduction of physical water losses	Mainly for WAF but include under WSMP and WSSSP
✓ Water re-use (agriculture, industry, landscaping)	Included ~~under FSM strategy~~
✓ Extension of sewerage systems in flood-prone areas	Technical point to be addressed
✓ Diversification of water sources	Underway

6.2 Climate-Resilient Drinking Water Safety, Security and Sanitation Plans

The RWSS Master Plan adopts the UNICEF Pacific WASH Resilience Guidelines, which recognise DWSSSPs as the primary mechanism for strengthening community resilience to climate change and improving public health outcomes. DWSSSPs combine risk-based planning, community participation, capacity building, and access to technical and financial support to identify and implement priority improvements to water supply and sanitation systems.

The Master Plan proposes scaling up DWSSSP implementation nationwide through strengthened institutional support from DWS, MoHMS and partner organisations. This will be supported by a national stakeholder coordination platform, a digital management information system (MIS), and improved access to funding to prioritise investments in vulnerable communities. DWS, as the national water sector regulator, will facilitate technical assistance, training, performance monitoring and financial support to enable communities to achieve safe, resilient and sustainable water and sanitation services.

The DWSSSP process follows five key steps:

1. Engage the community and establish a planning team.
2. Describe the community water and sanitation systems.
3. Assess water supply and sanitation risks.
4. Develop and implement improvement plans.
5. Establish sustainable community management and ongoing monitoring.

Surveillance and performance monitoring will be undertaken through periodic DWSSSP audits, drinking water quality monitoring, and waterborne disease surveillance coordinated by DWS and MoHMS.

6.3 Preliminary Climate-Proofing Measures

The RWSS Master Plan proposes a Climate Resilience Water and Sanitation Fund to finance climate adaptation and asset resilience measures identified through DWSSSPs. The Fund will support implementation of the principle of "build back better" by integrating climate resilience into the planning, design, rehabilitation and maintenance of rural water and sanitation infrastructure.

Key climate-proofing measures include:

- ✓ Protection of water intakes, treatment plants and pumping stations from flooding.
- ✓ Improved asset management systems, infrastructure inventories and evidence-based investment planning.
- ✓ Wind-resistant infrastructure design, including cyclone strapping and structural reinforcement.
- ✓ Diversification of water sources through rainwater harvesting groundwater development and increased storage capacity.
- ✓ Water conservation and demand management during droughts.
- ✓ Protection of watersheds and catchments to improve long-term water security.
- ✓ Flood, landslide and coastal hazard mitigation through improved siting and resilient engineering design.
- ✓ Promotion of renewable energy, particularly solar power, to improve operational resilience and reduce energy costs.

Given that a significant proportion of rural water schemes are already affected by seasonal droughts and flooding, the Climate Resilience Water and Sanitation Fund will provide a dedicated financing mechanism to implement priority climate adaptation measures identified through DWSSSPs.

6.4 Related Climate Resilience Initiatives

The Master Plan recognises complementary initiatives being undertaken by development partners to strengthen climate resilience and nature-based solutions. These include watershed management, ecosystem restoration and rural sanitation programmes led by organisations such as the Wildlife Conservation Society, WISH Fiji and the World Bank. Where appropriate, these initiatives may be integrated with investments supported through the Climate Resilience Water and Sanitation Fund.

6.5 Planning and Implementation Timeframes

The RWSS Master Plan adopts a phased implementation approach:

- ✓ Water Supply Management Plans (WSMPs) will be prepared for all rural villages and settlements not served by WAF urban systems, initially using data from the National Water Point Mapping Survey and subsequently updated approximately as and when required.
- ✓ Approved DWSSSPs will be progressively implemented across all rural communities before Vision 2050, with annual updates to community action plans, risk assessments and emergency works.

- ✓ RWSS Unit will maintain the capacity and resources to respond rapidly to emergency repairs and system failures, with all interventions recorded through the national MIS to support monitoring, planning and asset management

Table 24: Proposed timetable for planning tools

On demand or 5-years	WSMPs used to achieve physical coverage by 2030 for safely managed water supply and sanitation and then repeated on demand or every 5 years
Rolling basis	DWSSSP to ensure sustainable, resilient service delivery with all villages and settlements covered on a rolling basis By vision 2050 the DWSSSP planning process and improvement programme should be well established in all villages and settlements
Annual	Update DWSSSP through community action plans and emergency works
Emergency work	RWSS Unit response to village requests for external support
MIS	Baseline data and information from the NRWPMS Updated continuously with data and information reported by WCs, RWSS Units and other implementation agencies Coordination with all stakeholders to share data and information based on their own programmes

7. Cost Estimates and Investment Plan

This section presents the 25-year Rural Water Supply and Sanitation (RWSS) Investment Plan covering the period 2026–2050. The Investment Plan provides the indicative capital and operational investment required to achieve universal access to safely managed rural water supply and sanitation while ensuring long-term service sustainability and climate resilience.

The Investment Plan is structured around two implementation phases:

- **Phase 1 (2026–2030):** Achieve universal physical coverage of safely managed rural water supply and sanitation across Fiji's four administrative divisions, consistent with the National Development Plan (NDP), Sustainable Development Goal (SDG) 6, and national sector performance targets.

- **Phase 2 (2031–2050):** Consolidate and sustain service delivery through system rehabilitation, asset renewal, climate adaptation, improved operational performance, and institutional strengthening to achieve the Vision 2050 objectives.

The Investment Plan is intended to be a living document and will be updated as improved planning data, project information and implementation experience become available.

Investment requirements are presented under four broad categories:

- **Division-based Rural Water Supply Programmes:** Investment estimates are provided for each of Fiji's four administrative divisions (covering the 14 provinces and Rotuma). Rural water supply programmes may be financed through Government budgets or development partner projects. Development partner support provides additional benefits, including project management, technical assistance, institutional capacity building, community support services, and implementation support for DWS and the Rural Water Supply and Sanitation (RWSS) Units.

- **Rural Sanitation Programmes:** Household on-site sanitation systems, including toilets and septic tanks, have traditionally been financed by households. The RWSS Master Plan proposes targeted subsidies for vulnerable and low-income households through the proposed **Climate Resilience Water and Sanitation Fund** to improve equitable access to safely managed sanitation.

- **Technology Innovation Programmes:** Investment opportunities are identified for innovative rural water supply technologies, including packaged water treatment plants, solar-powered desalination systems, and solar-powered groundwater schemes. These technologies are well suited to development partner financing, blended finance and public-private partnerships.

- **Faecal Sludge Management (FSM) Programme:** Investments include decentralised faecal sludge treatment plants (FSTPs), vacuum trucks, mini vacutugs and mobile treatment units (MTUs) to establish a sustainable rural faecal sludge management service. These programmes also present strong opportunities for development partner investment.

Key Assumptions

The Investment Plan is based on the following assumptions:

- ✓ Costs are presented in Fijian Dollars (FJD) and United States Dollars (USD) using an exchange rate of USD 1.00 = FJD 2.266 (mid-April 2025).
- ✓ All costs exclude VAT, import duties and customs charges.
- ✓ Unit rates are based on information obtained from DWS, WAF, equipment manufacturers, suppliers and recent project cost data.
- ✓ Future costs include an allowance for inflation using the latest Asian Development Bank (ADB) inflation forecasts for Fiji.
- ✓ Investment estimates include:
    - Capital expenditure (CAPEX) for new and rehabilitated infrastructure;
    - Institutional support costs for DWS and RWSS Units; and
    - Estimated operation and maintenance (OPEX) costs over the 25-year planning period.

7.1 Water Supply Investment Needs

This section presents the estimated investment requirements for rural water supply based on data from the NRWPMS. While the NRWPMS provides the most comprehensive national dataset currently available, DWS is continuing to validate and refine the information to address identified data inconsistencies.

7.1.1 Existing Water Supply Systems

The NWPMS records 1,680 villages and settlements across Fiji. The majority are served by 961 Rural Water Schemes (57%), followed by 436 communities (26%) connected to WAF urban water supply systems. The remaining communities rely on rainwater harvesting systems (8%), boreholes, private water supplies and other local water sources.

The dataset also identifies two areas requiring further verification:

- ✓ Desalination systems appear to be under-reported, with only one system recorded despite several installations known to exist.
- ✓ Elevated Package Systems (EPS) are listed as a separate water supply category, although these are generally treatment components within Rural Water Schemes rather than standalone supply systems.



A summary of the existing water supply systems is provided in Table 25.

Table 25: Type of Water Supply Scheme

Primary Water Scheme Type	No. locations	Percent of total
WAF Urban Water Supply	436	26%
Rural Water Scheme	961	57%
MRD Borehole Scheme	62	4%
Rainwater harvesting system	141	8%
EPS - Ecological Purification System	33	2%
Privately owned/supply system	48	3%
Sea water desalination system	0	0%
Total	**1,681**	**100%**



Of the 1600 villages or settlements 185 (12%) also have a secondary water source. The distribution of the type of water supply for a total of 1,785 schemes in 1600 locations in the four divisions and 14 provinces and Rotuma is shown in Table 13.

Table 26: Water Supply Type by Division and Province

Location	Rural Water Scheme	WAF Urban Water Supply	EPS - Ecological Purification	Rainwater harvesting	MRD Borehole Scheme	Sea water desalinisation	Privately owned supply	Total
Central	**211**	**170**	**16**	**48**	**6**	**2**	**1**	**454**
Naitasiri	81	10	6	10	4		0	111
Namosi	23	2	2	1	-		0	28
Rewa	13	62	1	4	-		0	80
Serua	29	23	-	4	-		0	56
Tailevu	65	73	7	29	2	2	1	179
Eastern	**180**	**36**	**3**	**53**	**2**	**3**	**1**	**278**
Kadavu	79	1	-	3	1	1	0	85
Lau	44	9	-	33	1	2	1	90
Lomaiviti	57	9	3	14	-		0	83
Rotuma	-	17	-	3	-		0	20
Northern	**319**	**63**	**4**	**33**	**25**	**2**	**12**	**458**
Bua	56	12	2	5	6		2	83
Cakaudrove	161	14	1	13	4	1	2	196
Macuata	102	37	1	15	15	1	8	179
Western	**268**	**178**	**9**	**41**	**40**	**3**	**56**	**595**
Ba	77	106	-	21	6	3	24	237
Nadroga	41	48	5	11	10		22	137
Navosa	52	6	1	9	19		4	91
Ra	98	18	3	-	5		6	130
Grand Total	**978**	**447**	**32**	**175**	**73**	**10**	**70**	**1785**

7.1.2 Water Supply Facilities

Table 27 summarises the water supply infrastructure recorded across 1,600 villages and settlements during the NRWPMS. The dataset includes information on reservoirs, water storage tanks and rainwater harvesting tanks serving approximately 154,905 households across Fiji's four divisions, 14 provinces and Rotuma.

For a typical rural water supply scheme, it would generally be expected that each community has at least one reservoir and one communal storage tank, together with communal and/or household rainwater harvesting tanks where applicable. However, the NRWPMS data does not consistently distinguish between community and household infrastructure, and further validation by DWS is recommended.

Reservoirs

A total of 1,301 reservoirs were recorded across 913 locations (57%), while 687 locations (43%) reported no reservoir. Most locations (73%) had a single reservoir, although one location recorded as many as 15 reservoirs. Approximately 78% of all reservoirs are associated with Rural Water Schemes, reflecting their central role in community water supply systems.

Water Storage Tanks

The survey recorded 15,103 water storage tanks. However, it is unclear whether this figure refers only to communal storage tanks or also includes household storage tanks. Of the 1,600 surveyed locations, 522 (33%) reported having storage tanks, while 1,078 (67%) recorded none.

Most locations with storage tanks (83%) had between 1 and 10 tanks, although 19 locations—primarily in Macuata and Ba Provinces reported more than 100 tanks, suggesting that household storage tanks may have been included in the survey. Approximately half of the recorded storage tanks are associated with Rural Water Schemes, while around 34% are linked to WAF urban water supply systems.

Rainwater Harvesting Tanks

The NRWPMS recorded 16,164 rainwater harvesting tanks (RHTs) across 905 locations, while 695 locations reported no RHTs. The 905 locations with RHTs comprise approximately 68,905 households, representing 56% of rural households captured in the survey.

On average, there are 5.3 households per rainwater harvesting tank, although the distribution varies considerably between communities. Approximately 35% of villages and settlements have five or fewer households per RHT, indicating relatively good household access to rainwater harvesting in many communities.

Overall, the survey demonstrates the widespread use of reservoirs, storage tanks and rainwater harvesting systems across rural Fiji. However, clarification of the asset inventory particularly the distinction between communal and household infrastructurewill improve the accuracy of future planning, investment prioritisation and asset management.



Table 27: Summary of Water Supply Facilities at Locations

Division and Province	Population	Number of villages and settlements	Number of households	Number of water storage tanks	Number of reservoirs	Number of rainwater harvesting tanks	Number of households without rainwater harvesting tanks	Average no. HHs per rainwater harvesting tank
Central	**203,558**	**424**	**35,098**	**614**	**275**	**3,241**	**8,103**	**17.23**
Naitasiri	26,413	101	5,488	38	76	968	2,426	18.52
Namosi	8,001	27	1,743	7	23	91	833	27.65
Rewa	49,904	78	11,671	194	30	370	1,273	18.30
Serua	43,510	56	3,470	94	35	220	1,651	16.16
Tailevu	75,730	162	12,726	281	111	1,592	1,920	15.57
Eastern	**37,779**	**253**	**9,587**	**171**	**264**	**1,591**	**3,282**	**12.27**
Kadavu	11,795	83	2,918	40	97	176	1,864	18.60
Lau	9,412	72	2,747	79	76	1,097	118	5.32
Lomaiviti	14,606	81	3,419	26	88	230	1,300	20.14
Rotuma	1,966	17	503	26	3	88	-	6.05
Northern	**143,696**	**409**	**33,722**	**6,073**	**378**	**5,976**	**9,428**	**13.85**
Bua	16,271	76	3,306	162	68	348	1,031	12.04
Cakaudrove	50,880	183	11,095	209	180	1,378	6,026	19.19
Macuata	76,545	150	19,321	5,702	130	4,250	2,371	9.87
Western	**286,407**	**514**	**76,498**	**8,245**	**384**	**5,356**	**48,092**	**23.95**
Ba	193,017	190	55,112	7,176	124	2,020	40,602	41.83
Nadroga	40,705	127	9,391	719	89	1,823	1,624	13.78
Navosa	18,902	78	4,047	63	69	939	2,115	13.94
Ra	33,783	119	7,948	287	102	574	3,751	19.17
Grand Total	**671,440**	**1600**	**154,905**	**15,103**	**1,301**	**16,164**	**68,905**	**17.55**

7.2 Sanitation

The range of sanitation facilities used by households in the 1600 villages and settlements is recorded for 153,111 households is shown in the following table broken down by Division and Province. This shows that 152,002 (98%) have a household toilet and only small number use a community toilet, 3,570 (2%) share toilet facilities, and 3,585 (2%) have no toilet facilities. No households were recorded as practicing open defecation.

In terms of the range of sanitation facilities used by households in the villages and settlements the classification showed that majority (81%) only had a household toilet and did not have to resort to other facilities.

Fifty one percent of the households in the locations that were recorded as having all household toilets were in locations served by the WAF urban water supply, and 19% in Rural water schemes. An additional 6% of households were in WAF urban schemes that also were served by rural water supply and or privately owned water supply schemes. This implies that the majority of households in WAF supplied scheme areas have an individual household toilet.

The type of toilet used by households was also recorded and the disposal method as either a septic tank or a drum. In total 86% of households use a flush toilet, 8% have a water seal toilet, and 4% have a cesspit, pit toilet or compost toilet. Those with no toilet make up 2% of households. It is noted that the distinction between a flush toilet and a water seal toilet is that a flush toilet is connected to a cistern for flushing while a water seal toilet is not and relies on a pour flush.

In terms of the disposal method, 69% were recorded as having a septic tank and 31% as a drum. However, the type of septic tank was not recorded and whether or not they conform to an accepted design and outflow disposal is not known. Three locations were recorded as having a compost toilet.

7.2.1 Toilets in Community Facilities

The NRWPMS also recorded sanitation facilities in community buildings, including churches, community halls, schools, and other public facilities. Approximately 70% of surveyed locations reported having at least one community toilet, with a total of 3,434 toilets recorded. Almost all of these facilities were flush toilets, indicating that improved sanitation is generally available in key community institutions.

7.2.2 Faecal Sludge Disposal Practices

The NRWPMS recorded the methods used for managing faecal sludge across 1,571 locations, identifying the following disposal practices:

- ✓ Construct a new septic tank.
- ✓ Empty the septic tank manually and continue using it.
- ✓ Septic tank not yet full.
- ✓ Cover the filled pit with soil and construct a new pit.
- ✓ Empty by vacuum (bail-out) truck and transport to a wastewater treatment plant (WWTP).
- ✓ Empty by vacuum (bail-out) truck and dispose of elsewhere.
- ✓ Pit not yet full.

The survey found that many communities use a combination of sludge management practices, while others have not yet required desludging because their septic tanks or pits are not full. The most common practice, reported in 49% of locations, is to cover a full pit with soil and construct a new one. In 225 locations, no action had been taken because the septic tank or pit had not yet reached capacity. Only 13% of locations reported that faecal sludge was collected by vacuum (bail-out) trucks, either for transport to a wastewater treatment plant or disposal elsewhere.

The WHO/UNICEF Joint Monitoring Programme (JMP) defines sanitation service levels as follows:

- ✓ Safely managed sanitation: Use of an improved sanitation facility that is not shared with other households, where excreta is safely contained, emptied and treated off-site, or conveyed through a sewer and treated.
- ✓ Basic sanitation: Use of an improved sanitation facility that is not shared with other households, but where excreta is not safely managed.
- ✓ Limited sanitation: Use of an improved sanitation facility that is shared between two or more households.

The survey indicates that while access to household toilets in rural Fiji is high, the management of faecal sludge remains the principal challenge to achieving safely managed sanitation. As most households already have private flush toilets, improving sanitation outcomes will depend on strengthening the management of septic systems through regular desludging, safe transport, treatment, and disposal of faecal sludge.

Table 28: Summary of Sanitation Access by Division and Province

Division & Province	Population	No. Households	No. Households generally use household toilet	No. Households generally use community toilet	No. Households share toilet facilities	No. Households have no toilet
Central	**203558**	**35098**	**36174**	**15**	**1109**	**1109**
Naitasiri	26413	5488	5225	9	254	254
Namosi	8001	1743	1597	0	146	146
Rewa	49904	11671	13657	6	208	208
Serua	43510	3470	3333		137	137
Tailevu	75730	12726	12362	0	364	364
Eastern	**37779**	**9587**	**9314**	**32**	**264**	**264**
Kadavu	11795	2918	2742	32	167	167
Lau	9412	2747	2728	0	19	19
Lomaiviti	14606	3419	3341		78	78
Rotuma	1966	503	503	0		
Northern	**143696**	**33722**	**32663**	**0**	**1058**	**1058**
Bua	16271	3306	3056		250	250
Cakaudrove	50880	11095	10496		599	599
Macuata	76545	19321	19111	0	209	209
Western	**286407**	**76498**	**73851**	**0**	**1139**	**1139**
Ba	193017	55112	53092		480	480
Nadroga	40705	9391	9259	0	164	164
Navosa	18902	4047	3996		51	51
Ra	33783	7948	7504	0	444	444
Grand Total	**671440**	**154905**	**152002**	**47**	**3570**	**3570**
Percent of Total			98%	0%	2%	2%

7.3 Status and Remedial Requirements for Water Supply

The NRWPMS collected information on the current status of water supply and sanitation systems, including identified deficiencies, remedial requirements, and potential improvements needed in villages and settlements. This information was obtained through interviews with designated community contact persons in each location and recorded as open-ended responses during the survey process.

For the analysis of the NRWPMS database, the responses were systematically reviewed and classified according to key thematic areas. This enabled the current status, challenges, and priority development needs of rural water supply and sanitation systems to be grouped under relevant categories for further assessment.

It is recognised that the extent of remedial works and new infrastructure requirements identified for water supply and sanitation may not fully represent the actual technical needs of each community. This is because the information was based primarily on discussions with community representatives, who may not have had complete knowledge of available technical options, infrastructure conditions, or long-term service requirements.

Nevertheless, the information collected through the survey represents the most comprehensive national assessment of current rural water supply and sanitation needs available and provides a valuable basis for establishing preliminary investment requirements and prioritising future interventions. More accurate cost estimates and detailed infrastructure requirements will be developed through the preparation of individual WSMPs for each village and settlement, followed by detailed technical assessments and implementation of the identified works.

7.3.1 Current Status of Water Supply Schemes

Of the 1,600 water supply schemes surveyed, 140 schemes reported no issues with their existing water supply, while 68 schemes reported that their water supply was sustainable. Combined, 208 schemes (13% of all surveyed schemes) were assessed as having no reported issues and a sustainable water supply system. A summary of responses by the main water supply provider is presented in Table 29.

Overall, only 13% of surveyed schemes reported both satisfactory performance and sustainability. Among the different service providers, WAF urban water supply schemes recorded the highest proportion of sustainable and issue-free systems at 24%, while rural water supply schemes recorded 9%.

None of the rainwater harvesting systems or seawater desalination schemes were reported as both sustainable and free from operational issues.

Intermittent water supply was identified as a significant challenge, with 349 schemes reporting disruptions or unreliable supply. This included 37% of WAF urban water supply schemes and 15% of rural water supply schemes.

It should be noted that communities experiencing intermittent water supply are eligible for support under the Government's programme for the provision of household rainwater tanks (HH RHTs) as an interim measure to improve water security and resilience, particularly during periods of supply interruption.

Table 29: Summary of No Issues and Sustainable Water Supply Reported

Main Water Supply Provider	No Issues	Sustainable WS	Total	Total schemes	% of all schemes
Rural Water Scheme	46	35	81	930	9%
WAF Urban Water Scheme	79	30	109	446	24%
MRD Borehole Scheme	6	3	9	45	20%
Privately owned	5	0	5	39	13%
Rainwater harvesting	0	0	0	118	0%
Sea water desalination system	0	0	0	3	0%
Total	**140**	**68**		**1600**	**13%**

Table 30: Summary of Current Status and Requests for Improvement of Water Supply Schemes

Division / Province	No. of villages & settle-ments	Population	Households	Status			Request for Repair and Upgrade								
				No WS Issues	WS is sustain-able	Intermit-tent water supply	Request EPS	Request Purification system	Need Storage Tanks	Upgrade/ Repair WS system	Develop new water source	Connect to WAF System	Bore holes	Reservoir/ dam repair & upgrade	HH Rain-water tanks	Desal plants
Central	**424**	**203,558**	**35,098**	**40**		**169**	**57**	**25**	**39**	**66**	**41**	**14**	**6**	**53**	**44**	
Naitasiri	101	26,413	5,488	9		16	25	6	13	22	9	3	1	19	11	
Namosi	27	8,001	1,743	2		9	12	4	2	2	10	5		4	2	
Rewa	78	49,904	11,671	11		48	4	1	6	5	1	4		3	7	
Serua	56	43,510	3,470	9		12	1	3	7	11	5	1		9	10	
Tailevu	162	75,730	12,726	9		84	15	11	11	26	16	1	5	18	14	
Eastern	**253**	**37,779**	**9,587**	**13**	**3**	**38**	**74**	**34**	**13**	**49**	**19**		**10**	**44**	**37**	**2**
Kadavu	83	11,795	2,918	1	3	8	12	26	8	18	9		1	28	9	
Lau	72	9,412	2,747	2		11	20	4	2	10	4		9	6	18	2
Lomaiviti	81	14,606	3,419			17	42		3	17	6			8	10	
Rotuma	17	1,966	503	10		2		4		4				2		
Northern	**409**	**143,696**	**33,722**	**30**	**14**	**56**	**113**	**83**	**51**	**62**	**62**	**11**	**29**	**28**	**34**	**4**
Bua	76	16,271	3,306	3		7	30	2	3	14	5	2	12	6	5	
Cakaudrove	183	50,880	11,095	13	6	25	65	42	21	30	38	3	5	12	10	
Macuata	150	76,545	19,321	14	8	24	18	39	27	18	19	6	12	10	19	4
Western	**514**	**286,407**	**76,498**	**57**	**51**	**86**	**63**	**48**	**38**	**76**	**61**	**31**	**38**	**33**	**70**	**1**
Ba	190	193,017	55,112	16	34	27	10	24	14	24	19	22	11	9	39	1
Nadroga	127	40,705	9,391	24	5	24	3	20	11	11	12	5	12	8	18	
Navosa	78	18,902	4,047	5	3	18	26	2	3	14	14	2	11	5	7	
Ra	119	33,783	7,948	12	9	17	24	2	10	27	16	2	4	11	6	
Grand Total	**1600**	**671,440**	**154,905**	**140**	**68**	**349**	**307**	**190**	**141**	**253**	**183**	**56**	**83**	**158**	**185**	**7**

7.3.2 EPS Requests

A total of 307 locations requested the installation of an EPS, including the rehabilitation of existing non-functional units. An additional 190 locations requested water purification systems, bringing the total demand for water treatment facilities to 497 locations. Approximately 92% of these requests were from rural water supply schemes, benefiting an estimated 40,173 people in 9,030 households.

Given that most rural water schemes rely on surface water sources, the provision of EPS or equivalent water treatment systems is essential to ensure safe drinking water and reduce the risk of waterborne diseases. These investments represent a priority for improving drinking water quality and public health.

7.3.3 Storage Tank Requests

A total of 141 locations requested additional water storage tanks, with 77% of requests originating from rural water schemes and 15% from WAF urban water supply schemes. These locations serve approximately 42,591 people in 9,229 households.Additional storage capacity is a key climate resilience measure, improving water security during periods of drought, supply interruptions, and increasing demand (see Section 6).

7.3.4 Repair and Upgrade of Water Supply Systems

A total of 253 locations requested repairs or upgrades to existing water supply systems. The majority (72%) of requests were from rural water schemes, while 18% were from WAF urban systems, representing approximately 20% of all rural schemes and 10% of WAF urban schemes. These locations serve an estimated 82,847 people in 18,617 households.

Although further technical assessments are required, the reported needs are primarily associated with the rehabilitation and maintenance of water supply assets, including pipelines, reticulation networks, leak repairs, and related infrastructure. These activities are categorised as asset management interventions and are incorporated within the Climate Resilient Water and Sanitation Fund.

7.3.5 Development of New Water Sources

A total of 183 locations requested the development of new water sources. Most requests (78%) were from rural water schemes, while 12% originated from communities relying on rainwater harvesting systems. These locations serve approximately 56,669 people in 12,959 households.

Developing additional water sources is an important climate adaptation measure that strengthens water security and reduces vulnerability to drought and seasonal shortages. Where feasible, communities should be supported through the development of multiple water sources, including groundwater, surface water, communal rainwater harvesting, and household rainwater tanks (see Section 6).

7.3.6 Connection to the WAF Urban Water Supply System

A total of 54 locations requested connection to the Water Authority of Fiji (WAF) urban water supply network, serving approximately 36,340 people in 8,573 households. Around 63% of requests were from communities already partially served by WAF, while 24% were from rural water schemes.

Requests included extending water mains to unserved communities or connecting households within villages that are currently outside the existing WAF distribution network. As these investments fall within WAF's service mandate, they are expected to be addressed through WAF's capital investment programme and are therefore not included in the RWSS Master Plan investment costs.

7.3.7 Repair and Development of Boreholes

A total of 83 locations requested the repair of existing boreholes or the development of new boreholes. Requests were distributed across rural water schemes (33%), MRD-managed borehole schemes (20%), and rainwater harvesting communities (25%), benefiting approximately 24,492 people in 6,132 households.

Implementation will require close coordination with the Ministry of Rural and Maritime Development (MRD), which is responsible for borehole development and maintenance. In addition, the Department of Water and Sewerage (DWS) has identified 12 priority sites requiring new solar-powered boreholes, of which eight have been identified as high priority, serving approximately 2,438 people in 453 households.

To meet current and future demand, the Investment Plan proposes the construction of 90 boreholes, taking into account DWS priority sites and the anticipated expansion of MRD's implementation capacity. The final selection of sites will be undertaken in consultation with MRD and other relevant government agencies (Table 31).

Solar-powered boreholes are identified as a key climate-resilient and low-carbon technology that offers a sustainable solution for improving rural water security and is recommended as a priority investment under the Master Plan.

Table 31: Identified Potential Locations for Boreholes with Solar Power by DWS

No	Province	Tikina	Village	Population	HH
Priority Sites					
1	Tailevu	Namara	Naisausau	205	46
2	Tailevu	Namara	Nakorolevu	351	58
3	Tailevu	Namara	Matamaivere	127	36
4	Tailevu	Bau	Natila	347	37
5	Tailevu	Vugalei	Visa No 2	137	33
6	Tailevu	Tai	Dravuni	149	36
7	Tailevu	Tai	Naiborebore	247	57
8	Serua	Serua	Nabulivatu	110	16
Other Sites					
1	Naitasiri	Nabaitavu	Nabaitavo	269	48
2	Naitasiri	Matailobau	Taulevu	214	34
3	Naitasiri	Matailobau	Delaitoga/ Muaitivi settlement	169	30
4	Namosi	Veivatuloa	Navunisoco	113	22
12				2,438	453

7.3.8 Repair and Development of Reservoirs

A total of 158 locations requested the repair of existing reservoirs, dams, or weirs, or the development of new storage infrastructure to improve water supply. Approximately 90% of these requests were from rural water supply schemes that rely primarily on surface water sources. These locations serve an estimated 32,553 people in 7,312 households.

The rehabilitation of reservoirs, dams, and weirs is considered an asset management intervention, alongside the maintenance of water reticulation networks. Accordingly, the associated costs are included under the Climate Resilient Water and Sanitation Fund.

7.3.9 Household Rainwater Harvesting Tanks

Requests for household rainwater harvesting tanks (RHTs) were recorded from 185 locations, with 41% originating from rural water supply schemes, 22% from WAF-served areas, and 32% from communities already using rainwater harvesting systems. Across these locations, the survey recorded 3,613 existing household rainwater tanks.

Based on an assumed target of one rainwater harvesting tank per household, an estimated 17,142 additional tanks are required to achieve full household coverage. The requesting communities comprise approximately 77,899 people in 20,755 households, representing about 13% of all surveyed households.

Household rainwater harvesting is a key climate resilience measure that improves water security in areas experiencing water scarcity or intermittent supply. While Government assistance is prioritised for eligible households in these areas, wider household investment in rainwater harvesting is encouraged. All requests should be assessed against the Government's eligibility criteria before implementation.

7.3.10 Desalination Plants

The survey recorded three requests for desalination plants, serving approximately 559 people in 146 households. These include Vanuavatu (Lau Province), Mataniwai Village/ Settlement (Macuata Province), and Yasawa i Rara Village and Votua Settlement (Ba Province). Two of the requests relate to the rehabilitation of existing desalination facilities.

In addition, the Department of Water and Sewerage (DWS) has identified 28 locations where solar-powered desalination systems could provide a sustainable water supply in areas lacking reliable potable water sources. Of these, eight locations have been identified as priority sites for early implementation (Table 32).

Solar-powered desalination is recognised as an innovative, climate-resilient technology and is recommended as a strategic investment option for remote and maritime communities where conventional water sources are limited (see Section 4.2.5).

Table 32: Potential Locations for Desalinisation Plants by DWS

No	Province	Tikina	Village	Population	HHs
Priority Sites					
1	Tailevu	Bau	Viwa Island	103	32
2	Nadroga	Vatulele	Taunovo	300	73
3	Nadroga	Vatulele	Lomanikaya	89	30
4	Nadroga	Vatulele	Bouwaqa	158	45
5	Nadroga	Malolo Island	Yaro	200	50
6	Nadroga	Malolo Island	Solevu	250	60
7	Ba	Vuda	Namara (Naboro/Yamata Sett)	500	90
8	Serua	Serua	Yanuca	170	41
Other Sites					
1	Macuata	Udu	Vunikodi	119	33
2	Macuata	Macuata	Cikiobia-Nalele/Vunuku	38	13
3	Macuata	Udu	Nabuono	27	10
4	Macuata	Namuka	Druadua Island/salevukoso	165	22
5	Macuata	Namuka	Druadua Island/Delaivadra	65	14
1	Lau	Ono	Doi	86	28
2	Lau	Ono	Matokana	92	21
3	Lau	Ono	Nukuni	152	40
4	Lau	Ono	Lovoni	56	20
5	Lau	Nayau	Narocivo	165	41
6	Lau	Oneata	Dakuiloa	34	11
7	Lau	Oneata	Waiqori	58	27
8	Lau	Ono	Vatoa	170	45
1	Bua	Vuya	Yadua Island	153	38
2	Bua	Lekutu	Yaqaga Island	175	40
3	Bua	Lekutu	Galoa Island	316	50
4	Bua	Lekutu	Tavea Island	238	49
1	Cakaudrove	Laucala	Yacata Village	180	45
2	Cakaudrove	Tunuloa	Kioa	360	89
3	Cakaudrove	Cakaudrove	Nuku-Tabewa Village, Farm settlement, Nukuloa settlement, Tabewa Miang settlement, Nuku, Stream Valley settlement, SDA settlement, Batutu settlement, Waimalua settlement, Eritabeta, Tiburaro, Lawake, Tibatiba, Bani settlement	1200	272

7.3.11 Packaged Water Treatment Plants

Surface water packaged treatment plants have been identified as an innovative and climate-resilient solution for improving rural water supply in suitable locations. Each system would comprise a water treatment plant, clear water storage tank, and a reticulated distribution network supplying potable water directly to individual households.

The Investment Plan includes the installation of 10 packaged water treatment plants, with the final locations to be determined by the DWS based on technical feasibility and service demand. Priority will be given to locations that meet the following criteria:

- ✓ A reliable and sustainable surface water source;
- ✓ Sufficient population density, including clusters of villages, to support efficient service delivery;
- ✓ Potential to achieve service levels comparable to urban water supply standards; and
- ✓ Community willingness and capacity to pay Water Authority of Fiji (WAF) water tariffs where appropriate.

The use of solar-powered packaged treatment plants is recognised as a key technology innovation that can enhance energy efficiency, reduce operating costs, and improve the long-term sustainability of rural water supply systems (see Section 4.2.6).

7.4 Status and Remedial Requirements for Sanitation

The National Rural Water Point Mapping Survey (NRWPMS) assessed the condition of sanitation facilities and identified priority improvement needs across villages and settlements. Compared with the water supply sector, the sanitation data contained fewer detailed requests for remedial works, with most recommendations relating to sewer connections, wastewater management, handwashing facilities, and communal sanitation.

Of the 1,600 surveyed locations, 224 (14%) requested improved handwashing facilities, 225 (14%) identified the need for improved wastewater treatment and disposal, eight locations requested connection to a sewerage system, and four locations requested communal septic tanks.

7.4.1 Upgrade and Replacement of Septic Systems

The highest priority for improving rural sanitation is upgrading or replacing inadequate on-site sanitation systems with approved septic tanks and soakaways that comply with national design and construction standards. This includes replacing permeable drums, cesspits, pit latrines, and substandard septic systems that do not provide safe containment and treatment of wastewater.

The NRWPMS recorded 60,848 households using water-seal toilets, drums, cesspits, pit latrines, or having no household toilet. These households are assumed to require upgraded sanitation facilities comprising an approved septic tank, soakaway, and, where necessary, a household flush toilet.

A further 93,506 households were recorded as having access to a septic tank. However, the survey did not assess their condition or compliance with approved design standards. Based on findings from WISH Fiji research (see Section 2.3), and as a planning assumption pending a field condition survey, this Master Plan assumes that 50% of existing septic tanks require upgrading or replacement to achieve safely managed sanitation.

Based on these assumptions, an estimated 46,753 existing septic tanks require upgrading. Combined with households lacking compliant on-site sanitation, this results in an estimated 107,601 households requiring improved sanitation facilities across rural Fiji.



The distribution of required new and upgraded septic systems by Division and Province is presented in Table 33.

Table 33: Summary of New and Upgraded Septic Tanks by Division and Province

Division & Province	Total population	Total No. households	No. of New Septic Tanks	No. of Septic Tank upgrade (50%)
Central				
Naitasiri	26413	5488	3520	955
Namosi	8001	1743	797	473
Rewa	49904	11671	1211	5,230
Serua	43510	3470	1062	974
Tailevu	75730	12726	3494	4,628
Eastern				
Kadavu	11795	2918	1339	804
Lau	9412	2747	1541	606
Lomaiviti	14606	3419	1379	1,005
Rotuma	1966	503	138	183
Northern				
Bua	16271	3306	2716	295
Cakaudrove	50880	11095	7247	1,917
Macuata	76545	19321	12739	3,293
Western				
Ba	193017	55112	13555	20,775
Nadroga	40705	9391	2232	3,551
Navosa	18902	4047	3167	459
Ra	33783	7948	4711	1,608
Grand Total	**671,440**	**154,905**	**60,848**	**46,753**

7.4.2 Communal Septic Tanks

The NRWPMS identified four locations requesting communal septic tanks, located in Naitasiri, Bua, Nadroga, and Ra Provinces. However, where a piped sewer network is required to serve multiple households, the feasibility of a decentralised wastewater treatment system (DEWATS) should also be assessed.

Compared with communal septic tanks, DEWATS can provide a more sustainable long-term solution by reducing the need for ongoing faecal sludge collection and transport.

Further research, pilot testing, and evaluation of both communal septic tanks and DEWATS should be undertaken as part of the DWS Research and Development (R&D) programme.

7.4.3 Faecal Sludge Treatment Plants

To support the implementation of a province-based faecal sludge management programme, six decentralised faecal sludge treatment plants (FSTPs) are proposed, as outlined in Section 5. The proposed locations are Bua, Cakaudrove (2), Macuata (2), and Tailevu, with each facility strategically located at or near existing WAF (DWS) rural depots to optimise sludge collection, transport, and operations.

Together, the six FSTPs are expected to serve an estimated 133,611 people, representing approximately 30,000 households, and will form the backbone of the proposed rural faecal sludge management system.

Table 34: Proposed Faecal Sludge Treatment Plants

Province	No. Plants	Population served
Bua	1	16,271
Cakaudrove	2	50,880
Macuata	2	48,596
Tailevu	1	17,864
TOTAL	**6**	**133,611**

7.4.4 Faecal Sludge Collection and Treatment Equipment

In addition to the six proposed faecal sludge treatment plants (FSTPs), the programme includes six vacuum trucks for septic tank desludging and transport, together with six mini vacuum collection vehicles (vacutugs) to service communities where access is restricted. A further ten Mobile Treatment Units (MTUs) are proposed for remote maritime communities, with their final locations to be confirmed by DWS based on service demand and operational feasibility. A summary of the proposed equipment is provided in Table 35.

The FSTPs, together with the associated vacuum trucks, vacutugs, and MTUs, represent innovative technologies that can be packaged as investment projects. These initiatives are well suited for financing through development partners, blended finance mechanisms, and public-private partnerships.

Table 35: Proposed Faecal Sludge Collection and Treatment Equipment

Province	Vacuum truck	Mini Tug	Mobile treatment Unit
Central			
Tailevu	1	1	1
Serua			2
Eastern			
Kadavu			1
Lau			1
Lomaiviti			1
Rotuma			1
Northern			
Bua	1	1	
Cakaudrove	2	2	1
Macuata	2	2	
Western			
Ba			1
Nadroga			1
Total	**6**	**6**	**10**

7.4.5 Nature-based Solutions and Constructed Wetlands

Nature-based Solutions (NbS), including constructed wetlands (CWs), are receiving increasing attention in Fiji through initiatives led by organisations such as NIWA and the Wildlife Conservation Society.

For the RWSS Master Plan, constructed wetlands have been considered as a potential option for faecal sludge management (see Section 5). While CWs are well suited for polishing treated wastewater and septic tank effluent, there is currently limited local experience in their application for faecal sludge treatment.

In addition, successful implementation would require suitable land, appropriate technical design, and sustained operation and maintenance capacity at the community level.

Accordingly, the Master Plan proposes decentralised faecal sludge treatment plants (FSTPs) with planted drying beds, operated by trained personnel, as the preferred long-term solution for rural faecal sludge management. Nevertheless, NbS, including constructed wetlands, should continue to be evaluated through the DWS Research and Development (R&D) programme for future application where technically and environmentally appropriate.

7.4.6 Summary of the Water Supply and Sanitation Investment Plan

Table 36 summarises the proposed water supply and sanitation investments derived from the NRWPMS and the investment strategy presented in Sections 4 and 5. These interventions form the basis for estimating the capital investment requirements of the RWSS Master Plan.

The Investment Plan focuses on expanding and upgrading rural water supply, sanitation and faecal sludge management services. Routine asset maintenance activities, including water supply repairs and reservoir rehabilitation, are excluded, as these are expected to be financed through the Climate Resilient Water and Sanitation Fund.

Similarly, investments relating to urban water supply systems operated by the WAF are excluded, as they fall within WAF's capital investment and asset management programmes.

Implementation of the Investment Plan should also be informed by GEDSI principles. During detailed planning and project design, priority communities, including remote maritime islands, informal settlements and peri-urban areas, should be assessed to better understand the differing needs and barriers experienced by women, men, persons with disabilities, older persons and other vulnerable groups. These assessments should be undertaken in consultation with relevant government agencies, community representatives and local rights-holder organisations to ensure that investments are equitable, inclusive and responsive to community needs.



Table 36: Summary of Water Supply and Sanitation Upgrade Programme

Facility	CENTRAL	Naitasiri	Namosi	Rewa	Serua	Tailevu	EASTERN	Kadavu	Lau	Lomaiviti	Rotuma
Water Supply											
a. Division Rural Water Support Programmes1/											
New surface water source (dam weir, EPS)	**41**	9	10	1	5	16	**19**	9	4	6	-
HH Rainwater harvesting tank	**1,885**	264	245	163	701	512	**510**	196	133	181	-
Storage tank	**39**	13	2	6	7	11	**13**	8	2	3	-
Ecological Purification System	**82**	31	16	5	4	26	**108**	38	24	42	4
b.Technology Innovations											
Package Plant (surface water)	**3**	**1**	1	1			**3**	**1**	1		1
Borehole (with solar power)	**12**	4	-	-	1	7	**11**	2	9	-	-
Desalination plant	**2**	-	-	-	1	1	**8**	-	8	-	-
Sanitation											
c. Upgraded Septic Tank Programmee											
New Septic tank (individual household)	**10,084**	3,520	797	1,211	1,062	3,494	**4,397**	1,339	1,541	1,379	138
Upgrade/replace Septic tank (50%)	**12,259**	955	473	5,230	974	4,628	**2597**	804	606	1,005	183
Septic tank (communal)	**1**	1					**-**				
d.Faecal Sludge Management Programme											
Faecal sludge vacuum tanker truck	**1**					1	**-**				
Mini Faecal collection trucks	**1**					1	**-**				
Faecal Sludge Treatment Plant	**1**					1	**-**				
Mobile Treatment Unit	**2**				2		**4**	1	1	1	1

Facility	NORTHERN	Bua	Cakaudrove	Macuata	WESTERN	Ba	Nadroga	Navosa	Ra	TOTAL
Water Supply										
a. **Division Rural Water Support Programmes**										
New surface water source (dam weir, EPS)	**62**	5	38	19	**61**	19	12	14	16	**183**
HH Rainwater harvesting tank	**3,400**	161	456	2,783	**13,249**	11,468	1,276	283	222	**19,044**
Storage tank	**51**	3	21	27	**38**	14	11	3	10	**141**
Ecological Purification System	**196**	32	107	57	**111**	34	23	28	26	**497**
b. **Technology Innovations**										
Package Plant (surface water)	**2**	**1**	1		**2**	**1**	1			10
Borehole (with solar power)	**29**	12	5	12	**38**	11	12	11	4	**90**
Desalination plant	**12**	4	3	5	**6**	1	5	-	-	**28**
Sanitation										
c.Upgraded Septic Tank Programme										
New Septic tank (individual household)	**22,702**	2,716	7,247	12,739	**23,665**	13,555	2,232	3,167	4,711	**60,848**
Upgrade/replace Septic tank (50%)	**5,505**	295	1,917	3,293	**26,393**	20,775	3,551	459	1,608	**46,753**
Septic tank (communal)	**1**	1			**2**		1		1	4
d.Faecal Sludge Management Programme										
Faecal sludge vacuum tanker truck	**5**	1	2	2	**-**					**6**
Mini Faecal collection trucks	**5**	1	2	2	**-**					6
Faecal Sludge Treatment Plant	**5**	1	2	2	**-**					**6**
Mobile Treatment Unit	**1**		1		**3**	1	2			**10**

Source: NRWPMS and Consultants | Note 1: As requested in the NRWPMS.

7.5 Cost estimates

7.5.1 Unit costs for water and sanitation facilities

The unit costs are identified from cost information provided by DWS and WAF and local suppliers of material in Fiji, in particular for septic tanks and water tanks. A range of international companies were contacted to provide their estimates of a solar-powered desalination plant suitable for Fiji. The costs are expressed in FJD and in USD converted at the April 2025 exchange rate of US$1.00 = FJ$2.266.

A summary of the unit costs and source is provided in Table 37 below. Details of the source and makeup of the costs for each item are included in Annex D.

Table 37: Summary of Water Supply and Sanitation Unit Costs

Facility	FJD	USD	Source
Water Supply			
New surface water source (dam weir, EPS)	650,650	287,136	DWS and Consultants
Package Plant (surface water)	1,000,000	441,306	AFD
Ecological Purification System	106,000	46,779	DWS and Consultants
Borehole	122,650	54,126	DWS
HH Rainwater harvesting tank	11,175	4,932	Rotomould and Consultants
Storage tank	39,500	17,432	Rotomould
Desalination plant	541,000	238,747	Morek and DWS
Sanitation			
New Septic tank (individual household)	13,000	5,737	Rotomould and DWS
Upgrade/replace Septic tank (50%)	10,500	4,634	Rotomould and DWS
Septic tank (communal)	24,000	10,591	Consultants
Faecal sludge vacuum tanker truck	102,000	45,013	Consultants
Mini Faecal collection trucks	11,350	5,009	Consultants
Faecal Sludge Treatment Plant	varies	-	Consultants ex India
Mobile Treatment Unit	106,502	47,000	Consultants

The cost of the six FSTPs varies according to the population served in each location and range from FJ$129,045 to FJ$403,529 per province, based on a CAPEX cost of US$3.50 (FJ$7.93) per capita served.

7.5.2 OPEX costs for water and sanitation

The annual operation and maintenance costs (OPEX) for the range of facilities are estimated based on a percentage of the original CAPEX cost for each component of the costs. Table 49 provides a summary. The OPEX for FSTPs is based on an annual cost of US$1.65 per capita equivalent to FJ$3.74 per capita.

Table 38: Summary of OPEX Costs for Water and Sanitation Facilities

Facility	% of Capex	F$ per year	US$ per year
Water Supply			
A. Division Rural Water Support Programmes			
New surface water source (dam weir, EPS)	1.2%	8,315	3,669
HH Rainwater harvesting tank	0.7%	82	36
Storage tank	0.8%	310	137
Ecological Purification System	1.5%	1,537	678
B. Technology Innovations			
Package Plant (surface water)	1.1%	11,000	4,854
Borehole (with solar power)	1.6%	1,990	878
Desalination plant	2%	9,880	4,360
Sanitation			-
C. Upgraded Septic Tank Programme			
New Septic tank (individual household)	0.5%	68	30
Upgrade/replace Septic tank (50%)	0.5%	55	24
Septic tank (communal)	0.7%	158	70
D. Faecal Sludge Management Programme			
Faecal sludge vacuum tanker truck	40%	40,800	18,005
Mini Faecal collection trucks	40%	4,540	2,004
Faecal Sludge Treatment Plant (varies according to plant capacity)			-
Mobile Treatment Unit	25%	26,626	11,750

7.5.3 Support costs for DWS and RWSS Unit

The RWSS Master Plan proposes a programme for the institutional support and capacity development of DWS and RWSS Unit to ensure that the sector has the management capacity to sustain the new and existing facilities.

(see Sections 9 and 10). The total annual cost is estimated at FJ$2.880 million (US$1.271 million) (see Table 50).

The support costs are estimated to start in 2026 and to apply for the whole 25-year programme until 2050.

Table 39: Summary of DWS and RWSS Proposed Support

Item		Annual costs 2026-2050 (FJ$)
A. DWS		
1. Digital Platform (database and MIS)		430,000
2. Stakeholder Coordination		100,000
3. Periodic Planning	No additional resources needed	
4. Review and Approve WSMP		1,350,000
5. Performance Based Finance	DWS Senior Accountant appointed	
6. Technical & Financial Audit		540,000
Total DWS		**2,420,000**
B. RWSS Unit		
1. Capacity Building & Training	to be determined	
2. Technical Backstopping Water Committees	Linked to technical and financial audit managed by DWS	460,000
3. Annual Reports Submission		
Total RWSS		**460,000**
Total All		**2,880,000**

7.5.4 Climate Resilient Water and Sanitation Fund

As outlined in Section 6, a range of interventions have been identified to strengthen asset management and improve the climate resilience of rural water supply and sanitation infrastructure. These activities will be implemented through the DWSSSPs. For the purposes of the RWSS Master Plan, the required funding has been estimated as a percentage of the capital investment (CAPEX) for new infrastructure.

An allocation equivalent to 2% of the CAPEX for new water supply and sanitation infrastructure during the 2026–2030 investment period is proposed to establish a Climate Resilient Water and Sanitation Fund (CRWSF). The Fund will support asset management, rehabilitation, and climate-proofing measures to improve the long-term resilience and sustainability of rural water and sanitation services.

The proposed allocation is FJ$34.271 million (US$15.124 million).

The Fund will also provide targeted financial assistance for sanitation improvements. It is proposed that households living in extreme poverty (estimated at 5% of households requiring sanitation upgrades) receive a 100% subsidy for the construction or upgrading of approved septic tank systems. The estimated cost of this subsidy is FJ$64.10 million (US$28.3 million) over the 2026–2030 investment period.

7.5.5 DWS Salary Costs

The annual salary cost for the DWS staff establishment of 67 positions in 2025 is estimated at FJ$2.161 million. For completeness, these costs are included in the investment framework and cover staff responsible for planning and design, capital project implementation, operations and maintenance, and corporate support services.



Table 40: DWS and RWSS Support Costs and Climate Resilient Water and Sanitation Fund

Item	Salary Grade	Unit cost F$/yr	No.	F$ 2025	2026	2027	2028	2029	2030
A. **DWS**									
1. Digital Platform (database and MIS)									
a. Technicians (digital platform and GIS)	GD	70,000	2		140,000	140,000	140,000	140,000	140,000
b. Support staff (data verification, analytics, GIS)	GB	45,000	2		90,000	90,000	90,000	90,000	90,000
c. Dedicated Manager (coordinate water quality, monitoring and surveillance)	GE	100,000	2		200,000	200,000	200,000	200,000	200,000
Subtotal					**430,000**	**430,000**	**430,000**	**430,000**	**430,000**
2. Stakeholder Coordination									
a. Dedicated coordinator (capacity building & training)	GE	100,000	1		100,000	100,000	100,000	100,000	100,000
3. Periodic Planning									
(no additional resources needed)									
4. Review and Approve WSMP									
a. Managers (1 per division)	GG	180,000	4		720,000	720,000	720,000	720,000	720,000
b. Support staff (1 per province)	GB	45,000	14		630,000	630,000	630,000	630,000	630,000
Subtotal					**1,350,000**	**1,350,000**	**1,350,000**	**1,350,000**	**1,350,000**
5. Performance Based Finance									
DWS Senior Accountant appointed									
6. Technical & Financial Audit									
a. Manager (1 per division)	GF	135,000	4		540,000	540,000	540,000	540,000	540,000

Item	Salary Grade	Unit cost F$/yr	No.	F$ 2025	2026	2027	2028	2029	2030
B. **RWSS Unit**									
1. Capacity Building & Training									
(to be determined)									
2. Technical Backstopping Water Committees									
a. Support resources (per division)									
- vehicles (purchase)		100,000	4	-	400,000				
- vehicles O&M		40,000	4	-	160,000	160,000	160,000	160,000	160,000
- field expenses		25,000	4	-	100,000	100,000	100,000	100,000	100,000
- stores inventory		50,000	4	-	200,000	200,000	200,000	200,000	200,000
Subtotal				-	**860,000**	**460,000**	**460,000**	**460,000**	**460,000**
3. Annual Reports Submission				-					
(linked to technical and financial audit managed by DWS)									
C. CLIMATE RESILIENT WATER & SANITATION FUND									
- **2% of CAPEX 2026 - 2030**		2%		-	**5,029,605**	**6,978,651**	**7,276,942**	**7,236,708**	**7,746,592**
TOTAL ALL			FJ$	0	**8,309,605**	**9,858,651**	**10,156,942**	**10,116,708**	**10,626,592**

7.5.6 Schedule of Costs

The construction of new and upgraded rural water supply and sanitation infrastructure is planned for implementation over the 2026–2030 period to support the achievement of the NDP targets and key performance indicators. While this programme is ambitious, its successful delivery will depend on securing significant financial support from development partners, as the required capital investment is expected to exceed available Government resources.

The additional operation and maintenance (OPEX) costs associated with new infrastructure are assumed to commence in the year following commissioning and continue through to 2050. Similarly, the support costs for the DWS and the Rural Water Supply and Sanitation (RWSS) Units are assumed to commence in 2026 and continue throughout the 25-year planning period.

7.6 Cost Summary Tables

7.6.1 Summary of Investment Costs

This section presents the summary cost tables generated from the RWSS Master Plan financial model for the 2026–2050 investment period.

The estimated investment requirements are summarised below:

Rural water supply: Capital investment for division-based rural water supply programmes is estimated at **US$176 million (FJ$398 million)**, with a further **US$13 million (FJ$30 million)** allocated for technology innovation projects, including desalination systems, packaged treatment plants and solar-powered boreholes. The associated operation and maintenance costs to **2050** are estimated **at US$43 million (FJ$98 million)**.

Rural sanitation: The estimated capital cost of upgrading all non-compliant septic systems is **US$566 million (FJ$1.282 billion)**. However, the Master Plan proposes Government funding only for eligible low-income households, with the remaining costs to be met by household owners. The proposed **faecal sludge management programme**, including faecal sludge treatment plants, vacuum trucks, vacutugs and mobile treatment units, requires an estimated **US$1.6 million (FJ$3.6 million)** in capital investment. The associated operation and maintenance costs to **2050** are estimated at **US$75 million (FJ$169 million)**.

Institutional support: The estimated support costs to **2050** are **US$28 million (FJ$63 million)** for DWS and **US$6 million (FJ$14 million**) for the RWSS Units. Existing DWS staff salary costs over the same period are estimated at **US$24 million (FJ$54 million)**.

Climate Resilient Water and Sanitation Fund: A total allocation of **US$15 million (FJ$34 million)** is proposed for the **2026–2030** period to finance asset management and climate-proofing measures. The targeted sanitation subsidy (US$28.3 million) is costed separately but would also be administered through the CRWSF.

Table 41: Summary of Investment Plan Costs by Facility Category

Item		USD Thousand		Total	FJD Thousand		
		Local	Foreign		Local	Foreign	Total
A.	**CAPEX COSTS**						
	Water Supply						
	a. Division Rural Water Support Programme	128,616.3	**47,107.1**	**175,723.5**	**291,144.6**	**106,744.7**	**398,189.3**
	New surface water source (dam weir, EPS)	44,879.4	11,219.9	56,099.3	101,696.8	25,424.2	127,121.0
	HH Rainwater harvesting tank	65,742.1	28,175.2	93,917.3	148,971.7	63,845.0	212,816.7
	Storage tank	1,720.5	737.4	2,457.9	3,898.7	1,670.9	5,569.5
	Ecological Purification System	16,274.3	6,974.7	23,249.0	36,877.5	15,804.7	52,682.2
	b. Technology Innovations	**5,807.9**	**7,327.7**	**13,136.6**	**13,160.8**	**16,604.6**	**29,765.4**
	Package Plant (surface water)	3,089.1	1,323.9	4,413.1	7,000.0	3,000.0	10,000.0
	Borehole (with solar power)	1,948.5	2,922.8	4,871.4	4,415.4	6,623.1	11,038.5
	Desalination plant	770.2	3,081.0	3,851.2	1,745.4	6,981.5	8,726.9
	Total Water Supply	**134,424.3**	**54,434.8**	**188,859.1**	**304,605.4**	**123,349.3**	**427,954.7**
	Sanitation	-	-	-	-	-	-
	c. Upgraded Septic Tank Programme	**282,883.2**	**282,883.2**	**565,766.3**	**641,013.3**	**641,013.3**	**1,282,026.5**
	New Septic tank (individual household)	174,541.9	174,541.9	349,083.8	395,512.0	395,512.0	791,024.0
	Upgrade/replace Septic tank (50%)	108,320.1	108,320.1	216,640.1	245,453.3	245,453.3	490,906.5
	Septic tank (communal)	21.2	21.2	42.4	48.0	48.0	96.0
	d. Faecal Sludge Management Programme	**784.5**	**801.4**	**1,585.9**	**1,777.7**	**1,816.0**	**3,593.7**
	Faecal sludge vacuum tanker truck	54.0	216.1	270.1	122.4	489.6	612.0
	Mini Faecal collection trucks	6.0	24.0	30.1	13.6	54.5	68.1
	Faecal Sludge Treatment Plant	489.5	326.3	815.8	1,109.2	739.4	1,848.6
	Mobile Treatment Unit	235.0	235.0	470.0	532.5	532.5	1,065.0
	Total Sanitation	**283,667.7**	**283,684.6**	**567,352.3**	**642,790.01**	**642,829.3**	**1,285,620.2**
	Total Capex	**418,092.0**	**338,119.4**	**756,211.4**	**947,396.4**	**766,178.6**	**1,713,575.0**
B.	**SUPPORT TO DWS & RWSS**						
	A. DWS support costs	24,863.2	2,762.6	27,625.8	56,340.0	6,260.0	62,600.0
	B. RWSS support costs	5,520.7	613.4	6,134.2	12,510.0	1,390.0	13,900.0
	C. Climate resilience fund	12,099.4	3,024.8	15,124.2	27,417.2	6,854.3	34,271.5
	D. DWS salary costs current	20,982.0		20,982.0	47,545.2		47,545.2
	Total Support Costs	**63,465.3**	**6,400.8**	**69,866.1**	**143,812.4**	**14,504.3**	**158,316.7**
C.	**OPEX**	-	-	-			
	Water Supply Opex (new facilities)	38,798.9	4,311.0	43,109.9	87,918.3	9,768.7	97,687.0
	Sanitation Opex (new facilities)	67,230.8	7,470.1	74,700.8	152,344.9	16,927.2	169,272.1
	Total Opex	**106,029.7**	**11,781.1**	**117,810.7**	**240,263.2**	**26,695.9**	**266,959.1**
	TOTAL ALL	**587,586.9**	**356,301.3**	**943,888.2**	**1,331,472.0**	**807,378.8**	**2,138,850.8**

Table 42: Summary of Investment Programme Costs by Division for Water Supply (FJ$ million)

	Northern Division		Western Division		Central Division		Eastern Division		Rotuma	O&M		Total cost
Item	**Amount**	**% of cost category**	**Amount**	**% of cost category**	**Amount**	**% of cost category**	**Amount**	**% of cost category**	**Amount**	**% of cost category**	**Amount**	**Amount**
Water Supply												
a. Division Rural Water Support Programmes												
New surface water source (dam weir, EPS)	43.07	33.9%	42.37	33.3%	28.48	22.4%	13.20	10.4%	-	0.0%	-	**127.12**
HH Rainwater harvesting tank	38.00	17.9%	148.06	69.6%	21.06	9.9%	5.70	2.7%	-	0.0%	-	**212.82**
Storage tank	2.01	36.2%	1.50	27.0%	1.54	27.7%	0.51	9.2%	-	0.0%	-	**5.57**
Ecological Purification System	20.78	39.4%	11.77	22.3%	8.69	16.5%	11.02	20.9%	0.42	0.8%	-	**52.68**
	103.85		**203.70**		**59.78**		**30.44**		**0.42**			**398.19**
b. Technology Innovations												
Package Plant (surface water)	2.00	20.0%	2.00	20.0%	3.00	30.0%	2.00	20.0%	1.00	10.0%	-	**10.00**
Borehole (with solar)	3.56	32.2%	4.66	42.2%	1.47	13.3%	1.35	12.2%	-	0.0%	-	**11.04**
Desalination plant	3.81	43.6%	2.02	23.2%	0.84	9.7%	2.05	23.5%	-	0.0%	-	**8.73**
	9.37		**8.68**		**5.32**		**5.40**		**1.00**			
Total Water Supply Capex	**113.22**	**26.5%**	**212.38**	**49.6%**	**65.09**	**15.2%**	**35.83**	8.4%	**1.42**	0.3%	-	**427.95**
Water Supply Opex (new facilities)											**97.69**	**97.69**
TOTAL WATER SUPPLY (Capex & Opex)												**525.64**

Table 43: Summary of Investment Programme Costs by Division for Sanitation (FJ$ million)

	Northern Division		Western Division		Central Division		Eastern Division		Rotuma		O&M	Total cost
Item	Amount	% of cost category	Amount	% of cost category	Amount	% of cost category	Amount	% of cost category	Amount	% of cost category	Amount	Amount
Sanitation	-		-		-		-		-		-	**-**
a. Upgraded Septic Tank Programmes												
New Septic tank (individual household)	295.13	37.3%	307.65	38.9%	131.09	16.6%	55.37	7.0%	1.79	0.2%	-	**791.02**
Upgrade/replace Septic tank (50%)	57.80	11.8%	277.12	56.5%	128.72	26.2%	25.35	5.2%	1.92	0.4%	-	**490.91**
Septic tank (communal)	0.02	25.0%	0.05	50.0%	0.02	25.0%	-	0.0%	-	0.0%	-	**0.10**
	352.95		**584.81**		**259.84**		**80.72**		**3.71**		**-**	**1,282.03**
b. Faecal Sludge Management												
Faecal sludge vacuum tanker truck	0.51	83.3%	-	0.0%	0.10	16.7%	-	0.0%	-	0.0%	-	**0.61**
Mini Faecal collection trucks	0.06	83.3%	-	0.0%	0.01	16.7%	-	0.0%	-	0.0%	-	**0.07**
Faecal Sludge Treatment Plant	1.71	92.3%	-	0.0%	0.14	7.7%	-	0.0%	-	0.0%	-	**1.85**
Mobile Treatment Unit	0.11	10.0%	0.32	30.0%	0.21	20.0%	0.32	30.0%	0.11	10.0%	-	**1.07**
	2.38		**0.32**		**0.47**		**0.32**		**0.11**		**-**	**3.59**
Total Sanitation Capex	**355.33**	**27.6%**	**585.13**	**45.5%**	**260.30**	**20.2%**	**81.04**	**6.3%**	**3.82**	**0.3%**	**-**	**1,285.62**
Sanitation Opex (new facilities)											**169.27**	**169.27**
TOTAL SANITATION (Capex and Opex)												**1,454.89**

7.6.2 Impact of Inflation

The costs presented in the summary tables are expressed in base-year prices and do not include the effects of inflation over the implementation period. Consequently, the actual cost of delivering the Investment Plan is expected to increase over time.

Forecast inflation rates for Fiji for the period 2025–2030 have been applied to the base costs to estimate the impact of price escalation. Based on these forecasts, costs are expected to increase by 12.7% for expenditures denominated in Fijian Dollars (FJD) and 12.1% for foreign expenditures denominated in United States Dollars (USD).

Although inflation will continue to influence project costs beyond 2030, no allowance has been made for the period 2031–2050 due to the uncertainty associated with long-term economic forecasts. Actual investment costs over this period are therefore expected to be higher than the base cost estimates presented in this Master Plan.

7.6.3 Forecast Inflation

The latest ADB inflation forecasts for local-currency (FJD) and foreign-currency (USD) costs are shown in Table 44.

Table 44: Summary of Forecast Inflation for Fiji 2025-2030

Inflation rates			**2025**	**2026**	**2027**	**2028**	**2029**	**2030**
Foreign currency (USD)	USD		2.00%	3.00%	2.00%	1.80%	1.80%	1.80%
Local currency (FJD)	FJD		2.60%	2.40%	2.10%	2.00%	2.00%	2.00%
Cumulative Inflation 1/			**2025**	**2026**	**2027**	**2028**	**2029**	**2030**
Foreign currency (USD)	%		2.0%	3.5%	6.1%	8.1%	10.1%	12.1%
Local currency (FJD)	%		2.6%	3.8%	6.2%	8.3%	10.5%	12.7%
Price index								
Foreign currency (USD)	#	1	1.020	1.04	1.0612	1.0813	1.1008	1.1206
Local currency (FJD)	#	1	1.03	1.038	1.0617	1.0834	1.1051	1.1272
Relative (FJD/USD)	#		1.01	1.00	1.0005	1.0019	1.0039	1.0059
Exchange rate			**2.2660**	**Exchange rate 14 Apr 2025**				
Real (FJD/USD)	FJD/USD		2.27	2.27	2.27	2.27	2.27	2.27
Nominal (FJD/USD)	FJD/USD		2.27	2.27	2.27	2.27	2.27	2.28
Exchange Rate (PPP)	FJD/USD		2.27	2.25	2.25	2.25	2.25	2.25

Source: ADB ADO inflation forecast 2025 - 2029, Apr 20-2025

Note 1. Inflation calculated at mid-year by taking half of current year and half of previous year inflation.

Applying forecast inflation to the main investment period (2025–2030) adds FJ$205.40 million, an increase of 11.4% on the base cost of FJ$1,797.18 million for this period.

Table 45: Summary of Costs 2025 – 2030 with Inflation (FJD)

Division & Province	2025	2026	2027	2028	2029	2030	Total 2025-30
A. CAPEX							
Northern Division							
Bua	0.00	7.60	10.87	11.49	10.05	11.37	51.37
Cakaudrove	0.00	23.07	33.59	34.52	32.62	38.34	162.14
Macuata	0.00	37.67	51.85	53.76	53.78	57.97	255.03
Subtotal	**0.00**	**68.34**	**96.31**	**99.77**	**96.45**	**107.69**	**468.55**
Western Division							
Ba	0.00	80.86	109.02	115.77	121.24	115.96	542.86
Nadroga	0.00	14.04	19.73	20.96	20.24	20.99	95.96
Navosa	0.00	9.08	12.95	13.26	12.85	15.17	63.31
Ra	0.00	13.78	19.27	19.55	19.31	23.48	95.39
Subtotal	**0.00**	**117.76**	**160.97**	**169.53**	**173.65**	**175.60**	**797.52**
Central Division							
Naitasiri	0.00	10.31	14.33	14.66	14.40	16.60	70.30
Namosi	0.00	3.87	5.69	5.92	5.89	6.42	27.79
Rewa	0.00	11.26	15.06	15.19	15.24	18.18	74.94
Serua	0.00	5.35	7.53	8.06	8.05	7.91	36.91
Tailevu	0.00	16.80	23.42	23.88	23.54	27.82	115.46
Subtotal	**0.00**	**47.59**	**66.04**	**67.71**	**67.12**	**76.92**	**325.40**
Eastern Division							
Kadavu	0.00	5.75	8.31	8.60	8.26	9.07	39.99
Lau	0.00	5.50	8.03	8.82	7.18	8.00	37.54
Lomaiviti	0.00	5.70	8.12	8.42	8.07	9.03	39.35
Rotuma	0.00	0.84	1.15	1.14	1.09	1.02	5.24
Subtotal	**0.00**	**17.79**	**25.61**	**26.98**	**24.61**	**27.12**	122.11
Total CAPEX Costs	**0.00**	**251.48**	**348.93**	**364.00**	**361.84**	**387.33**	**1,713.57**
B. DWS & RWSS SUPPORT							
A. DWS support costs	0.00	2.42	2.42	2.42	2.42	2.42	12.10
B. RWSS support costs	0.00	0.86	0.86	0.46	0.46	0.46	3.10
C. Climate resilience fund	0.00	5.03	6.98	7.28	7.24	7.75	34.27
D. DWS salary costs current	0.00	2.16	2.16	2.16	2.16	2.16	10.80
Total Support Costs	**0.00**	**10.47**	**14.42**	**12.32**	**12.28**	**12.79**	**60.28**
TOTAL INVESTMENT COSTS	**0.00**	**261.95**	**361.35**	**376.32**	**374.11**	**400.12**	**1,773.85**
C. OPEX							
Water supply Opex	0.00	0.00	0.58	1.53	2.65	3.64	8.40
Sanitation Opex	0.00	0.00	1.21	3.06	4.61	6.05	14.93
Total OPEX Costs	**0.00**	**0.00**	**1.79**	**4.60**	**7.26**	**9.68**	23.33
TOTAL ALL	**0.00**	**261.95**	**363.14**	**380.91**	**381.37**	**409.80**	**1,797.18**
B. Price Inflation							
2. Price	0.00	17.95	32.54	42.04	50.18	62.69	205.40
Total Inflation	**0.00**	**17.95**	**32.54**	**42.04**	**50.18**	**62.69**	**205.40**
Total Project Costs	**0.00**	**279.90**	**395.69**	**422.95**	**431.55**	**472.49**	**2,002.58**
Disbursement per year	0%	14%	20%	21%	22%	24%	100%

8. Financial and Economic Analysis

This section presents the financial and economic analysis for the 25-year investment programme for the rural water supply and sanitation sector and describes the impact of the increased investment on the ongoing OPEX for the new facilities. An economic evaluation of the economic costs and benefits of the investment programme is also included.

8.1 OPEX Costs

8.1.1 OPEX Assumptions

OPEX costs have been estimated through applying a percentage of the original capital investment costs (CAPEX) for the main components of the costs of each water supply and sanitation facility in the investment programme. A summary of the percentages applied for estimating the annual costs is shown in Table 46.

Table 46: Summary of OPEX Cost Percentages Applied to CAPEX

Facility and Component	% of CAPEX per year
Water Supply	
Dam or weir	0.5%
Reservoir	0.5%
EPS	2.0%
Clearwater storage tank and base	1.0%
Distribution network	3.0%
Household connections	1.0%
Public standpipe	1.0%
Optional HH purification system	2.0%
Low level pumps (solar)	5.0%
Fencing	2.0%
Borehole	
Borehole, filter, screen, well cap	0.5%
Clearwater storage tank	1.0%
Distribution network	3.0%
Public standpipe	1.0%
Optional HH purification system	5.0%
Pump (solar)	5.0%
Rainwater Harvesting System	
Rainwater tank (3100 l Rotomould)	0.5%
Concrete tank base	0.5%
Pipework, house guttering, downpipes	1.0%
Rainwater harvesting set (first flush diverter, leaf eater, tank gauge)	1.0%
Desal Plant 1/	
Desalination reverse osmosis plant solar powered	2.0%
Integrated solar system 34.4 kWp capacity	2.0%
Onsite commissioning	2.0%
Remote monitoring system	2.0%
Basic water collection point	2.0%
Septic Tank New and Upgrade	
Individual septic tank (4550lt Rotomould)	0.5%
Latrine set (latrine riser and bowl)	1.0%
Installation	0.5%
Cistern flush or pour-flush toilet	1.0%
Installation	0.5%
Sludge Collection and Treatment	
FSTP	FJ$3.74 per capita
Tanker truck	40%
Mini tanker	40%
Mobile FSTP	25%

Source: Consultants

8.1.2 OPEX costs estimate

The projected OPEX cost relating to the new water and sanitation facilities based on these percentages is presented in Table 47. The total estimated OPEX in 2031 when the new facilities are all assumed to be in place and functioning amounts to FJ$11.56 million, equivalent to US$5.10 million.

On average, 39% of this is for water supply and 61% for sanitation; the higher sanitation share reflects the large number of household septic systems and the cost of septage collection and treatment. Overall, the OPEX is 0.7% of the total CAPEX costs per year.

Table 47: Summary of OPEX Cost Percentages Applied to CAPEX

Facility	FJ$ per year	US$ per year
Water Supply		
New surface water source (dam weir, EPS)	8,315	3,669
Package Plant (surface water)	11,000	4,854
Ecological Purification System	1,537	678
Borehole	1,990	878
HH Rainwater harvesting tank	82	36
Storage tank	310	137
Desalination plant (varies according to capacity 2% of Capex)	9,880	4,360
Sanitation		-
New Septic tank (individual household)	68	30
Upgrade/replace Septic tank (50%)	55	24
Septic tank (communal)	158	70
Faecal sludge vacuum tanker truck	40,800	18,005
Mini Faecal collection trucks	4,540	2,004
Faecal Sludge Treatment Plant (varies according to plant capacity)		-
Mobile Treatment Unit	26,626	11,750

Source: Consultants

The payment of OPEX is largely the responsibility of the rural communities benefiting from the services, although it is not clear if the cost of the collection and treatment of septage from septic tanks will be fully met by the households.

The OPEX costs relate to the new infrastructure and facilities and do not allow for the annual OPEX associated with the existing infrastructure, particularly for water supply. The existing OPEX of infrastructure that will be upgraded or replaced will offset part of the incremental OPEX of the investment programme; this amount is unknown. In practice, OPEX varies from year to year depending on breakdowns and repairs, including damage from extreme climate events, which cannot be predicted.

8.2 Comparative Analysis of Water Supply

A range of water supply schemes based on examples of large, medium and small schemes provided by WAF and a borehole scheme, desalination scheme, and a typical household rainwater collection and storage system were analysed to show their comparative economic efficiency. The construction costs and details of the population served and projected demand were analysed for eight schemes to show their comparative cost and efficiency through calculating the average incremental economic cost (AIEC) for each scheme considering their CAPEX, OPEX and projected beneficiaries over a 20-year period discounted to present value at a 5% discount rate. The examples covered a range of different scheme configurations and costs that are tailored and adapted to each location and so are not necessarily comparing like-with-like or alternatives to provide water to the same location. The results of the analysis are shown in Table 59. Details are included in the Annexes.

Table 48: Comparative Analysis of Water Supply Schemes

Scheme Type	Location	Population served (2026)	CAPEX FJ$	AIEC FJ$/ capita	OPEX per capita (2026)
Gravity					
Large	Moturiki Island	858	3,200,000	581	29.97
Medium	Nawaisomo	516	188,497	53	5.30
Medium	Vatudavila	285	212,114	106	9.37
Small	Navau & Uluiravo	45	125,631	518	69.15
Small	Nuku School	178	96,033	92	16.83
Borehole	Rarapatu	45	186,156	575	43.03
Desalination	-	250	502,208	309	40.18
Rainwater Harvesting (household)	-	5	11,175	399	16.45

The results show a range of AIEC values reflecting the range of parameters and the peculiar aspects of each location. The example of a large gravity scheme for Moturiki Island has the highest AIEC on account of its comparatively high capital cost. The small gravity scheme for Navau and Uluiravo Settlement and the borehole scheme for Rarapatu also are relatively high because of the small number of beneficiaries and they also have the highest OPEX cost per capita. Desalination also has a relatively high OPEX per capita but will be dependent on the number of people served.

The installation of household rainwater collection and storage also has a high AIEC. Rainwater storage cannot be relied on to provide sufficient water for the household during the dry seasons when rainfall is inadequate and usually must be supplemented from other water sources during periods of low rainfall. An AIEC analysis is usually used to evaluate the economic efficiency of alternatives to supply water to a particular location where there are several options to consider. Because the examples above cover a range of locations with different features the results are not indicative of the merits of a particular model. However, as a matter of principle it is usually advantageous to favour water supply schemes with lower ongoing OPEX, as these are more affordable and sustainable where operation and maintenance are the responsibility of the benefiting community. The use of solar powered pumps to reduce ongoing energy costs is appropriate, especially for locations that rely on fossil fuel power generation.

8.3 Funding and Procurement Packages

The total cost of the investment programme for the period 2026 to 2050 is estimated to be FJ$2,138.9 million, equivalent to US$943.9 million base cost before allowing for inflation. Investment of this magnitude is likely to be beyond the resources of the Fiji Government to fully fund the activities identified and costed in the Master Plan. Support from multilateral and bilateral donors will be needed to fulfil the programme.

An estimate of the likely scale of the funds need is made assuming that the Fiji Government is responsible for funding the ongoing staff costs of DWS, and the OPEX costs for the additional water supply and sanitation facilities that are implemented will be funded by communities. The largest component of the programme is for the installation of new septic tanks and the upgrade and replacement of existing septic tanks and sanitation facilities that do not meet the appropriate standard, which accounts for 75% of the Capex costs for water supply and sanitation. It is assumed that individual households will be responsible for meeting these costs with direct assistance from DWS restricted to supporting poor households. Extreme poverty in Fiji is measured against the World Bank international poverty line of US$3.00 per person per day (2021 purchasing power parity). Based on this measure, extreme poverty affected 4.7% of households in 2019/20. The national poverty rate, as defined by the Fiji Government was 29.9% in 2019, with the rural sector having 41.5% in 2019-20. For the purpose of allocating funding responsibility, it is assumed GoF would be responsible for funding 5% of the cost of improved sanitation facilities for septic tanks.

The various components have been allocated to packages that could represent discrete packages to be funded by the various donors. At this point the only confirmed commitment to funding is for AFD, which has committed to funding the water supply package plants.

A summary of the potential packages is shown in Table 49.

In terms of the financing strategy, the following options are proposed:

- ✓ The division-based rural water supply programmes would be financed by donors and/or GoF. This would include the support costs to DWS and RWSS Units.
- ✓ The water supply technology innovations would be financed by donors.
- ✓ Septic tanks would be financed by households, except the 5% of households living in extreme poverty who would be eligible for a subsidy (administered under the CRWSF but funded by GoF).
- ✓ The faecal sludge management programme would be financed by donors.
- ✓ The CRWSF for asset management and climate-proofing will be financed by public funding and donors (potentially in collaboration with environmental or green trust funds).
- ✓ Operation of new water supply and sanitation facilities is the responsibility of Water Committees. For systems that need support the RWSS Unit will provide assistance with funding facilitated by DWS as needed.

The total funding demand for the Fiji Government over the period 2026 – 2050 is estimated to be FJ$111.7 million equivalent to US$49.3 million.

This sum includes a subsidy for sanitation for families living in extreme poverty of US$28.3 million. However, it presupposes that rural water supply programmes and technology innovations will be fully funded by development partners. This funding requirement for rural water supply programmes and water supply technology innovations is US$188.9 million plus US$34.0 million for DWS and RWSS unit support costs. The funding demand on households for the improvement of septic tanks is US$537.5 million. The faecal sludge management programme costs US$1.6 million and is expected to be funded by development partners. The Climate Resilient Water and Sanitation Fund for asset management and climate proofing is US$15.1 million. The cost of Opex of new water supply and sanitation facilities to be borne by the communities over the period to 2050 is US$117.8 million.

8.4 Partnerships and Coordination

DWS is currently working with the following development partners and NGOs.

UNICEF

- ✓ Funds for World Water Day celebrations
- ✓ UNICEF Funds for Rural Water Committee Training in other Provinces
- ✓ UNICEF Funds for Formulation of Rural Water Supply and Sanitation Master Plan
- ✓ UNICEF Funds for Installation of Ecological Purification Systems in Health Care Facilities

ADB

- ✓ ADB Technical Assistance (TA) for Institutional Strengthening of DWS

AFD

- ✓ Grant for Water Treatment Package Plants for Rural Water Schemes=

Australian Water Partnership (AWP)

- ✓ TA for Water Advisor for DWS and Diagnostic Study for Water Quality Monitoring
- ✓ TA for Feasibility Study for Scaling-Up Community Level WRM in Fiji. DWS working with Live and Learn

LDS Charities

- ✓ Funds for Installation of Solar Powered Boreholes

High Commission of India

- ✓ Funds to support Tubalevu Village Ground Water Project Reticulation

FASEP[1]

- ✓ UCD2 FAST Water Treatment Package Plant Pilot Project

The Netherlands Government

- ✓ 1st phase development of Fiji Integrated Water Supply and Sewerage Management Information System

8.5 Current Capital Projects Funding

The following projects are ongoing.

- ✓ FJ$200,000.00 – Upgrade of RWS in Navunimono and Verata Ucunivanua in Tailevu and installation of UCD FAST Package Treatment Plant.
- ✓ FJ$108,000.00 – EPS installation in Nakorosule and Vatukarasa Health Care Facilities

1 Fonds d'Étude et d'Aide au Secteur Privé (French Private Sector Study and Aid Fund), a financial tool managed by the French Treasury (**Direction Générale du Trésor**)

2 Compact water treatment plant

Table 49: Component Packages and Funding

Item	$ million	FJ$ million	Funding Source (USD million)						
	Base Costs		AFD	Donor 1 Water supply	Donor 2 Sanitation	HHs/ donors	Donor 4 CRS	Fiji Govt	Total
Water Supply									
A. Division Rural Water Support Programme									
New surface water source (dam weir, EPS)	56.10	127.1	-	56.1	-	-	-	-	**56.10**
HH Rainwater harvesting tank	93.92	212.8	-	93.9	-	-	-	-	**93.92**
Storage tank	2.46	5.6	-	2.5	-	-	-	-	**2.46**
Ecological Purification System	23.25	52.7	-	23.2	-	-	-	-	**23.25**
Subtotal	**175.72**	**398.19**	**-**	**175.7**	**-**	**-**	**-**	**-**	**175.7**
B. Technology Innovations									
Package Plant (surface water)	4.41	10.0	4.4	-	-	-	-	-	**4.41**
Borehole (with solar)	4.87	11.0	-	4.9	-	-	-	-	**4.87**
Desalination plant	3.85	8.7	-	3.9	-	-	-	-	**3.85**
Subtotal	**13.14**	**29.77**	**4.41**	**8.72**	**-**	**-**	**-**	**-**	**13.14**
Total Water Supply	**188.9**	**428.0**	**4.4**	**184.4**	**-**	**-**	**-**	**-**	**188.9**
Sanitation									
C.Upgraded Septic Tank Programme									
New Septic tank (individual household)	349.08	791.0	-	-	-	331.6	-	17.5	**349.08**
Upgrade/replace Septic tank (50%)	216.64	490.9	-	-	-	205.8	-	10.8	**216.64**
Septic tank (communal)	0.04	0.1	-	-	-	0.0	-	0.0	**0.04**
Subtotal	**565.77**	**1,282.03**	**-**	**-**	**-**	**537.48**	**-**	**28.29**	**565.77**

Item		$ million	FJ$ million	Funding Source (USD million)						
		Base Costs		AFD	Donor 1 Water supply	Donor 2 Sanitation	HHs/ donors	Donor 4 CRS	Fiji Govt	Total
	D.Faecal Sludge Management									
	Faecal sludge vacuum tanker truck	0.27	0.6	-	-	0.3	-	-	-	**0.27**
	Mini Faecal collection trucks	0.03	0.1	-	-	0.0	-	-	-	**0.03**
	Faecal Sludge Treatment Plant	0.82	1.8	-	-	0.8	-	-	-	**0.82**
	Mobile Treatment Unit	0.47	1.1	-	-	0.5	-	-	-	**0.47**
	Subtotal	**1.6**	**3.6**	**-**	**-**	**1.6**	**-**	**-**	**-**	**1.6**
	Total Sanitation	**567.4**	**1,285.6**	**-**	**-**	**1.6**	**537.5**	**-**	**28.3**	**567.4**
Climate Resilience Fund		15.12	34.3	-	-	-	-	15.1	-	**15.12**
Other non-contracted expenses										
	Water supply Opex	43.11	97.7	-	-	-	43.1	-	-	**43.11**
	Sanitation Opex	74.70	169.3	-	-	-	74.7	-	-	**74.70**
	Subtotal	**117.8**	**267.0**	**-**	**-**	**-**	**117.8**	**-**	**-**	**117.8**
	DWS Support Costs	27.63	62.6	-	13.8	13.8	-	-	-	**27.63**
	RWSS Support Costs	6.13	13.9	-	3.1	3.1	-	-	-	**6.13**
	DWS Salaries (current)	20.98	47.5	-	-	-	-	-	21.0	**20.98**
	Total Other Expenses	**54.7**	**124.0**	**-**	**16.9**	**16.9**	**-**	**-**	**21.0**	**54.7**
TOTAL (USD)		**943.9**	**2,138.9**	**4.4**	**201.3**	**18.5**	**655.3**	**15.1**	**49.3**	**943.9**
TOTAL (FJ$)				**10.0**	**456.2**	**41.8**	**1,484.9**	**34.3**	**111.6**	**2,138.9**

Item	$ million	FJ$ million	Funding Source (FJ$ million)						
	Base costs		AFD	Donor 1 Water supply	Donor 2 Sanitation	HHs/ donors	Donor 4 CRS	Fiji Govt	Total
Water Supply									
A. Division Rural Water Support Programme									
New surface water source (dam weir, EPS)	56.10	127.1	-	127.1	-	-	-	-	**127.12**
HH Rainwater harvesting tank	93.92	212.8	-	212.8	-	-	-	-	**212.82**
Storage tank	2.46	5.6	-	5.6	-	-	-	-	**5.57**
Ecological Purification System	23.25	52.7	-	52.7	-	-	-	-	**52.68**
Subtotal	**175.72**	**398.19**	**-**	**398.2**	**-**	**-**	**-**	**-**	**398.2**
B. Technology Innovations			-	-	-	-	-	-	
Package Plant (surface water)	4.41	10.0	10.0	-	-	-	-	-	**10.00**
Borehole (with solar)	4.87	11.0	-	11.0	-	-	-	-	**11.04**
Desalination plant	3.85	8.7	-	8.7	-	-	-	-	**8.73**
Subtotal	**13.14**	**29.77**	**10.00**	**19.77**	**-**	**-**	**-**	**-**	**29.77**
Total Water Supply	**188.9**	**428.0**	**10.0**	**418.0**	**-**	**-**	**-**	**-**	**428.0**
Sanitation									
C. Upgraded Septic Tank Programme									
New Septic tank (individual household)	349.08	791.0	-	-	-	751.5	-	39.6	**791.02**
Upgrade/replace Septic tank (50%)	216.64	490.9	-	-	-	466.4	-	24.5	**490.91**
Septic tank (communal)	0.04	0.1	-	-	-	0.1	-	0.0	**0.10**
Subtotal	**565.77**	**1,282.03**	**-**	**-**	**-**	**1,217.93**	**-**	**64.10**	**1,282.03**
D. Faecal Sludge Management			-	-		-	-	-	
Faecal sludge vacuum tanker truck	0.27	0.6	-	-	0.6	-	-	-	**0.61**
Mini Faecal collection trucks	0.03	0.1	-	-	0.1	-	-	-	**0.07**
Faecal Sludge Treatment Plant	0.82	1.8	-	-	1.8	-	-	-	**1.85**
Mobile Treatment Unit	0.47	1.1	-	-	1.1	-	-	-	**1.07**
Subtotal	**1.6**	**3.6**	**-**	**-**	**3.6**	**-**	**-**	**-**	**3.6**
Total Sanitation	**567.4**	**1,285.6**	**-**	**-**	**3.6**	**1,217.9**	**-**	**64.1**	**1,285.6**

Item	$ million	FJ$ million	Funding Source (FJ$ million)						
	Base costs		AFD	Donor 1 Water supply	Donor 2 Sanitation	HHs/ donors	Donor 4 CRS	Fiji Govt	Total
Climate Resilience Fund	15.12	34.3	-	-	-	-	34.3	-	**34.27**
Other non-contracted expenses									
Water supply Opex	43.11	97.7	-	-	-	97.7	-	-	**97.69**
Sanitation Opex	74.70	169.3	-	-	-	169.3	-	-	**169.27**
Subtotal	**117.8**	**267.0**	**-**	**-**	**-**	**267.0**	**-**	**-**	**267.0**
DWS Support Costs	27.63	62.6	-	31.3	31.3	-	-	-	**62.60**
RWSS Support Costs	6.13	13.9	-	7.0	7.0	-	-	-	**13.90**
DWS Salaries (current)	20.98	47.5	-	-	-	-	-	47.5	**47.54**
Total Other Expenses	**54.7**	**124.0**	**-**	**38.3**	**38.3**	**-**	**-**	**47.5**	**124.0**
TOTAL (FJ$)	**943.9**	**2,138.9**	**10.0**	**456.2**	**41.8**	**1,484.9**	**34.3**	**111.6**	**2,138.9**

Source: Consultants

8.6 Cost benefit analysis

The economic benefits arise from the combined impact of the programme on the resident rural population, business sector, civil society, and the environment through investment in water supply and sanitation facilities and infrastructure to meet the NDP and SDG targets and KPIs by 2030, and ongoing institutional strengthening for governance and capacity building for management of the sector by DWS and the benefiting communities. The economic analysis is based on the following quantifiable and monetised benefits.

For water supply:

- ✓ Increased reticulated supply from the project replacing present consumption from other sources. Valued at the opportunity cost of alternative sources of supply
- ✓ Increased consumption over existing consumption. Valued at the Willingness to Pay (WTP)
- ✓ Saved disinfection costs of having to treat water and store water
- ✓ Time saving in collecting and storing water
- ✓ Health benefits (reduction in water-borne related disease burden) from improved water supply and sanitation
- ✓ Lost income from days off work

For sanitation:

- ✓ Reduced public health risk due to better-managed on-site systems and treatment facilities
- ✓ Avoided healthcare cost from wastewater and sanitation improvement

In addition, the following unquantified benefits are considered: resource use value and existence value, employment impact, training and capacity building, increased tourism, and economic development.

The results of the cost benefit economic analysis for the total investment programme for rural water supply and sanitation give an Economic Internal Rate of Return (EIRR) of 4.7% with an Economic Net Present Value (ENPV) at an OCC of 5% of –FJ$40.07 million. This result is slightly below the 5% hurdle rate. The full cost-benefit analysis is presented in Annex A.

9. DWS Coordination and Regulatory Functions

This section outlines the institutional roles and responsibilities of the Department of Water and Sewerage (DWS), which provides overall guidance, regulation and coordination. The institutional roles and responsibilities focus on the six core functions shown in Figure 18.

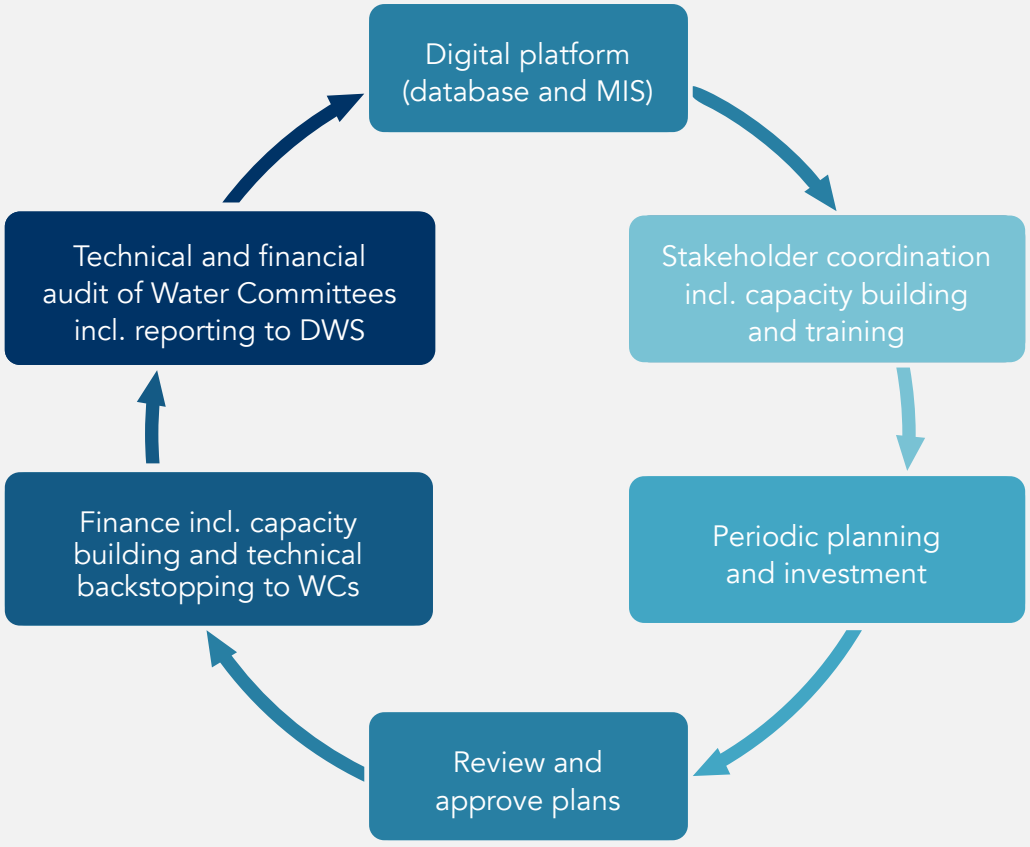


Figure 18 : Six core functions for DWS and RWSS Units

These core functions are essential for effective implementation of the RWSS Master Plan in the period 2026 to 2030 with a priority focus on physical coverage, and up to Vision 2050 with a long-term focus on sustainable, resilient service delivery. They provide the basis for identifying the resources needed for DWS to manage the government programme including staff, skills, and funding.

1. Digital platform (database and MIS)
2. Stakeholder coordination
3. Periodic planning and investment
4. Review and approve WSMP and DWSSSP (with MoHMS)
5. Performance based finance including backstopping WCs including capacity building and training
6. Technical and financial audit of Water Committees including the submission of annual reports

Embedded within these six core functions are the fundamental principles for periodic planning review. Based on the functions described in this section, the following minimum resources are proposed.

Table 50: Minimum resources required to implement the RWSS Master Plan

Function	Minimum resources required
DWS Step 1 Digital platform (database and MIS)	✓ 2 x technicians for the digital platform and GIS technology ✓ 2 x support staff for data verification, analytics and GIS mapping ✓ 1 x dedicated manager to coordinate the water quality monitoring and surveillance programmes
DWS Step 2 Stakeholder coordination	✓ 1 x dedicated coordinator for the Master Plan and National Water Resources Management Coordination Committee and Stakeholder Advisory Committee
DWS Step 3 Periodic planning and investment	No additional resources needed
DWS Step 4 Review and approve WSMP and DWSSSP (with MoHMS)	✓ Within DWS it is proposed that 4x managers are appointed for each division to support the review process and the technical and financial audit (see below). ✓ Under each division manager x14 support staff will be appointed to take responsibility for the villages / settlements within each province. ✓ These 4 teams will also work with RWSS Units to support the submission of annual reports to DWS (see below).
DWS Step 5 Performance based finance including backstopping Water Committees	✓ DWS Senior Accountant appointed to liaise with MoF on the funding requirements and report to MoF.

Function	Minimum resources required
DWS Step 6 Technical and financial audit of Water Committees including the submission of annual reports	✓ Within DWS it is proposed that 4x managers will be appointed at division level to manage this programme for the technical and financial audit and related reporting and benchmarking (linked to Step 4 above)
RWSS Unit Step 1 Capacity building and training	✓ Dedicated coordinator for capacity building and training at a national level as well as resourcing for local capacity building and training ✓ The details and additional resources need to be worked out with DWS / MPWMST and MoHMS
RWSS Unit Step 2 Technical backstopping Water Committees	✓ Additional vehicles, budget for fuel and other field expenses, and stores inventory of essential spare parts ✓ Streamline the process for administrative approval for RWSS Units to respond quickly to WC needs
RWSS Unit Step 3 Submission of annual reports	This is linked to the technical and financial audit managed by DWS

9.1 The DWS functions including periodic planning review

The DWS will lead the overall management and coordination for implementation of the RWSS Master Plan and Investment Plan. DWS has six core functions, which are described below.

Step 1 – Establish and Manage the Digital Platform (Database and MIS)

The Fiji Integrated Water and Sewerage Information Management System (IWSIMS) pilot project is a collaborative effort between the AKVO Foundation and DWS. This will provide DWS with a working model and roadmap for future system development.

The RWSS Master Plan will support this effort by identifying specifications for the digital platform (database and MIS) for stakeholder coordination. This includes the following activities: review and analytics for the National Rural Water Point Mapping Survey (baseline data), establishing the mechanism for village / settlement planning, investment and reporting on improvement programmes, identification of stakeholder needs in terms of benchmarks, KPIs and other performance metrics, carrying out WC technical and financial audits, and establishing reporting apps, templates and protocols.

There needs to be coordination with all stakeholders to share data and information and identify their specific needs in terms of the M&E framework. In addition, the various water quality monitoring and evaluation programmes need to be brought under a common framework.

For DWS the primary concern is to monitor coverage against SDG 2030 targets and the quality of service delivery to identify communities that need follow up support. For MoHMS the interest is in health-based outcomes which are linked to successful implementation of DWSSSP with verification through water quality monitoring and surveillance, and monitoring outbreaks of waterborne diseases. MRD will be concerned with issues relating to groundwater protection and sustainable development. Other key concerns are water catchment management, surface water resources and measures to address climate and disaster risks.

Outputs for Step 1:

- ✓ Provide specifications for the digital platform (database and MIS) supporting the work of AKVO
- ✓ Identify the specific needs of the different stakeholders for M&E
- ✓ Ensure village / settlement compliance with planning processes as set out in the DWS timetable of events (see below)
- ✓ Put in place the reporting protocols and analytics for project progress monitoring and the required benchmarks, KPIs and performance metrics
- ✓ Operationalise technical and financial audits to verify improvements achieved under prior financing
- ✓ Bring the various water quality monitoring and surveillance programmes under a common framework

Minimum additional resources needed for Step 1:

- ✓ 2 x technicians for the digital platform and GIS technology
- ✓ 2 x support staff for data verification, analytics and GIS mapping
- ✓ 1 x dedicated manager to coordinate the water quality monitoring and surveillance programmes

Step 2 – Establish Stakeholder Coordination Platform under the National Water Resources Management Coordination Committee and the Stakeholder Advisory Committee

The Stakeholder Coordination Platform will provide the forums to coordinate the implementation of the RWSS Master Plan and Investment Plan. Once established, the National Water Resources Management Coordination Committee will include key departments and agencies to coordinate rural water and sanitation in Fiji. A Stakeholder Advisory Committee will be established for other Government agencies and key non-government organisations including funding partners to play an advisory role.

All stakeholders will be able to share information on their projects and avoid duplication of effort, agree on what the priority projects are and how to coordinate investment, coordinate support for capacity building and training, and share data and information. The digital platform (database and MIS) will be the key instrument for stakeholder coordination.

The Stakeholder Coordination Platform will include Focal Points from:

- ✓ Core stakeholders that sit on the National Water Resources Management Coordination Committee include- DWS, WAF, MoHMS, MRD, Ministry of iTaukei Affairs, and MRMD – to ensure there is a common agenda for rural water supply and sanitation
- ✓ Other Government stakeholders (some of whom may also sit on the Coordination Committee):
- ✓ Ministry of Finance (MoF) – to coordinate budget allocations and disbursements.
- ✓ Ministry of Environment and Climate Change (MECC)
- ✓ Representatives of local rural authorities, Roko Tui Office and Provincial Administration - to address community level concerns and ensure that infrastructure and improvements are affordable.
- ✓ Other ministries – to ensure coordination of efforts in broader areas such as water catchment management, surface water resources, climate risk and vulnerability assessments, etc.

The Stakeholder Advisory Committee will include:

- ✓ Other Government stakeholders as appropriate
- ✓ Representation of Water Committees to identify their constraints and the support needed since new capital installations must be operated by them.
- ✓ Bilateral and multilateral development partners and NGOs – to advocate for funding and earmark potential investment packages.
- ✓ UNICEF, UNDP and other concerned UN organisations.

The National Water Resources Management Coordination Committee will be responsible for prioritising investments and projects based on needs. The process established will involve multiple criteria assessment and the Coordination Committee will engage with the Stakeholder Advisory Committee and other Government stakeholders in determining the prioritisation.

Criteria for prioritising investments will (at least) consider the following factors:

- ✓ **Existing service level:** Unserved communities should be the top priority.
- ✓ **Public health threat:** Communities affected by poor water quality are also an immediate priority.
- ✓ **Climate change risks:** Communities in hotspot areas affected by climate or disaster risks e.g. flooding, drought, high wind, will also be a priority.

- ✓ **Construction cost and financial viability**: Proposals that are cost-effective and have a sound maintenance and cost recovery strategy should be prioritised to make the most of limited resources available to government.

Outputs from Step 2:

- ✓ Coordination of water and sanitation investment at a national level
- ✓ Common understanding of the status of rural water supply and sanitation
- ✓ Agreement on sector priorities and coordination of investment in projects
- ✓ Shared agenda and effort for capacity building and training

Minimum resources needed for Step 2:

- ✓ Secretariat to be made up from existing DWS senior management and support staff
- ✓ 1 x dedicated coordinator

Step 3 – Prepare and Disseminate a Timetable of Events for the WSMP and DWSSSP

This is a crucial step for the overall success of the RWSS Master Plan. The most important task for DWS is to establish a dialogue with MoHMS and coordinate the work programmes on WSMP and DWSSSP and with Division / Provincial administrators to coordinate rural water supply and sanitation programmes.

The specific challenge is how to scale up the WSMP and DWSSSP approach to cover 1,600 villages / settlements within a reasonable timeframe, and to establish a process of periodic review and updating of plans.

- ✓ DWS will prepare and disseminate to all key stakeholders a timetable of events for the WSMP and the DWSSSP under the periodic review (which will be repeated every five years for WSMP, and on a rolling basis for DWSSSP). This will be coordinated with:
- ✓ MoHMS for integration of DWSSSP investment strategies and capacity building and training
- ✓ MoF for medium-term investment and annual budget allocations including the Climate Resilient Water and Sanitation Fund.
- ✓ MiTA and MRMD to ensure collaboration with the local administration and iTaukei Affairs and with IVDPs and Governance for Resilience initiative.
- ✓ WAF, MRD and other implementation agencies including NGOs
- ✓ Roko Tui Office, District Advisory Councillors, the RWSS Units and sub-divisional health workers to coordinate Division / Provincial level programmes
- ✓ Water Committees with support from implementation agencies will submit WSMP and DWSSSP:
- ✓ WSMP (prepared every five years) with 5-year investment plan for new infrastructure, expansion and rehabilitation (renewal and replacement)

- ✓ DWSSSP (prepared on a rolling basis and updated annually) with control measures for water safety, water security and sanitation under the community Action Plan for:
- ✓ Asset management plan (updated annually)
- ✓ Climate proofing measures (updated annually)
- ✓ Emergency measures (control measures that require external support with rapid deployment of RWSS Unit)

Outputs from Step 3:

- ✓ A timetable of events for the periodic planning review for the WSMP and DWSSSP.

Minimum resources needed for Step 3:

- ✓ The timetable of events will be prepared by the Director DWS with existing DWS senior management in collaboration with MoF and MoHMS representatives, and in consultation with other key stakeholders.

Step 4 – Review and approve village / settlement plans

Water Committees are responsible for preparing their own WSMP based on an assessment of what the community needs, wants and can afford. This includes consideration of the water source, treatment technology, distribution system, household connections, and wastewater management (flush toilet, septic tank, soakaway and faecal sludge management). It also includes the management and operations arrangements.

The consideration of the water source should also include measures for catchment management including protection of surface and groundwater resources. There may also be consideration of nature-based solutions such as constructed wetlands where there are concerns for sensitive coastal eco-systems in areas with tourism.

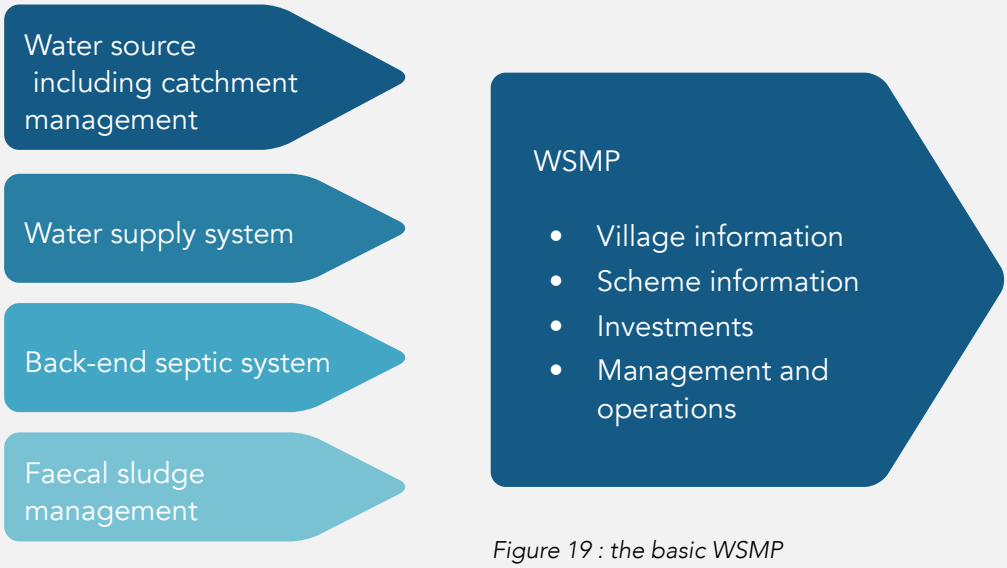


Figure 19 : the basic WSMP

The proposal the village / settlement submits to DWS is based on the policy requirements and WSMP guidelines.

The DWSSSP looks into the sustainability and resilience of the water supply and sanitation arrangements in terms of health-based outcomes which can be traced back to management of risk relating to water quality, water source security, and sanitation and hygiene. Control measures to address these risks are set out in improvement programmes (including asset maintenance and climate-proofing measures) which are implemented through community Action Plans or external support (emergency works).

The DWSSSP needs to feed into the WSMP for technical approval and financing. It also needs to be updated annually based on the implementation of the community Action Plan and emergency works, and identification of new risks and control measures.

Water quality monitoring and surveillance provides one means of verifying the effectiveness of control measures.

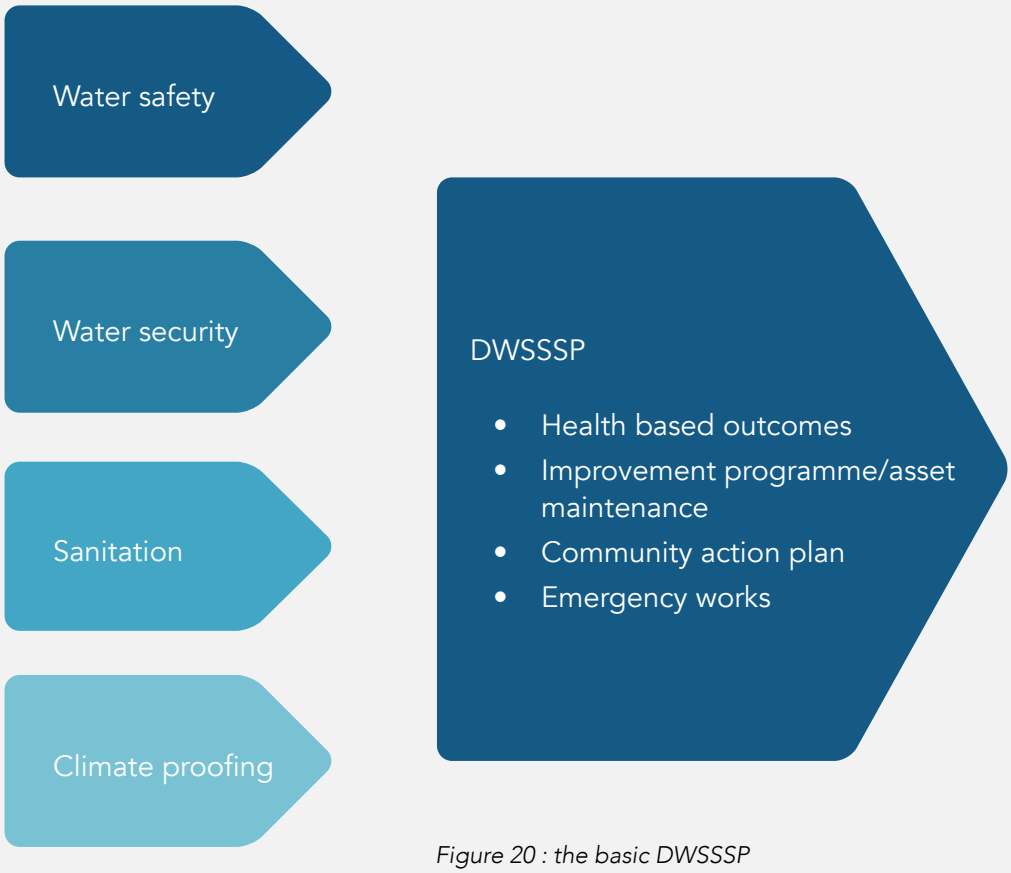


Figure 20 : the basic DWSSSP

DWS then needs to assess WSMP and DWSSSP (with MoHMS):

- ✓ To ensure that it is consistent with national policy objectives and a genuine representation of what the community wants and can afford.
- ✓ For completeness and clarity, where necessary DWS should request missing information or explanation from the WCs.
- ✓ To ensure they are technically credible and financially viable and have a sensible arrangement for management and operations, e.g., by the WC with access to technical support.

When DWS assess the plans, they will look at technical, financial and management aspects and WCs need to ensure that their proposals address the following questions:

- ✓ Is the proposed water supply and sanitation what the community wants?
- ✓ Is the cost acceptable compared with other options?
- ✓ Are user fee charges affordable or is there a credible proposal for fund raising?
- ✓ Are funds available for new infrastructure, operation and maintenance, replacement of parts, and expansion?
- ✓ Does the WC have the political commitment and the management capability to implement the plan and operate the new or improved water supply and sanitation systems?
- ✓ The implementing agencies work with the WCs to ensure that plans are feasible and will not result in unnecessary delays in DWS approval.

DWS should prepare a report which lists those WSMPs for which DWS approval has been given, and recommendations to help improve WSMPs for which DWS approval has not been given.

For the unsuccessful applications, DWS should advise Implementing Agencies why the plans have not been approved and offer suggestions on how to adjust the plans (but in most cases there would have been discussion between DWS and implementing agencies at the initial plan submission stage).

Outputs from Step 4:

- ✓ Internal monitoring report on submission/receipt and completeness of WSMPs
- ✓ Internal review of i) physical coverage for safely managed water supply and sanitation, ii) sustainability and climate resilience – water safety, water security, sanitation, asset maintenance, climate proofing, and iii) externalities – catchment management, surface water and groundwater management
- ✓ Assessment sheet for each WSMP

Minimum resources needed for Step 4:

- ✓ The review process will need to cover plans submitted by 1,600 villages and settlements. The WSMP are to be submitted annually or as and when required and the DWSSSP on a rolling basis. DWSSSP are to be updated annually with implementation of community Action Plans and emergency works. This task will be coordinated between DWS and MoHMS.
- ✓ This is a major task. The review process would be led by senior management within DWS and MoHMS but will need additional support staff. The additional staff resources will need to be identified once the timetable of the periodic review is agreed.
- ✓ Within DWS it is proposed that 4x managers are appointed for each division to support the review process and the technical and financial audit (see below). Under each division manager x14 support staff will be appointed to take responsibility for the villages / settlements within each province. These 4 teams will also work with RWSS Units to support the submission of annual reports to DWS (see below).

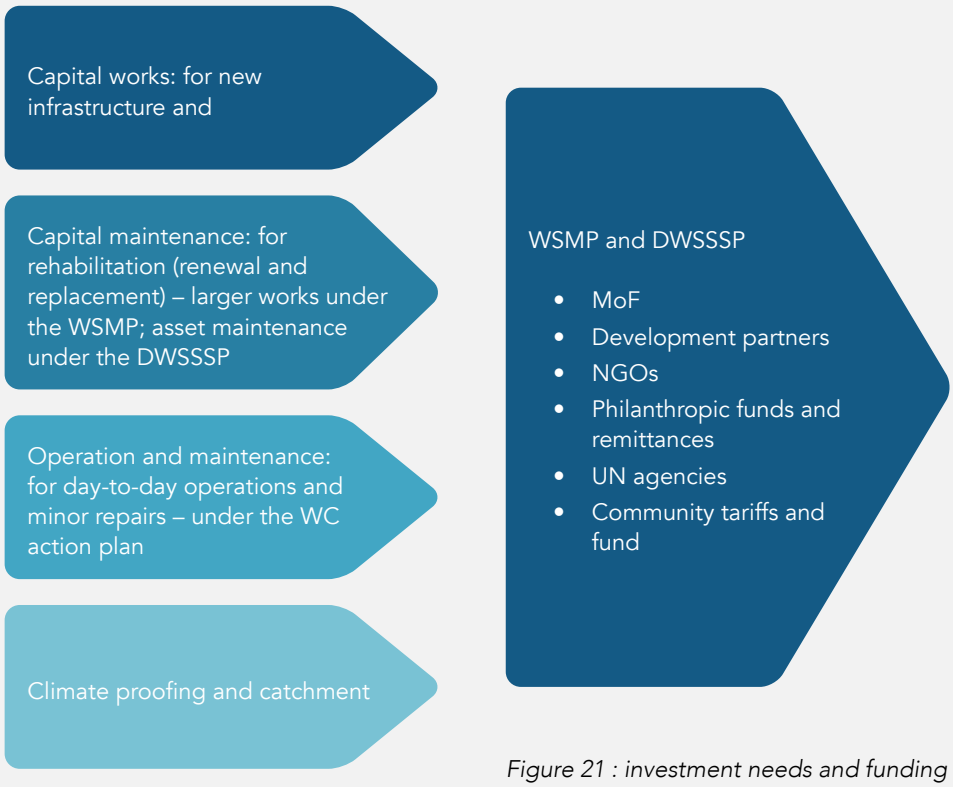


Figure 21 : investment needs and funding sources

Step 5 – Facilitate Financing

The importance of the periodic planning review and the integration of the WSMP with the DWSSSP becomes evident when funding is considered. As described earlier the following investment needs must be considered as set out in Figure 21.

Funding needs to be secured on an annual basis.

- ✓ MoF annual budget allocation. The evidence for budget requests from DWS to MoF is provided by WSMP.
- ✓ Development Partners. Development partners will be attracted to infrastructure investments with clearly defined outputs, e.g. desalination plants, packaged plants, FSTPs, etc.
- ✓ NGOs such as Rotary Pacific implement their own projects in partnership with DWS and other agencies with funding from multiple sources including philanthropic funds.
- ✓ UN agencies support activities through ministries/departments with which they have partnerships e.g. UNICEF, WHO and UNDP
- ✓ WC own funds and remittances are used for day-to-day O&M, minor repairs and implementation of community action plans
- ✓ Green/Climate funds. The green / climate trust funds have some flexibility to finance components of projects that are linked to environmental protection, climate proofing, disaster risk management or nature-based solutions. Most trust funds need to be secured through partnerships with development partners or accredited agents for the trust fund. The proposed Climate Resilient Water and Sanitation Fund can benefit from such support.

Figure 21 sets out the various funding sources. Current experience is based on MoF budget allocations for WSMP which in the past has been geared to rural water supply schemes, rainwater tanks and water carting. This is still the primary mechanism to achieve physical coverage for safely managed water supply.

MoHMS receive budget to implement DWSSSP which provide the means for long term sustainable, resilient service delivery. However, the budget and implementation capacity is not sufficient to reach full coverage of 1,600 villages and settlements within a reasonable timeframe. To scale up the approach, DWS and MoHMS need to work in partnership with a more flexible funding arrangement that can respond to annual funding needs as set out in community action plans for asset management and climate-proofing.

While the DWSSSP approach considers wider issues of catchment management, water resources protection and NbS, the main mechanism for this comes through the work of agencies like the Wildlife Conservation Society. This would include for example implementation of constructed wetlands as a control measure to protect vulnerable coastal eco-systems.

The takeaway from this is the need for flexibility in the funding of DWSSSP which is the mechanism for addressing community action plans, asset management and climate-proofing required for long term sustainable, resilient service delivery.

Output from Step 5

- ✓ Operationalise the mechanism for funding for all plans and life-cycle costs
- ✓ Flexible funding mechanism set up with MoF for community action plans, asset management, climate proofing measures, and emergency works (where external assistance is required).

Minimum resources needed for Step 5

- ✓ DWS Senior Accountant appointed

Step 6 – Manage the technical and financial audit of Water Committees

DWS in collaboration with MoHMS will manage RWSS Unit staff and MoHMS health workers to carry out a technical and financial audit of the performance of the Water Committees. This will be an annual process linked to the digital platform (database and MIS) with standardised reporting protocols and field verification.

It will be based on the following instruments:

- ✓ Annual reports
- ✓ Benchmarks, KPIs and other performance metrics
- ✓ Water quality monitoring and surveillance
- ✓ Site visits by RWSS Unit staff and MoHMS health workers

The web-based Management Information System will be used to facilitate on-line submission of data, information and plans to be considered for approval and financing.

There is a need for WCs to submit annual progress reports so that DWS can check that they are on schedule and to budget, and if there are concerns, necessary follow-up actions need to be identified to correct problems. DWS will judge whether WCs have the capacity to overcome problems or whether recommendations should be made on additional support. Emphasis should be on assisting WCs to overcome problems.

Where plans are on schedule and to budget, WCs simply need to tick the boxes. Where a part is behind schedule or over budget, an explanation will be required with a description of actions being taken to correct the situation. WCs could request specific assistance if problems have been encountered, although such problems should not wait for annual reporting but should be discussed with RWSS Unit and sub-divisional environmental health workers at the time they arise.

Benchmarks, KPIs and other metrics are used to provide baseline information on operational performance (service levels) and a means of measuring improvement progress. WCs are required to report on their operational performance to DWS.

In addition, there are two forms of benchmarking performance, namely "process" and "metric" benchmarking, which DWS should take up and establish over time.

Process benchmarking involves identifying and learning from 'best in class', i.e., WCs can learn from other WCs that are doing well. The approach is to find out which WC is currently the best at some aspect of planning or operations. For that particular aspect, the other WCs can then learn how to perform at a level comparable with the best. If this learning process can be established not as a competition, but as experience sharing, there can be great enthusiasm to take part in the workshops and to work together to the benefit of all. This can be a part of existing training/refresher training programmes.

Metric benchmarking aims to establish league tables of performance to stimulate comparative competition and incentives for WCs to improve performance. It is important to start in a simple way with a few key performance measures, obtain sound baseline data, and initially concentrate on looking at performance trends for each WC. Each WC should be aiming to improve on its own performance year by year. This can be a part of the existing annual reporting process, where year by year operational performance can be compared.

DWS can begin by identifying the critical aspects for process benchmarking. Workshops can be held to develop the approach for learning from best in class in a Province. At the same time a few critical parameters can be chosen for making a start on metric benchmarking, for which simple league tables can be established and linked to national or provincial incentive reward schemes. Training of the benchmarking facilitators (DWS, RWSS Unit staff and others) is critical for success.

Outputs from Step 6:

- ✓ WC annual progress report
- ✓ Follow-up programme of support
- ✓ Initiate process and metric benchmarking and incentive reward schemes

Minimum resources needed for Step 6

- ✓ Existing RWSS Unit staff and MoHMS sub-divisional health workers may require additional training to support this task.
- ✓ Within DWS it is proposed that 4x managers will be appointed at division level to manage this programme for the technical and financial audit and related reporting and benchmarking.

9.2 GEDSI

Gender Equality, Disability and Social Inclusion (GEDSI) must be taken into consideration in all areas of water institutional governance and regulation. The main focus for DWS will be to ensure that women, people with disabilities and marginalised groups are involved in all activities under the preparation and implementation of the WSMP and DWSSSP at the local level. At a national level DWS will ensure that women, people with disabilities and marginalised groups are involved in the various decision-making and advisory committees under the Stakeholder Coordination Platform. The integration of GEDSI considerations across all its activities will be a goal of the Master Plan. This functional responsibility needs to be considered under the new DWS staffing schedule.

GEDSI requires active involvement of women, people with disabilities and marginalised groups in decision-making, participation in design, implementation and service delivery, access to appropriate services, and shared benefits. It also requires a deeper understanding of the barriers to participation, potential backlash and resistance to participation. The achievement of GEDSI objectives must be tracked under the digital platform with the disaggregation of data, and informed by Fijian GEDSI experts, women's organisations and organisations of persons with disabilities.

9.3 Climate Resilient Water and Sanitation Fund

The proposed Climate Resilient Water and Sanitation Fund (CRWSF) is intended to provide a coordinated financing mechanism to support the long-term sustainability, resilience and performance of Fiji's rural water and sanitation sector. The Fund is based on the following guiding principles:

- ✓ **Coordinate sector planning and financing** to support sustainable and climate-resilient water and sanitation services, consistent with the Community Water Management Plus (CWM+) approach.
- ✓ **Support monitoring, evaluation and evidence-based decision-making** through a national digital information and asset management platform.
- ✓ **Provide targeted financing** for asset management, climate-proofing, faecal sludge management, sanitation improvements and viability gap funding where required.
- ✓ **Strengthen service delivery** through financing for Water Committee accreditation, technical assistance, institutional support, capacity building and training under the Drinking Water Safety, Security and Sanitation Planning (DWSSSP) framework.

The Fiji Rural Electrification Fund (FREF) provides a useful governance model for the proposed CRWSF. Established as a charitable trust under Fijian law, FREF is managed by the Ministry of Public Works, Meteorological Services and Transport through a dedicated Secretariat and operates under a Trust Deed. Strategic direction is provided by a Board of Trustees comprising Permanent Secretaries from relevant ministries, supported by a multi-stakeholder Advisory Committee that provides technical advice and donor representation. Government retains overall strategic and regulatory oversight through the Board.

A similar governance structure is proposed for the CRWSF. Subject to the final institutional arrangements, the Fund should operate under or in close coordination with the National Water Resources Management Coordination Committee to ensure alignment with national water sector priorities. The Board should comprise Permanent Secretaries or senior representatives of key ministries, including those responsible for water, finance, rural development, iTaukei affairs, climate change, and women, children and poverty alleviation. An Advisory Committee, comprising technical agencies, development partners and other key stakeholders, would provide specialist advice and recommendations to the Board.

DWS, as the national water services regulator and sector coordinator, would serve as the Secretariat to the Fund, while implementation of funded activities would be supported by the Rural Water Supply and Sanitation (RWSS) Unit in collaboration with relevant government agencies, local authorities and development partners.

Note: The governance relationship between the National Water Resources Management Coordination Committee and the CRWSF Board (whether the Board operates under the Committee, in parallel, or as a subcommittee) should be confirmed during the institutional design phase. Likewise, the role of the broader stakeholder coordination platform as the Fund's Advisory Committee should be formalised in the governance framework.

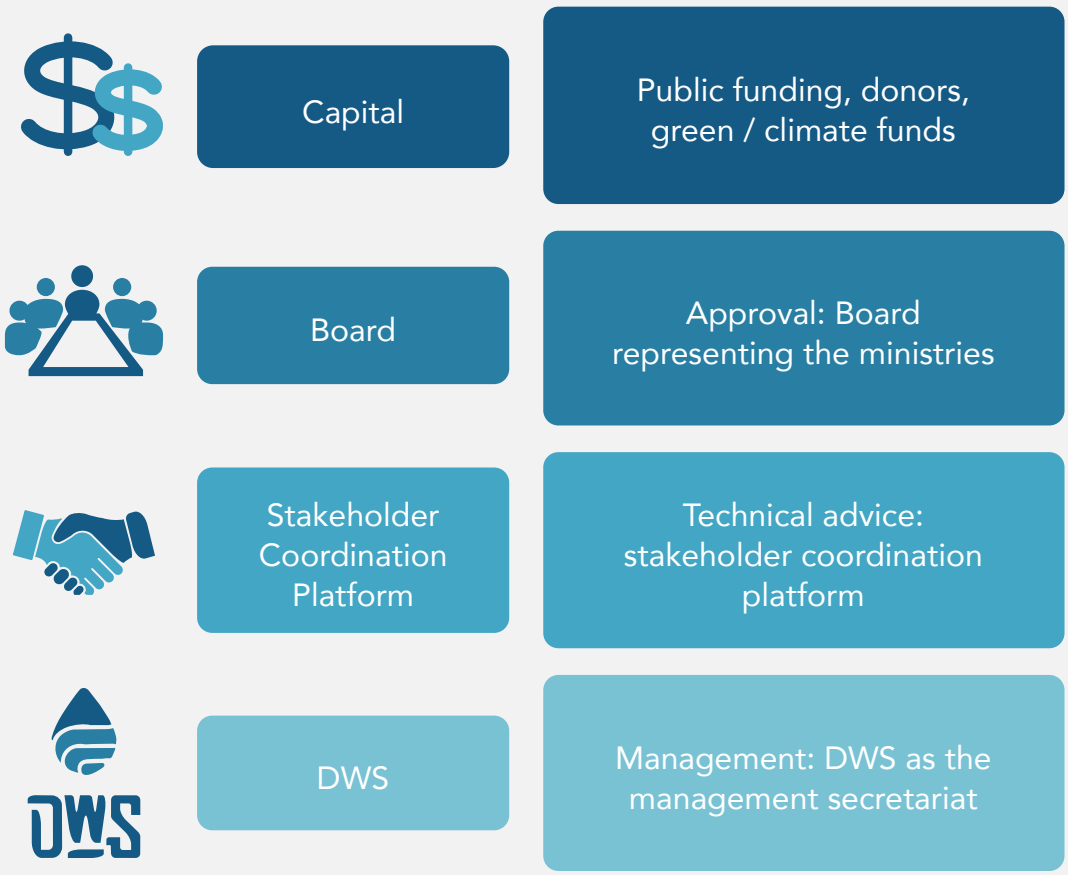


Figure 27: The governance structure proposed for the CRWSF

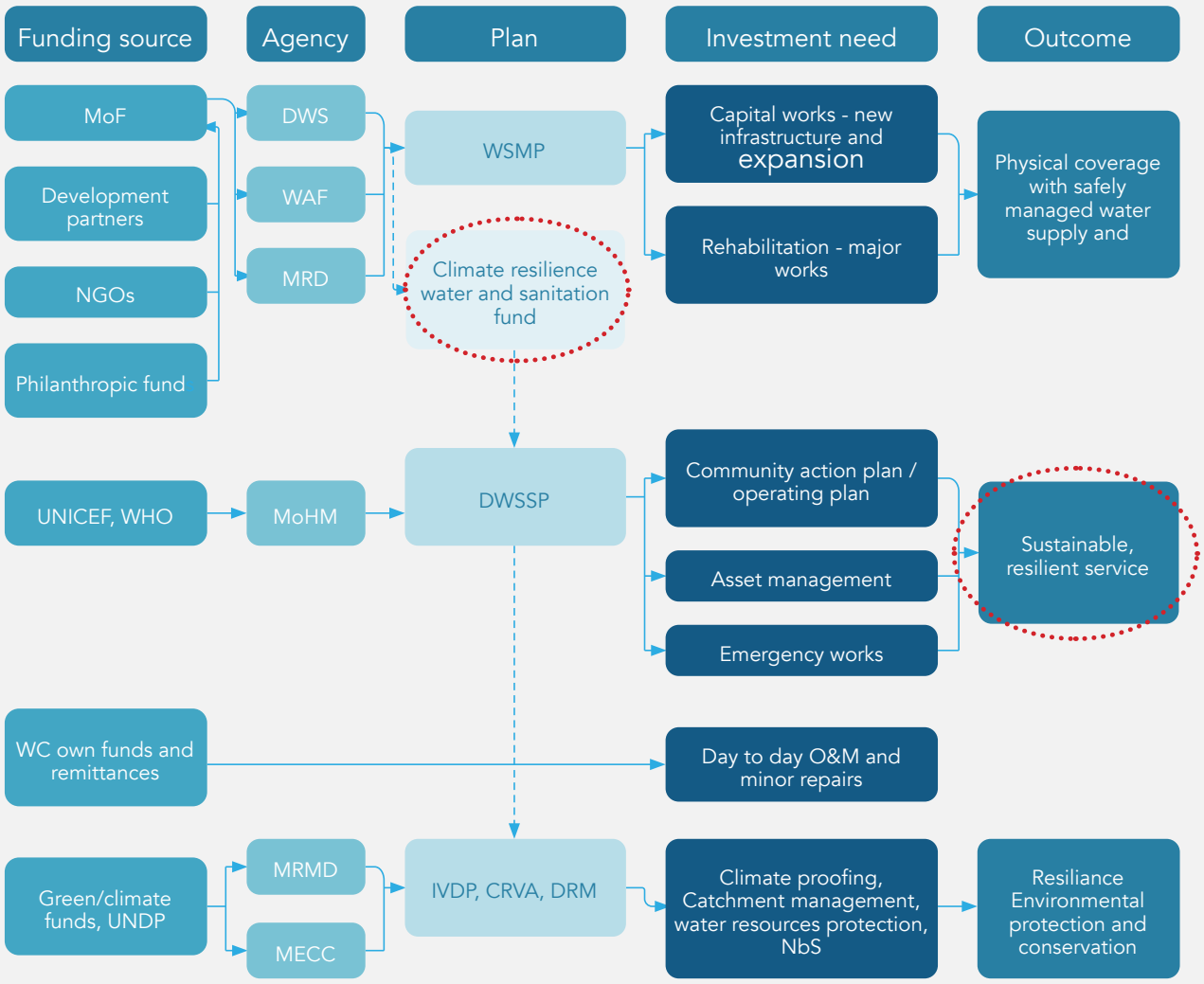


Figure 22 : Fund flows

10. RWSS Unit Functions

The Rural Water Supply and Sanitation (RWSS) Unit will play a central role in implementing the RWSS Master Plan and supporting the DWS in its role as the national water services regulator. The Units will also collaborate closely with the Ministry of Health and Medical Services (MoHMS), local government authorities, Water Committees, and other implementation partners to deliver safe, sustainable, and climate-resilient rural water and sanitation services.

A key priority for RWSS Unit staff is to develop a sound understanding of the WSMP and DWSSSP frameworks. This includes understanding national service standards, climate resilience requirements, asset management principles, and community-based planning approaches to achieve safely managed water supply and sanitation.

The core functions of the RWSS Unit are:

1. **Plan, design and implement** rural water supply and sanitation projects, including rehabilitation and new infrastructure where required.
2. **Build community capacity** by providing training and technical guidance to Water Committees in the preparation, implementation and review of WSMPs and DWSSSPs.
3. **Provide technical support** for the operation, maintenance and emergency repair of rural water and sanitation systems, including specialist assistance beyond community capacity.
4. **Monitor, inspect and report** through inspections, data collection and compliance monitoring, and submit regular operational reports and annual performance reports to DWS.

Understanding the WSMP and DWSSSP Framework

RWSS Unit staff should be able to apply the principles of safely managed, sustainable and climate-resilient water and sanitation services, including:

- ✓ **Universal Coverage** – Achieving safely managed rural water supply and sanitation services for all villages and settlements in line with national targets.
- ✓ **Customer Service** – Improving public health and service reliability through better infrastructure and service delivery.

- ✓ **Water Security** – Ensuring reliable and sustainable water sources through integrated management of surface water, groundwater and rainwater, supported by catchment protection.
- ✓ **Water Safety** – Applying the multi-barrier approach to manage water quality risks and undertaking routine monitoring and surveillance.
- ✓ **Integrated Sanitation** – Promoting safe sanitation through improved on-site systems, septic tank management and faecal sludge management.
- ✓ **Climate Resilience** – Identifying and mitigating risks from climate change and natural hazards to protect infrastructure and maintain service continuity.
- ✓ **Asset Management** – Prioritising the maintenance, rehabilitation and replacement of existing assets to ensure long-term service sustainability.

RWSS Unit staff are expected to apply these principles in partnership with MoHMS environmental health officers, local authorities and Water Committees to support community planning, strengthen local capacity, and improve the long-term sustainability of rural water and sanitation services.

10.1 Functions of the RWSS Unit

Step 1 – Facilitate Capacity Building, Training and Technical Support

The RWSS Unit will lead capacity building and technical support programmes to enable communities to prepare WSMPs using a nationally consistent planning framework. Training of Trainers (ToT) programmes should be delivered through accredited institutions, enabling qualified trainers and implementation partners to support Water Committees throughout the planning, implementation and operational phases.

Training programmes should combine classroom learning, practical field-based training and peer-to-peer learning through exposure visits to well-performing communities.

Typical training topics include:

- ✓ Community mobilisation and stakeholder engagement.
- ✓ Participatory planning and decision-making.
- ✓ Water source and system assessments.
- ✓ Water budgeting and demand forecasting.
- ✓ Water conservation, rainwater harvesting and groundwater recharge.
- ✓ Drinking water quality monitoring and Water Safety Planning.
- ✓ Operation and maintenance of water supply and sanitation systems.
- ✓ Financial management, record keeping and asset management.
- ✓ Preparation of community investment plans.
- ✓ Performance monitoring, reporting and regulatory compliance.

DWS will also publish annual planning guidelines outlining submission timelines, required documentation and assessment criteria for WSMPs and DWSSSPs.

Outputs

- ✓ Capacity building and training programme established.
- ✓ Standard WSMP and DWSSSP templates and guidance materials.
- ✓ Information, Education and Communication (IEC) resources.
- ✓ Annual planning timetable and submission guidelines.

Minimum resources required

- ✓ Dedicated funding for training and refresher programmes across all villages and settlements.
- ✓ Technical support from RWSS Units, MoHMS Environmental Health Officers, NGOs, vocational institutions and universities.
- ✓ Development partner support to strengthen implementation capacity and specialist expertise.

Step 2 – Plan, Design and Implement Rural Water and Sanitation Projects

RWSS Units will provide planning, engineering design and project implementation support for rural water and sanitation infrastructure.
Where appropriate, RWSS Units may act as the implementing agency for priority projects, particularly where specialist technical support or government-led implementation is required. The selection of implementing agencies should be coordinated through the National Water Resources Management Coordination Committee, taking into account technical capacity, funding arrangements and advice from development partners.

Outputs

- ✓ Priority rural water and sanitation projects planned, designed and implemented.
- ✓ Infrastructure delivered in accordance with approved WSMPs, DWSSSPs and national standards.

Minimum resources required

- ✓ Engineering, project management and procurement capacity.
- ✓ Adequate operational budgets and technical support resources.
- ✓ Coordination with development partners and implementing agencies.

Step 3 – Provide Technical Backstopping to Water Committees

RWSS Units will provide ongoing technical support to Water Committees, including operational advice, emergency response, major maintenance and troubleshooting.
Support requirements will be identified through annual technical and financial audits, routine monitoring, performance reporting and requests from Water Committees. The objective is to strengthen local capacity, maintain regulatory compliance and protect public investment in rural water and sanitation infrastructure.

To respond effectively, RWSS Units require adequate operational resources, including transport, field operating budgets, spare parts inventories and delegated authority for emergency response.

Outputs

- ✓ Technical support provided to Water Committees.
- ✓ Emergency repairs and major maintenance completed.
- ✓ Operational issues resolved and regulatory compliance improved.
- ✓ Community infrastructure maintained and protected.

Minimum resources required

- ✓ Vehicles and transport.
- ✓ Field operating budgets.
- ✓ Stores inventory for critical spare parts.
- ✓ Streamlined administrative approval processes.

Step 4 – Monitor Performance and Report to DWS

RWSS Units will monitor the performance of rural water and sanitation services and prepare annual reports for DWS.
Annual reports should summarise:

- ✓ Implementation progress against approved work plans and budgets.
- ✓ Service level performance across villages and settlements.
- ✓ Findings from technical and financial audits.
- ✓ Performance of individual Water Committees.
- ✓ Operational challenges and recommended corrective actions.
- ✓ Lessons learned and recommendations to improve planning, implementation and regulatory oversight.

RWSS Unit should also assess the effectiveness of incentive and recognition programmes in improving Water Committee performance.

Outputs

- ✓ Annual RWSS Unit performance reports.
- ✓ Updated performance database and benchmarking information.
- ✓ Recommendations for improving sector performance and planning processes.

Minimum resources required

- ✓ Monitoring and reporting systems linked to the national digital information platform.
- ✓ Technical and financial audit programme coordinated by DWS.

11. Stakeholder Coordination Platform

The Stakeholder Coordination Platform will provide the principal mechanism for coordinating implementation of the RWSS Master Plan and Investment Plan. The Platform will facilitate collaboration between government agencies, development partners, NGOs and communities to align investments, strengthen institutional coordination, share technical knowledge and avoid duplication of effort. The national digital information platform will support evidence-based planning, monitoring and reporting.

The Platform should include representatives from:

- ✓ Core members of the National Water Resources Management Coordination Committee, including DWS, WAF, MoHMS, MRMD, the Ministry of iTaukei Affairs and relevant government agencies.
- ✓ Ministry of Finance, to coordinate budget planning and resource allocation.
- ✓ Provincial administrations, Roko Tui Offices and local authorities.
- ✓ Water Committee representatives.
- ✓ Other sector agencies are responsible for water resources, catchment management, climate resilience and disaster risk management.
- ✓ Bilateral and multilateral development partners, NGOs and civil society organisations.
- ✓ United Nations agencies, including UNICEF and UNDP.

Objectives

The Stakeholder Coordination Platform will:

- ✓ Promote a shared understanding of the status and performance of the rural water and sanitation sector.
- ✓ Coordinate sector planning, investment priorities and implementation programmes.
- ✓ Strengthen collaboration on capacity building, technical assistance and institutional development.
- ✓ Promote information sharing through the national digital information and asset management platform.
- ✓ Support mobilisation of financial and technical resources for priority investments.

11.1 Institutional Governance and Regulation

The Stakeholder Coordination Platform will support DWS in its role as the national water services regulator by strengthening coordination across the sector and promoting evidence-based planning and decision-making. Consistent with the institutional framework presented in Sections 9 and 10, two key governance principles underpin implementation of the RWSS Master Plan:

1. **Clear institutional roles** through the separation of policy development, regulation and service delivery
2. **Coordinated implementation**, whereby national policy is translated into action through the RWSS Master Plan, divisional and provincial programmes, and prioritised investment packages.

Operationalising DWS as the national water services regulator is fundamental to achieving safely managed, sustainable and climate-resilient rural water and sanitation services. The Stakeholder Coordination Platform will complement this role by facilitating coordination, promoting accountability and supporting effective implementation across all stakeholders.

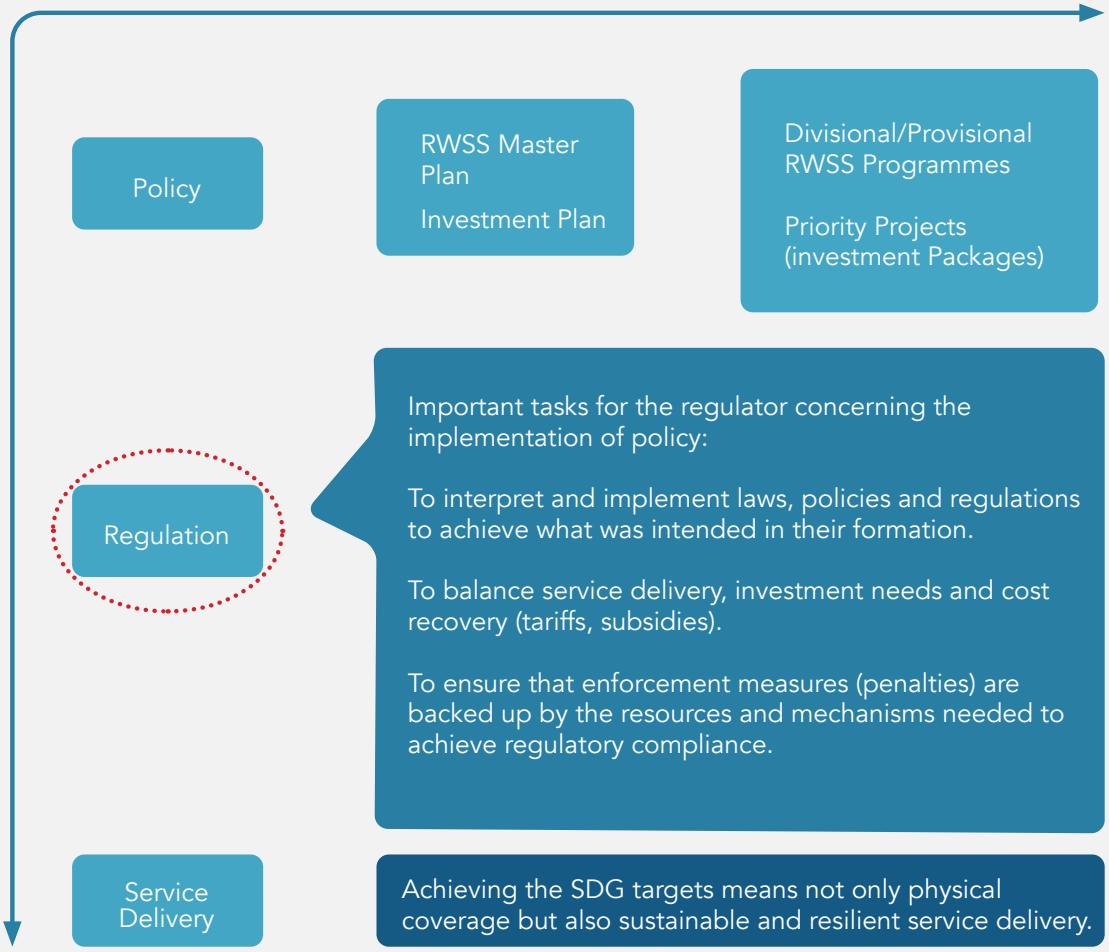


Figure 23 : Two Dimensions of a) Policy, Planning and Investment (shown horizontally), and b) Institutional Governance (shown vertically)

11.2 Roles and Responsibilities of Key Stakeholders

This section outlines the roles and responsibilities of key stakeholders in implementing the Rural Water Supply and Sanitation (RWSS) Master Plan. These responsibilities complement those defined in the Rural Water and Sanitation Policy and other relevant legislation and policy frameworks.

11.2.1 Department of Water and Sewerage (DWS)

As the national water services regulator and sector coordinator, DWS will:

1. Lead sector planning, regulation and coordination, including:
   - ✓ Management of the national digital information platform (database, GIS and Management Information System).
   - ✓ Coordination of the National Water Resources Management Coordination Committee and Stakeholder Coordination Platform.
   - ✓ Preparation and periodic review of the RWSS Master Plan and Investment Plan.
   - ✓ Review and approval of Water Supply Management Plans (WSMPs) and Drinking Water Safety, Security and Sanitation Plans (DWSSSPs) in collaboration with MoHMS.
   - ✓ Administration of performance-based financing through the Climate Resilient Water and Sanitation Fund (CRWSF).
   - ✓ Technical and financial auditing of Water Committees.
2. Develop national performance indicators, benchmarking systems and incentive schemes for Water Committees and service providers.
3. Maintain and continuously update the National Rural Water Point Mapping Survey (NRWPMS) and establish a comprehensive GIS-based national asset inventory.
4. Lead research, development and pilot programmes for emerging technologies and innovative approaches, including:
   - ✓ Energy efficiency and renewable energy.
   - ✓ Greywater recycling.
   - ✓ Faecal sludge management systems.
   - ✓ Nature-based Solutions, including constructed wetlands.
5. Build institutional capacity through training and sensitisation of RWSS Units and implementation partners on the WSMP and DWSSSP frameworks.
6. Lead advocacy and resource mobilisation for implementation of the RWSS Master Plan, including engagement with development partners and climate finance mechanisms.
7. Regulate and coordinate faecal sludge management, including:
   - ✓ Standards for septic tank upgrading.
   - ✓ Development of faecal sludge treatment facilities.
   - ✓ Procurement and management of treatment equipment.
   - ✓ Licensing and regulation of desludging service providers.

- ✓ Standard operating procedures for sludge collection, transport, treatment and disposal.
    - Monitoring and reporting in collaboration with MoHMS and local authorities.

8. Coordinate with relevant agencies to strengthen enforcement of environmental legislation relating to wastewater discharge, sludge disposal and environmental compliance.

11.2.2 Rural Water Supply and Sanitation (RWSS) Unit

The RWSS Units will support implementation of the Master Plan by:

1. Planning, designing and implementing selected rural water supply and sanitation projects.
2. Delivering community capacity building and training programmes for Water Committees.
3. Providing technical support for operation, maintenance, emergency repairs and major rehabilitation works.
4. Monitoring infrastructure performance and preparing annual reports for DWS.

In addition, the RWSS Units will carry out tasks assigned by DWS such as managing regional stores and spare parts inventories to support timely maintenance and emergency response, and operating and maintaining DWS-managed rural water and sanitation infrastructure where these responsibilities are not delegated, including:

- ✓ Faecal Sludge Treatment Plants (FSTPs).
- ✓ Vacuum trucks and vacutugs.
- ✓ Mobile Treatment Units (MTUs).
- ✓ Packaged water treatment plants.
- ✓ Solar-powered desalination plants and other technology innovations.

11.2.3 Water Authority of Fiji (WAF)

WAF will:

1. Participate in the National Water Resources Management Coordination Committee and Stakeholder Coordination Platform.
2. Support institutional arrangements associated with the establishment of RWSS Units.
3. Share strategic plans and investment programmes for expansion of urban water supply and sewerage services, particularly in peri-urban areas.
4. Collaborate with DWS on opportunities for co-treatment of faecal sludge at wastewater treatment plants where technically feasible.
5. Continue to manage water and wastewater services that remain under its operational responsibility, including water carting and urban service delivery.

11.2.4 Ministry of Health and Medical Services (MoHMS)

MoHMS will:

1. Participate in sector coordination and planning mechanisms.
2. Collaborate with DWS to integrate public health information into the national digital information platform.
3. Lead implementation of the DWSSSP programme in partnership with DWS, including review and quality assurance of community plans.
4. Undertake drinking water quality monitoring, surveillance and public health inspections in coordination with DWS.
5. Monitor waterborne diseases and contribute health surveillance data to support evidence-based planning.
6. Develop and disseminate facilitator guidelines, training materials and Training of Trainers (ToT) programmes.
7. Register and oversee NGOs delivering community WASH capacity building under the Public Health Act.
8. Assess and approve new sanitation and water treatment technologies through the Board of Public Health.
9. Support community awareness, surveys and identification of households requiring sanitation improvements as part of the faecal sludge management programme.

11.2.5 Ministry of Rural and Maritime Development (MRMD) and Ministry of iTaukei Affairs

MRMD and the Ministry of iTaukei Affairs will:

1. Participate in sector coordination and planning.
2. Support integration of community development information into the national digital platform.
3. Coordinate village administrative processes supporting preparation and endorsement of WSMPs and DWSSSPs.
4. Integrate rural water and sanitation planning with Integrated Village Development Plans and climate-resilient community development initiatives.
5. Coordinate with DWS, MoHMS, provincial administrations and Water Committees on faecal sludge management planning, including service areas, desludging schedules and community engagement.

11.2.6 Mineral Resources Department (MRD)

MRD will:

1. Participate in sector coordination and planning.
2. Contribute groundwater information to the national digital information platform.
3. Undertake groundwater monitoring and surveillance in coordination with DWS.

4. Support groundwater development, borehole construction, rehabilitation and maintenance.
5. Coordinate with DWS on groundwater supply systems and reticulation infrastructure.
6. Support implementation of the National Groundwater Resources Development and Management Policy.

11.2.7 Ministry of Finance (MoF)

The Ministry of Finance will:

1. Participate in sector planning and investment coordination.
2. Support financing of the RWSS Master Plan through national budget processes.
3. Facilitate access to development partner financing and climate finance.
4. Support establishment and governance of the Climate Resilient Water and Sanitation Fund.
5. Coordinate with DWS on investment planning and financial reporting requirements.

11.2.8 Non-Government Organisations (NGOs)

NGOs will:

1. Participate in the Stakeholder Coordination Platform.
2. Align programmes with the RWSS Master Plan and national policies.
3. Contribute data and information to the national digital information platform.
4. Apply approved WSMP and DWSSSP planning processes and technical standards.
5. Deliver community capacity building and training in accordance with MoHMS-approved guidance.
6. Comply with regulatory requirements for approved technologies.
7. Support research, innovation and pilot projects.

11.2.9 UNICEF

UNICEF will continue to support DWS by:

1. Participating in sector coordination mechanisms.
2. Providing technical assistance for climate-resilient rural WASH, including:
   - ✓ Climate Risk and Vulnerability Assessments.
   - ✓ Hazard mapping.
   - ✓ DWSSSP implementation.
   - ✓ National Rural Water Point Mapping Survey improvements.
3. Supporting establishment of the Climate Resilient Water and Sanitation Fund and mobilisation of climate finance.
4. Supporting operationalisation of DWS's regulatory functions, planning systems and investment framework.

12. Digital Platform

12.1 Structure of the Digital Platform

The digital platform is a core component of the institutional framework for implementing the RWSS Master Plan. It will provide a centralised database, Management Information System (MIS), and GIS-based asset inventory to support planning, coordination, monitoring, and decision-making across the rural water and sanitation sector.

The platform will serve as the primary tool for stakeholder coordination and support:

- ✓ Management and analysis of National Rural Water Point Mapping Survey (NRWPMS) data as the sector baseline.
- ✓ Preparation, review, and monitoring of WSMPs and DWSSSPs.
- ✓ Asset inventory and asset management.
- ✓ Investment planning and project tracking.
- ✓ Performance monitoring using KPIs and benchmarks.
- ✓ Technical and financial audits of Water Committees.
- ✓ Standardised reporting templates, forms, and protocols.

The platform will enable timely information sharing, improve evidence-based planning, and strengthen monitoring and evaluation across all stakeholders.

12.2 Proposed Development Process

Development of the digital platform should be a priority during the initial phase of RWSS Master Plan implementation and undertaken in collaboration with AKVO and key stakeholders.

The proposed development process comprises five stages:

Step 1: Define Core Data Requirements

- ✓ Identify the information required for village infrastructure, assets, service delivery, regulatory compliance, and community characteristics.

Step 2: Define Stakeholder Information Needs

- ✓ Determine the data requirements of each stakeholder.
- ✓ Align reporting requirements with monitoring and evaluation responsibilities.

Step 3: Develop KPIs

- ✓ Establish stakeholder-specific Key Performance Indicators (KPIs) from the standardised data collection forms to measure service delivery and identify priority issues.

Step 4: Establish Benchmarking Framework

- ✓ Develop performance benchmarks to:
  - Measure progress against agreed standards.
  - Compare performance across communities and regions.
  - Identify areas requiring improvement.

Step 5: Digitise the System

- ✓ Convert the standardised forms into digital applications and dashboards in partnership with AKVO for field deployment and centralised reporting.

12.3 Platform Staffing Requirements

Effective operation of the digital platform will require dedicated technical and management personnel, including:

- ✓ **2 Digital Systems/GIS Technicians**
- ✓ **2 Data Management and GIS Support Officers**
- ✓ **1 Programme Manager** responsible for platform coordination and integration of water quality monitoring and surveillance data.

12.4 Key Performance Indicators and Benchmarking

KPIs will be generated from the standardised data collected through the digital platform and tailored to the responsibilities of each stakeholder. The KPIs will support:

- ✓ Performance monitoring.
- ✓ Evidence-based decision-making.
- ✓ Investment prioritisation.
- ✓ Regulatory oversight.
- ✓ Strategic planning.

Benchmarking will enable comparison of performance across communities, provinces, and implementing agencies, helping to identify service gaps, promote good practices, and drive continuous improvement. Together, KPIs and benchmarking will strengthen accountability and improve implementation of the RWSS Master Plan and DWSSSP.

12.5 Community Reporting Framework

The digital platform will establish standardised reporting mechanisms from community level to DWS to ensure consistent, accurate, and timely information.

12.5.1 Community Reporting Process

Each village or settlement will report through its Water Committee (WC), supported by the RWSS Unit.

The reporting process includes:

- ✓ RWSS Unit officers conduct scheduled visits to collect and verify data jointly with Water Committees.
- ✓ Completion of standardised digital forms covering infrastructure, service delivery, water quality, operation and maintenance, and community issues.
- ✓ Data entry using tablets, smartphones, or other digital devices, with offline capability where connectivity is limited.
- ✓ Multiple submissions throughout the year to support ongoing monitoring.

12.5.2 Reporting Frequency

Reporting frequency will reflect community accessibility and operational requirements:

- ✓ **Quarterly reporting** for larger communities or high-priority systems requiring regular monitoring.
- ✓ **Annual reporting** for remote or difficult-to-access communities where routine visits are less practical.
- ✓ **Event-based reporting** following emergencies, infrastructure failures, contamination incidents, or other significant service disruptions requiring immediate response.

This reporting framework will provide DWS and stakeholders with timely, reliable information to support regulatory oversight, asset management, and evidence-based investment planning.



13. Capacity Building and Training

This section outlines the capacity-building and training requirements to support implementation of the RWSS Master Plan. The focus is on strengthening the capabilities of the Department of Water and Sewerage (DWS) as the water services regulator, the Rural Water Supply and Sanitation (RWSS) Units as the primary implementation support agencies, and other stakeholders responsible for preparing and implementing Water Supply Management Plans (WSMPs) and Drinking Water Safety, Security and Sanitation Plans (DWSSSPs).

13.1 WSMP and DWSSSP Implementation

The capacity-building requirements for implementing the WSMP and DWSSSP framework are discussed in Sections 3, 9, and 10. While DWS and the Ministry of Health and Medical Services (MoHMS) have established training programmes, the key challenge is scaling these initiatives to achieve nationwide implementation.

With support from UNICEF, the three main agencies (DWS, WAF and MoHMS) have trained 425 Water Committee members across 110 communities to strengthen rural water supply management. This programme provides a strong foundation for expanding training nationwide. Future training should incorporate any updates to the WSMP guidelines, including integration with the DWSSSP framework and climate-resilient rural WASH standards.

MoHMS will continue to lead capacity building for DWSSSP implementation through facilitator guidelines, training materials, and Training of Trainers (ToT) programmes. The proposed registration of NGOs under the Public Health Act will help standardise and strengthen community-based training and implementation.
Development partner programmes should continue to support capacity building by funding qualified Support Organisations (NGOs) and technical assistance to expand implementation capacity.

13.2 Capacity Building for DWS

The priority capacity needs for DWS are outlined in Section 9. Immediate priorities include strengthening technical and management capacity to support its regulatory functions.

The proposed Water Adviser under the Australian Water Partnership (AWP) programme can support implementation of DWS's coordination and regulatory responsibilities. Additional technical assistance can be mobilised through development partner projects to strengthen programme management, regulatory systems, and institutional capacity.

Although a range of international training programmes on water regulation are available through development partners and professional water institutions, practical learning opportunities are likely to provide greater value.

Study visits and professional exchanges with established regulators facilitated through organisations such as the Australian Water Partnership (AWP) and the Australian Water Association (AWA) would provide practical experience in areas such as regulatory oversight, water safety planning, and compliance monitoring.

13.3 Capacity Building for RWSS Unit

The capacity-building requirements for the RWSS Unit are presented in Section 10. Training should focus on enabling RWSS staff to effectively support implementation of the RWSS Master Plan through:

- ✓ Application of the WSMP and DWSSSP planning framework.
- ✓ Community engagement and capacity building.
- ✓ Technical support to Water Committees.
- ✓ Operation and maintenance of rural water and sanitation systems.
- ✓ Emergency response and major maintenance works.
- ✓ Monitoring, reporting, and performance benchmarking.

Fiji and the Pacific region offer a range of vocational and technical training programmes through universities and training institutions. The Asian Development Bank (ADB) is also supporting the development of a regional water sector training programme based in Nadi.

DWS should also seek opportunities to participate in Water Operators' Partnerships and other peer-learning initiatives to strengthen practical skills. While these programmes often target WAF personnel, DWS should advocate for RWSS Unit staff to be included to build long-term technical capacity across the rural water sector.

14. Implementation Plan

The following priority actions form the basis of the RWSS Master Plan Implementation Plan. These activities should be implemented in a phased and coordinated manner to establish the institutional, regulatory, financing, and implementation arrangements required to achieve safely managed, sustainable, and climate-resilient rural water supply and sanitation services.

1. Obtain Government approval of the RWSS Master Plan, including the Rural Water Supply and Sanitation Strategy and Investment Plan.
2. Enact the Water and Sewerage Services Bill (2026) to establish the legislative framework for DWS to undertake its regulatory, coordination, and oversight functions.
3. Strengthen DWS institutional capacity by assigning existing staff or recruiting additional personnel to deliver the new regulatory and coordination responsibilities.
4. Establish the National Water Resources Management Coordination Committee to oversee implementation of the Master Plan and strengthen inter-agency coordination.
5. Establish the Stakeholder Coordination Platform to facilitate collaboration, information sharing, investment coordination, and engagement with development partners and other stakeholders.
6. Subject to Government approval, transfer the WAF Rural Water Programme and staff to establish a dedicated Rural Water Supply and Sanitation (RWSS) Unit responsible for implementation support and technical assistance.
7. Operationalise the Digital Platform, including the centralised database, Management Information System (MIS), and GIS-based asset inventory.
8. Update the National Rural Water Point Mapping Survey (NRWPMS) to include asset condition assessments, localised water demand surveys, hazard mapping, and other information required for planning and monitoring.
9. Establish the Climate Resilient Water and Sanitation Fund (CRWSF) to support investment, asset management, climate resilience, and targeted sanitation subsidies.

10. Mobilise sustainable financing through Government budget allocations, development partner support, and climate and green financing mechanisms.
11. Implement capacity-building and training programmes for DWS, RWSS Units, Water Committees, and other stakeholders to support implementation of the WSMP and DWSSSP framework.
12. Develop and implement a Monitoring and Evaluation (M&E) Framework for the RWSS Master Plan, including performance indicators, reporting arrangements, and periodic reviews to assess implementation progress and outcomes.
13. Prepare and integrate a Gender Equality, Disability and Social Inclusion (GEDSI) analysis and risk assessment into the WSMP and DWSSSP planning processes to ensure equitable, inclusive, and climate-resilient service delivery.

This sequence establishes the governance, institutional capacity, financing, information systems, and monitoring arrangements necessary for effective implementation of the RWSS Master Plan and achievement of Fiji's national rural water supply and sanitation objectives.



Annex A: Economic Analysis

1.1 Introduction

A conventional Cost–Benefit Analysis (CBA) has been undertaken to assess the economic viability and efficiency of the proposed Rural Water Supply and Sanitation Investment Plan. The analysis quantifies the programme's capital and operating costs together with the principal economic benefits expected from improved rural water supply and sanitation services.

The assessment is based on constant 2025 prices and evaluates the investment over a 25-year period from 2026 to 2050. Project performance is measured using three standard economic indicators: the Economic Internal Rate of Return (EIRR), Economic Net Present Value (ENPV), and Benefit–Cost Ratio (BCR). Sensitivity and risk analyses have also been undertaken to assess the robustness of the investment under different assumptions relating to project costs and expected benefits.

The following assumptions were applied in the Cost–Benefit Analysis:

- ✓ Costs and benefits are expressed in Fijian Dollars (FJ$). Where costs are estimated in United States Dollars (USD), they have been converted using the exchange rate of US$1.00 = FJ$2.266, applicable in mid-April 2025.
- ✓ The analysis is undertaken in constant prices (excluding inflation) over the period 2026–2050.
- ✓ Costs and benefits exclude taxes, import duties, and other transfer payments.
- ✓ Financial costs have been converted to economic costs by applying a shadow wage factor of 80% to the unskilled labour component of project costs.
- ✓ A 5% discount rate, representing the opportunity cost of capital, has been adopted.
- ✓ No residual or salvage values have been included at the end of the analysis period.

1.1.1 Summary of Potential Economic Benefits

The proposed investment will generate significant economic, social, environmental, and public health benefits through improved access to safe, reliable, and climate-resilient rural water supply and sanitation services. The programme supports achievement of the National Development Plan (NDP) targets, Sustainable Development Goal 6 (SDG 6), and the long-term objectives of the Rural Water Supply and Sanitation Master Plan.

Economic benefits arise from investments in rural water supply and sanitation infrastructure, strengthened sector governance, improved service delivery, and enhanced institutional and community capacity. These benefits extend to rural households, businesses, public institutions, civil society, and the environment.

The principal source of data used to estimate project benefits is the National Rural Water Point Mapping Survey (NRWPMS), undertaken between 2022 and 2024. The following table summarises the key economic benefits identified, the methodology used to quantify benefits in monetary terms for both water supply and sanitation interventions, and the additional non-monetised benefits that are expected but could not be reliably quantified.



Table 51: Summary of Identification and Quantification of Economic Benefits

Benefit	Means of Identification and Quantification	Data Source
Quantifiable and Monetized Benefits		
Water Supply		
Increased reticulated supply from the project replacing present consumption from other sources. Valued at the opportunity cost of alternative sources of supply	✓ Consumption and cost of alternative water consumption in the future without project situation, representing the saved opportunity cost of water from wells, roof collection, tanker supply, bottled water etc.	✓ NRWPMS ✓ Consultant's data collection and analysis
Increased consumption over existing consumption. Valued at the Willingness to Pay (WTP)	✓ Incremental consumption over current consumption.	✓ NRWPMS. Planned consumption in lpcd and for Willingness to Pay for increased consumption from more reliable source
Saved disinfection costs of having to treat water and store water	✓ Methods and cost of treating water – boiling, filtering, treatment with chemicals ✓ Cost of storage containers	✓ NRWPMS and local consultation in Fiji
Time saving in collecting and storing water	✓ Time saved in not having to source and collect water	✓ NRWPMS and local consultation in Fiji
Health benefits (reduction in water-borne related disease burden) from improved water supply and sanitation	✓ Estimated annual expenditure on health costs for illness related to water-borne disease. ✓ % of Disability-adjusted life years (DALYs) in Fiji related to water, sanitation and hygiene issues ✓ Number of new water supply connections and beneficiaries in the service area	✓ NRWPMS ✓ WHO latest statistics on DALYs ✓ HIES for expenditure on medicines and ill health in Fiji
Lost income from days off work	✓ Days lost due to sickness and family sickness in having to care for sick children	✓ Consultants' consultation and estimation
Sanitation		
Reduced public health risk due to better-managed on-site systems and treatment facilities	✓ Number of on-site systems maintained annually ✓ Volume of septage diverted from existing sanitation facility to new facility	✓ NRWPMS ✓ Consultants' consultation and estimation
Avoided healthcare cost from wastewater and sanitation improvement	✓ % of households with household members experiencing typical health problems due to the poor wastewater and sanitation ✓ Average healthcare cost per household ✓ The average loss of productivity due to health problems ✓ Estimated annual expenditure on health costs for illness related to water-borne disease	✓ NRWPMS ✓ HIES ✓ Prevailing cost of household including medicines of typical health problems with the poor wastewater and sanitation

Benefit	Means of Identification and Quantification	Data Source
	✓ % of DALYs in Fiji related to water, sanitation, and hygiene issues ✓ Number of improved sanitation facilities and beneficiaries	✓ Loss of workdays due to sickness of family members ✓ WHO latest statistics on DALYs
Unquantified Economic Benefits		
Resource use value Existence value	✓ Improved local environment – reduced pollution of groundwater, flooding, bad smells, and the more attractive environment through a reduction in pollution from improved sanitation ✓ Preservation of local assets for future enjoyment	✓ Willingness to Pay (WTP) studies in similar locations
Employment impact	✓ Increase in employment and incomes linked to increased commercial activity and tourism	✓ Projected employment in the commercial and tourism sectors, using conversion factors for the number of jobs per tourist arrival
Training and capacity building	✓ Support to Fiji for the sustainable management of rural water supply and sanitation infrastructure and provision of technical services, e.g., asset management, MIS, tariff setting	✓ Number and types of jobs ✓ Number of people trained
Increased tourism	✓ Potential for increased tourism through an improved rural environment resulting from the project ✓ Growth in tourism and average length of stay and daily expenditure	✓ Department of Tourism ✓ Projected tourist numbers ✓ Cruise ship visits
Economic Development	✓ Increase in economic activity due to improved infrastructure and improved governance and creation of a more liveable environment	✓ GDP statistics and Consultants estimates
	✓ Improved natural environment through reduction in pollution and, contamination groundwater through improved	✓ Local information on the growth of commercial activity ✓ Tourism statistics ✓ Property valuation
	✓ Growth in commercial activity and an increase in taxes and property values	

Source: Consultants estimates

1.1.2 Project Costs and Implementation

Capital Costs

Cost estimates for the investment programme for the period 2025 to 2050 have been prepared in Excel based on the number of rehabilitated and new facilities indicated from the NRWPMS and indicative unit costs for the main water supply and sanitation facilities included in the investment programmes. Component costs are based on information provided by WAF and DWS and local suppliers of material in Fiji, in particular for septic tanks and water tanks reflecting current prices for materials, equipment, and civil works in Fiji. A range of international companies were contacted to provide their estimates of a conceptual design for solar-powered desalination plants suitable for Fiji.

Cost estimates are based on current costs prevailing in early 2025 and are expressed in FJ$ in constant 2025 prices and do not include allowances for taxes and duties.

The range of facilities to be upgraded and replaced during the investment programme for water supply and sanitation is summarised in the table below. For water supply the largest component is the installation of 19,044 household rainwater harvesting and storage system, while for sanitation the upgrade and replacement of 107,601 septic tanks is the main element. The proposed upgrade of faecal sludge collection and treatment includes six new faecal sludge treatment plants and associated collection vehicles and mobile treatment plants.

Table 52: Summary of Water Supply and Sanitation Upgrade and Development Components

Facility	CENTRAL	EASTERN	NORTHERN	WESTERN	TOTAL
Water Supply					
New surface water source (dam weir, EPS)	41	19	62	61	**183**
Package Plant (surface water)	3	3	2	2	**10**
Ecological Purification System	82	108	196	111	**497**
Borehole	12	11	29	38	**90**
HH Rainwater harvesting tank	1,885	510	3,400	13,249	**19,044**
Storage tank	39	13	51	38	**141**
Desalination plant	2	8	12	6	**28**
Sanitation	-	-	-	-	
New Septic tank (individual household)	10,084	4,397	22,702	23,665	**60,848**
Upgrade/replace Septic tank (50%)	12,259	2597	5,505	26,393	**46,753**
Septic tank (communal)	1	-	1	2	4
Faecal sludge vacuum tanker truck	1	-	5	-	**6**
Mini Faecal collection trucks	1	-	5	-	**6**
Faecal Sludge Treatment Plant	1	-	5	-	**6**
Mobile Treatment Unit	2	4	1	3	**10**

The investment costs for the physical infrastructure cover the five-year period 2026 to 2030, in line with the target of meeting the SDGs by 2030. Programme costs include the proposed support to the sector through DWS and the RWSS for the whole period 2026 to 2050. Allowance is made for setting up the Climate Resilient Water and Sanitation Fund based on 2% of the CAPEX costs during the investment phase. The estimated OPEX costs for the new facilities cover the full period 2027 to 2050 and are phased to reflect the implementation of the CAPEX.

The total base cost of the investment program without inflation is FJ$2,092.62 million (US$923.48 million). Costs over the period 2031 to 2050 are shown in 5-year blocks. The majority of the costs are for the sanitation sector, making up 82% of the total, with the greatest share of the CAPEX costs for Western Division at 44% and Ba province at 30% of the total. The DWS and RWSS support costs contribute FJ$74.4 million making up 4.1% of the investment costs, while the accumulated funds for the Climate resilience fund amounts to FJ$34.4 million. The OPEX costs of the new facilities total FJ$263.8 million over the 25-year period, at an average of FJ$12.05 million per year. A summary of the investment program costs is shown in Table 53.



Table 53: Summary of Investment Programme Costs

FJ$ Million

Item	2025	2026	2027	2028	2029	2030	2031-35	2036-40	2041-45	2046-50	Total
A. CAPEX Investment Costs											
Total Water Supply	**-**	**59.09**	**92.63**	**110.73**	**105.08**	**66.85**	**-**	**-**	**-**	**-**	**434.38**
Sanitation											
Total Sanitation	**-**	**193.03**	**258.23**	**257.12**	**256.76**	**320.48**	**-**	**-**	**-**	**-**	**1,285.62**
Total CAPEX (A)	**-**	**252.12**	**350.86**	**367.85**	**361.84**	**387.33**	**-**	**-**	**-**	**-**	**1,720.00**
B. SUPPORT TO DWS & RWSS											
A. DWS support costs	-	2.42	2.42	2.42	2.42	2.42	12.10	12.10	12.10	12.10	**60.50**
B. RWSS support costs	-	0.86	0.86	0.46	0.46	0.46	2.70	2.70	2.70	2.70	**13.90**
C. Climate resilience fund	-	5.04	7.02	7.36	7.24	7.75	-	-	-	-	**34.40**
Total Support Costs (B)	**-**	**8.32**	**10.30**	**10.24**	**10.12**	**10.63**	**14.80**	**14.80**	**14.80**	**14.80**	**108.80**
C. OPEX COSTS											
Water Supply OPEX (new facilities)	-	-	0.59	1.58	2.76	3.74	22.86	22.86	22.86	22.86	**100.10**
Sanitation OPEX (new facilities)	-	-	1.16	2.89	4.39	5.80	37.37	37.37	37.37	37.37	**163.72**
Total OPEX (C)	**-**	**-**	**1.75**	**4.47**	**7.15**	**9.548**	**60.23**	**60.23**	**60.23**	**60.23**	**263.82**
TOTAL ALL	**-**	**260.44**	**362.91**	**382.56**	**379.10**	**407.50**	**75.03**	**75.03**	**75.03**	**75.03**	**2,092.62**

1.3. Benefits

1.3.1 Benefitting population

The NRWPMS recorded a total population of 671,440 people in 154,905 households in 1600 rural locations throughout Fiji, representing about 76% of the total population in 2017. This can be considered the maximum number of persons benefitting from the investment programme. Recent annual population growth in Fiji has been 0.5% per year and this factor has been used to project the population growth over the investment period.

With respect to water supply, of the 1600 locations, 208 (13 percent) said that they did not have any issues with their water supply and their supply was sustainable. Excluding these locations an estimated 585,000 persons in 135,000 households are expected to directly benefit from the support to water supply, although the whole rural population will benefit in some way.

On the other hand, the beneficiaries from the sanitation programme are expected to affect and benefit all households through the upgrade of on-site sanitation facilities to an accepted standard and the introduction of a comprehensive septic tank septage collection and treatment programme.

The main features of water and sanitation as tabulated in the NRWPMS are summarised below.

Water supply. The majority of the water supply systems are provided by 961 Rural Water Schemes (57%) with 436 (26%) provided by WAF Urban Water Supply. The balance is made up of rainwater harvesting (8%), boreholes, and private schemes. One seawater desalination system was recorded. The main source of water for the 960 Rural Water Schemes was recorded as stream, spring and creek making up almost 80% with spring contributing 40%. The source of water for the WAF Urban Water Schemes and the privately owned schemes was not stated in the survey. Rainwater harvesting is from rainwater. The water supply was recorded as being "improved" for almost all of the locations. The type of improved water supply was classified according to nine categories with the predominant category being "piped water inside dwelling" accounting for 54%, followed by "metered piped water inside dwelling" (26%), together accounting for 80%. WAF is recorded as being the main piped water provider. It is evident that most households have access to water inside their dwelling.

The water supply is also shared with other institutions, mostly schools and including with government offices, marketplaces, health centres and hospitals. Around 25% of the locations were recorded as sharing water supply facilities. In response to the question, "Is the water supply from this system available 24/7 or are there interruptions in supply?" 27% of the locations said that a continuous supply was available. 67% said supply was sometimes interrupted and 6% said that there were frequent interruptions.

Of the 1,681 water supply systems, 501 (30%) were recorded as having the water from the system treated. The most common treatment system was a WAF full conventional plant. A total of 409 WAF schemes were treating the water, representing 94% of the WAF Urban Supply schemes. A total of 83 Ecological Purification Systems were recorded. All 1681 locations were tested for water quality by taking water samples using a Compartment Bag Test (CBT). A test for the presence of E. Coli was conducted. The results of the water quality testing were used to classify the Risk Level for each location with the risk level categorised from high risk to no risk. Overall, 27% of the locations were assessed as high risk while 52% had no risk.

Sanitation. The range of sanitation facilities used by households in the 1600 villages and settlements as recorded for 153,111 households shows that 152,002 (98%) generally use a household toilet, 47 use a community toilet, and 3,570 (2%) either share toilet facilities or have no toilet. No households were recorded as practicing open defecation.
The type of toilet used by households was also recorded and the disposal method as either a septic tank or a drum. In total, 86% of households use a flush toilet, 8% have a water seal toilet, and 4% have a cesspit, pit toilet or compost toilet.

In terms of the disposal method, 69% were recorded as having a septic tank and 31% as a drum. However, the type of septic tank was not recorded and whether they conform to an accepted design and outflow disposal is not known

The most important aspect for the improvement of sanitation facilities is the replacement of the inadequate current sanitation facilities relating to water-seal toilets, drums, cess pits and pit latrines with approved septic tanks that conform to an accepted design and with proper discharge and soakaway facilities for the outflow from the septic tank. There is also a need to provide septic tanks and soakaways for those households who do not currently have access to toilet and use shared facilities. In total 107,601 new and upgraded septic tanks are proposed representing 70% of all households, and six new faecal sludge treatment plants and associated equipment.

A summary of the population and the number of households directly benefiting from the investment in water supply and sanitation infrastructure shows that a total of 387,129 people will benefit from water supply development representing 58% of the total, and 473,464 people will directly benefit for sanitation representing 70% of the rural population. In some locations households will benefit from more than one type of improved infrastructure, especially for water supply.

Table 54: Summary of Water Supply and Sanitation Direct Beneficiaries

Component	No.	Population	HHs
Water Supply			
New surface water source (dam weir, EPS)	183	56,669	12,959
Package Plant (surface water)	10	10,000	2,000
Ecological Purification System	497	40,173	9,030
Repair/ Upgrade WS	253	82,847	18,617
Borehole	90	2,438	453
HH Rainwater harvesting tank	19044	77,899	20,755
Storage tank	141	42,591	9,229
Reservoir upgrade	158	32,553	73,121
Connect to WAF WS	56	36,340	8,573
Desalination plant	28	5,619	1,329
Total Water Supply		**387,129**	**156,066**
Sanitation			
New Septic tank (individual household)	60848	267,731	60,848
Upgrade/replace Septic tank (50%)	46753	205,713	46,753
Septic tank (communal)	4	20	4
Faecal sludge vacuum tanker truck	6		
Mini Faecal collection trucks	6		
Faecal Sludge Treatment Plant	6		
Mobile Treatment Unit	0		
Total Sanitation		**473,464**	**107,605**

Source: NRWPMS and Consultants

1.3.2 Health benefits

Improved water supply and sanitation will result in a reduction in the incidence and cost of disease related to inadequate water supply and poor sanitation and environmental pollution. The costs associated with this relate to the lost productivity through days off work through sickness and for caring for sick children and other family members, the cost of treatment and hospitalisation. In extreme cases it results in increased number of deaths where the economic loss is related to the productive earnings over a lifetime of work. Days off school through sickness can result in reduced education achievement for children.

Water-related diseases are a significant health challenge in Fiji, particularly typhoid, leptospirosis and dengue fever. These diseases are linked to poor sanitation, hygiene practices, and unsafe water sources, causing outbreaks and impacting the health, especially among vulnerable populations like children and the iTaukei (Indigenous Fijians). There have been 20 reported typhoid outbreaks since 2005, and in 2021, Fiji had an estimated 467 typhoid cases, or 51 cases per 100,000 people.

Specific challenges and diseases related to inadequate water supply and poor sanitation noted by the Ministry of Health and Medical Services (MoHMS) are as follows:

- ✓ **Typhoid Fever:** Outbreaks of typhoid fever are common in Fiji, with incidence rates as high as 205.8 cases per 100,000 people in the Central Division. The disease is caused by bacteria and spread through contaminated water and food.

- ✓ Leptospirosis: Leptospirosis incidence rates range between 20 and 100 cases per 100,000 people, with peaks occurring during certain months of the year. The disease is contracted through contact with contaminated water or urine of infected animals.

- ✓ **Dengue Fever**: Dengue fever outbreaks can cause widespread illness, with incidence rates varying from 0.34 to 51.15 per 100,000 during non-outbreak periods and as high as 1057 per 100,000 in outbreaks.

- ✓ **Diarrheal Diseases:** Diarrheal diseases are also a concern, and MoHMS has implemented campaigns to prevent these outbreaks.

Factors contributing to water-related diseases are lack of access to clean drinking water and basic sanitation facilities for a significant portion of the population; poor hygiene practices, such as inadequate handwashing, can further exacerbate the risk of water-borne diseases.

Climate change, including increased rainfall and flooding, can impact water quality and increase the risk of disease outbreaks, and agricultural runoff and other land use practices can contaminate water sources.

MoHMS states that in Fiji, typhoid fever is a common disease due to poor sanitation in some areas, people not washing their hands properly and especially during and after the wet season where flooding can spread the contaminated water to food crops and water sources.

The NRWPMS recorded that 178 locations (11% of the 1,600 locations) had suffered a recent outbreak of waterborne disease with diarrhoea and typhoid the most common accounting for 90% of the incidences. Table 55 below shows a summary.

Table 55: Disease Incidence from NRWPMS

Disease type	Number	Percent of Total
Has there been a recent out-break of water borne disease in your village?		
No	1,422	89%
Yes	178	11%
Disease type:	**1,600**	
Diarrhoea	88	49%
Typhoid	33	19%
Typhoid|Diarrhea	39	22%
Giardiasis	1	1%
Typhoid|Cholera|Diarrhea	1	1%
Cholera	2	1%
Typhoid|Giardiasis	1	1%
Leptospirosis	4	2%
Skin disease	9	5%
Total	**178**	**100%**

The results of the analysis of water quality testing conducted by the NRWPMS used to classify the Risk Level for each location with the risk level categorised from high risk to no risk indicated that overall, 27% of the locations were assessed as high risk while 52% had no risk.

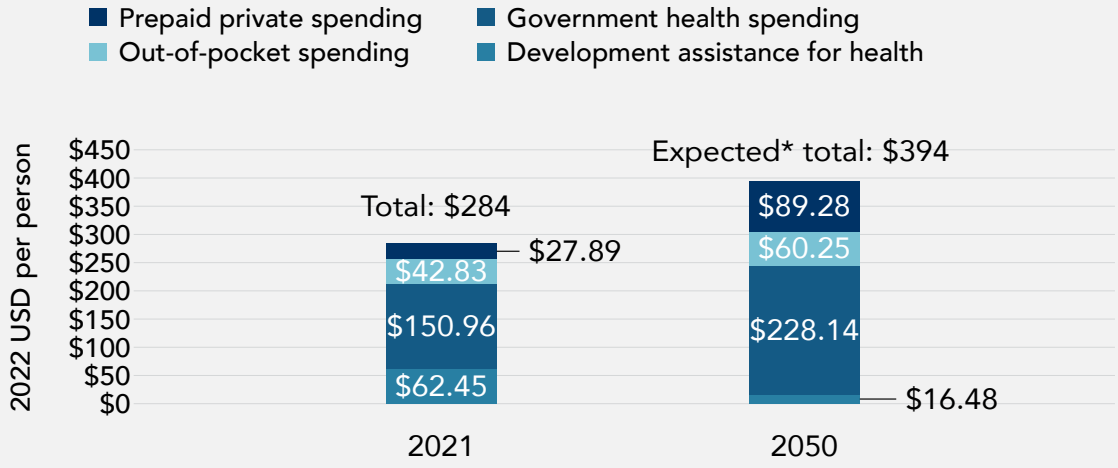
Health expenditure. A recent publication by the Institute for Health Metrics and Evaluation (IHME) shows the total health expenditure per capita for Fiji in 2021 of US$284.13 (FJ$682) and US$394.16 (FJ$945) as projected in 2050. Table 56 below provides a summary, and this is also shown graphically in Figure 22.

Table 56: Health Expenditure in Fiji 2021 and 2050

Spending source	2021	Ex Rate 2.4		2050*
	US$/capita	FJ$	US$	FJ$
Prepaid private spending	27.89	66.93	89.28	214.28
Out-of-pocket spending	42.83	102.79	60.25	144.60
Government health spending	150.96	362.31	228.14	547.55
Development assistance for health	62.45	149.87	16.48	39.55
Total	**284.12**	**681.89**	**394.16**	**945.98**

*Expected" is the future growth trajectory based on past growth.

How much is spent on health – now, and in the future – and from which sources?



*"Expected" is the future growth trajectory based on past growth.

Figure 2: Amount and Source of Expenditure on Health 2021 and 2050 (US$)

In 2021 average health expenditure per capita was estimated to be the equivalent of FJ$682 per year with Government contributing just over half, private sector 25% and development assistance contributing the remaining 22%. With improved water supply and sanitation and a reduction in water-borne disease reduced expenditure on health and medication by the Government and households can be expected as a positive benefit.

For the economic analysis, health benefits are valued as a saving of 10% in total health expenditure per capita per year, equivalent to FJ$68.10 per year. This value is also assumed to allow for and include the other benefits associated with improved health, such as increase in productivity through less sick days off work, higher education achievement through better school attendance and reduced mortality, due to poor sanitation and water supply, especially for infants and children.

1.3.3 Time saving

Time saving relates to the saving in time incurred by households having to travel and wait to collect water when they do not have access to a reliable supply nearby. The NRWPMS recorded that the majority of households have a piped supply within their house with 54% having a piped supply and 26% having a metered piped supply provided by WAF. A portion of households still have to collect water from communal standpipes or yard taps. However, only 27% of the locations said that they received a continuous water supply, while 73% suffered from frequent or sometimes interrupted supply. During those times households would have to resort to an alternative source to get water essential to their needs, which could involve more travel and time to collect water.

In response to a question in the NRWPMS, "How long does the furthest house take to reach water system (in minutes)", 78% said zero minutes, 21% less than five minutes, and only 1% more than five minutes. As this relates to the worst case in the village, it is clear that time saving from improved access to water will be relatively minor and even when water is being collected from communal standpipes access is not a problem. Nevertheless, when supply is limited, households will need to spend more time and effort collecting water.

For the purpose of the analysis a saving of five minutes per day (30 hours per year) for 20% of households has been included and valued at an amount of FJ$6.95 per hour based on the average GDP per capita of US$6,150 (FJ$13,890) in 2024 allowing for productive time of 2,000 hours per year. This amounts to FJ$208.50 per household per year.

1.3.4 Saving of cost of alternative supply

In times of water shortage villagers must resort to getting water from alternative sources such as collecting from a dam, river, well, and in extreme case relying on water supplied by tanker and purchasing bottled water. The NRWPMS recorded 33 locations that used water carted by tanker, and 12 locations that utilised bottled water during the dry season. This represents less than 3% of the locations in the NRWPMS, but it is likely that the use of bottled water by the rural community is much higher than as recorded in the NRWPMS due to its convenience and wide acceptability.

According to Statista, bottled water consumption in Fiji is high due to concerns about tap water safety and quality. Fijian consumers are increasingly opting for bottled water, with a forecast of 35.10m L in volume for consumption at home by 2025, and an average volume per person of 37.61 lt. This trend is influenced by the fact that tap water in Fiji is not recommended for drinking. The cost of bottled water in Fiji is a minimum of FJ$2.0 /lt and can be as high as FJ$8.0. At consumption of 37.61 lt per capita the average household of 4.33 persons is spending FJ$325.70 per year on bottled water.

Average consumption in rural households is likely to be somewhat less.

No data is available on the average consumption and sources of water for rural households. The NRWPMS did measure flow rates for 68% of the locations which exhibited a wide range. After adjusting for the number of households in each location the average daily flow per households was 533 litres. At an average household size of 4.33 this is equivalent to 123 lpcd, although actual consumption will be considerably less after allowing for losses and unaccounted for water.

The design standard for rural water supply is 100 lpcd for general use for cooking, cleaning, toilet flushing and washing and 20 lpcd for minimum use for drinking and cooking when supplies are limited or expensive. Current average consumption is considered to be less than the design standard.

With improvement of water supply brought about by the investment programme the need to use inadequate and more expensive sources of water from tanker supply and bottled water will be reduced. Although the tanker supply is subsidised by government, the economic cost includes the cost of the water at source and the cost of tanker delivery. Typical commercial costs for tanker delivery in Fiji by WAF can range from FJ$200 to FJ$380 per load, depending on the delivery distance and the volume.

In April 2023 it was reported that WAF was spending FJ$60,000 per day in providing 50 water carting trucks, equivalent to FJ$1,200 per truck per day. If on average a truck delivers four loads of 5,000 lt making 20,000 lt then the cost per m3 will be FJ$60. Historically, WAF reported that for the three-month period September to November 2018 WAF spent FJ$1.5 million delivering 36.36 million litres at an average cost of FJ$41.44 per m3. For the economic analysis a value of FJ$60/m3 has been used for the saved costs of tanker delivered water.

Bottled water costs are assumed to be FJ$2.0 per litre, or FJ$2,000 per m3. The saving in bottled water costs is assumed to be bundled with saved water cartage costs and is applied to 15% of the households.

Saved Opex costs. Replacement of the existing water supply and sanitation with improved facilities will result in a saving of the Opex costs incurred in the without-project situation. To allow for this the saved Opex is assumed to be 15% of the with-project annual Opex for water supply and 25% of annual Opex for sanitation. This amounts to a saving of FJ$2.45 million per year.

Increased water consumption and willingness to pay. The incremental increase in water consumption resulting from the improved water supply over the level of current consumption from all sources can be valued at the consumers' willingness to pay (WTP) for an increase consumption and included as an

economic benefit. However, as in Fiji, households with an annual income under FJ$30,000 receive a free water allowance of 92,500 litres per year (250 lt/d), their willingness to pay for an increased consumption is likely to be minimal. Information on the willingness to pay for incremental water consumption for rural households in Fiji is not available. This would require a dedicated survey of rural households using contingent valuation methodology and other survey methods to reliably estimate the WTP for incremental water consumption and improved sanitation facilities, which is outside the scope of this assignment. Consequently, the economic analysis does not quantify and include any benefits for incremental water consumption and improved sanitation due to absence of reliable data.

1.3.5 Disinfection costs

The NRWPMS recorded that 30% of locations received treated water, most commonly from a WAF full conventional plant, representing 94% of the WAF supply schemes. Generally, tap water is not recommended for drinking in Fiji and untreated raw water requires disinfection to a safe standard for drinking, etc. The NRWPMS data implies that 70% of the rural population will have to treat water through boiling, filtration and chemical treatment. The most common means will be by boiling as 92% of Fiji's households have access to electricity, although there is a disparity between urban and rural communities and 20% of rural dwellers do not have access.

The energy required to boil 1 lt of water from 20°C to 100° C is 0.093 kWh. At a cost of FJ$0.34 / kWh, the current domestic rate, it costs approximately FJ$0.03 per litre to boil water in a kettle. If the average household has to boil an extra 5 lt of water per day to provide safe water, then the cost is FJ$0.15 per day, equivalent to FJ$54.75 per year in a saved cost.

1.3.6 Other benefits – tourism, GDP, etc.

Other benefits that will emanate from improved water supply and sanitation to meet the SDGs are associated with the improvement in public health, the local environment and the reduction in pollution from incorrectly treated human waste. Indirectly an improvement in the local environment can be expected to contribute to the attractiveness of a location for tourism and local amenities. A healthier population will result in enhanced productivity and contribute to rising living standards and national GDP. Although these benefits are significant, they have not been quantified in monetary terms and have not been brought into the economic analysis.

The comprehensive support proposed to DWS and the RWSS will enhance the capacity to manage the water and sanitation sector and contribute to more effective asset management and sustainability of the assets and infrastructure. In the long run this should result in a reduction in the maintenance costs and the durability of the assets.

Skills developed by DWS will be transferable to other sectors, such as the urban water and sanitation sector. Better management of water supply and sanitation assets will make the sector more attractive to other donors to contribute, confident that their support will be more sustainable.

1.4 Results of the Economic Analysis

The results of the cost-benefit economic analysis for the investment programme are shown in the table below. The EIRR is 4.7% with an ENPV at an OCC of 5% of -FJ$40.07 million. This result is slightly less than the hurdle rate of 5%. A summary of the overall economic analysis is shown in Table 57 below. Details of the cash flows are in Table 59.

Table 57: Summary of Economic Analysis

RWSS Master Plan and Investment Programme Economic Analysis								
					Net Benefit (Cost)	Sensitivity		
		Economic Cost			Base	Investment	O&M	Benefit
Year	CAPEX	OPEX etc	Total Costs	Benefits	Case	20%	20%	20%
	FJ$ mill	FJ$ mill	FJ$ mill	FJ$ mill	FJ$ mill	FJ$ mill	FJ$ mill	FJ$ mill
2026	242.76	8.19	250.95	9.38	-242	-290	-243	-240
2027	337.83	11.81	349.64	31.96	-318	-385	-320	-311
2028	354.38	14.35	368.74	59.12	-310	-380	-312	-298
2029	348.68	16.80	365.49	86.98	-279	-348	-282	-261
2030	372.29	19.61	391.90	115.82	-276	-351	-280	-253
2031	-	14.49	14.49	131.14	117	117	114	143
2032	-	14.49	14.49	131.80	117	117	114	144
2033	-	14.49	14.49	132.46	118	118	115	144
2034	-	14.49	14.49	133.12	119	119	116	145
2035	-	14.49	14.49	133.79	119	119	116	146
2036	-	14.49	14.49	134.46	120	120	117	147
2037	-	14.49	14.49	135.13	121	121	118	148
2038	-	14.49	14.49	135.80	121	121	118	148
2039	-	14.49	14.49	136.48	122	122	119	149
2040	-	14.49	14.49	137.17	123	123	120	150
2041	-	14.49	14.49	137.85	123	123	120	151
2042	-	14.49	14.49	138.54	124	124	121	152
2043	-	14.49	14.49	139.23	125	125	122	153
2044	-	14.49	14.49	139.93	125	125	123	153
2045	-	14.49	14.49	140.63	126	126	123	154
2046	-	14.49	14.49	141.33	127	127	124	155
2047	-	14.49	14.49	142.04	128	128	125	156
2048	-	14.49	14.49	142.75	128	128	125	157
2049	-	14.49	14.49	143.46	129	129	126	158
2050	-	14.49	14.49	144.18	130	130	127	159
	1,656		2,017	3,055	1,038	707	966	1,649
			Discount Rate @ 5%	EIRR	4.7%	2.8%	4.4%	7.0%
				ENPV 5%	-40	-325	-80	277
			Sensitivity Indicator	EIRR		30.3	5.0	38.0
				ENPV		35.5	5.0	39.5
			Switching Value	EIRR		3%	20%	3%
				ENPV		3%	20%	3%

1.4.1 Risk and Sensitivity Analysis

The results of a sensitivity analysis testing the impact of changes in the main project parameters – capital costs, OPEX costs and the level of benefits is shown in Table 58, which also shows the switching values, the percentage change needed to change the EIRR to 5%.

Table 58: Sensitivity Analysis

Parameter	Change	EIRR	FJ$ mil	EIRR % SV
Base case		4.7%	-40.07	-
Capital	20%	2.8%	-324.53	-3%
O&M	20%	4.4%	-80.39	-20%
Benefits	+20%	7.0%	276.70	+2%
SV = switching value				

A 20% increase in CAPEX or OPEX reduces the EIRR to 2.8% and 4.4% respectively and a 20% increase in the benefits increases the EIRR to 7.0%. The switching value, the change in the parameter needed to force the EIRR to 5% range for a reduction of 3% for CAPEX, -20% for OPEX and a 2% increase in benefits.

The programme is sensitive to these parameters and shows that relatively small changes affect economic efficiency. Given the relatively broad-brush level of the economic analysis and the significant economic benefits that are not quantified, including the value of WTP for incremental water and improved sanitation the economic return can be considered acceptable.

Table 59: Economic Analysis Cash Flows

RWSS MASTER PLAN AND INVESTMENT PROGRAMME ECONOMIC ANALYSIS										
	FJ$ Million									
Year	**Unit**	**2026**	**2027**	**2028**	**2029**	**2030**	**2035**	**2040**	**2045**	**2050**
ECONOMIC COSTS										
1. CAPEX										
Water Supply		57.44	89.90	107.53	102.19	64.63				
Sanitation		185.32	247.94	246.85	246.49	307.66				
Total CAPEX		**242.76**	**337.83**	**354.38**	**348.68**	**372.29**				
2. DWS & RWSS Support		3.25	3.25	2.85	2.85	2.85	2.93	2.93	2.93	2.93
3. Climate Resilience Fund		4.94	6.88	7.21	7.09	7.59				
4. OPEX										
Water Supply		-	0.57	1.51	2.65	3.59	4.39	4.39	4.39	4.39
Sanitation		-	1.11	2.78	4.21	5.57	7.17	7.17	7.17	7.17
Total OPEX		**-**	**1.68**	**4.29**	**6.86**	**9.17**	**11.56**	**11.56**	**11.56**	**11.56**
Total Other Costs		**8.19**	**11.81**	**14.35**	**16.80**	**19.61**	**14.49**	**14.49**	**14.49**	**14.49**
TOTAL COSTS	**1,655.95**	**250.95**	**349.64**	**368.74**	**365.49**	**391.90**	**14.49**	**14.49**	**14.49**	**14.49**
RURAL POPULATION		Annual growth rate		0.50%						
Northern Division		143,696	144,414	145,137	145,862	146,592	150,293	154,088	157,979	161,968
Western Division		286,407	287,839	289,278	290,725	292,178	299,556	307,120	314,875	322,826
Central Division		203,558	204,576	205,599	206,627	207,660	212,903	218,280	223,791	229,442
Eastern Division		37,779	37,968	38,158	38,349	38,540	39,513	40,511	41,534	42,583
Total		**671,440**	**674,797**	**678,171**	**681,562**	**684,970**	**702,266**	**719,999**	**738,180**	**756,820**

BENEFITS										
1. Health Benefit										
Benefitting Population	100%	671,440	674,797	678,171	681,562	684,970	702,266	719,999	738,180	756,820
Benefit per year FJ$/capita	$68.10	**3.35**	**11.42**	**21.13**	**31.09**	**41.40**	**47.82**	**49.03**	**50.27**	**51.54**
2. Saved Time										
Benefitting Households	20%	31,013	31,168	31,324	31,481	31,638	32,437	33,256	34,096	34,957
Benefit per HH per year FJ$/HH	$208.50	**0.47**	**1.62**	**2.99**	**4.40**	**5.86**	**6.76**	**6.93**	**7.11**	**7.29**
3. Saved Water Costs (Cartage, bottled water, etc)										
Benefitting Households	15%	23,260	23,376	23,493	23,611	23,729	24,328	24,942	25,572	26,218
Water Volume MM3 (m3/HH/yr)	50	1.163	1.169	1.175	1.181	1.186	1.216	1.247	1.279	1.311
Benefit @ FJ$ / m3	$60.00	**5.11**	**17.43**	**32.25**	**47.45**	**63.18**	**72.98**	**74.83**	**76.72**	**78.65**
4. Saved Disinfection Costs										
Benefitting Households	70%	108,547	109,090	109,635	110,183	110,734	113,530	116,397	119,336	122,350
Cost saving per HH/year	$54.75	**0.44**	**1.48**	**2.75**	**4.04**	**5.38**	**6.22**	**6.37**	**6.53**	6.70
5. Saved OPEX Costs										
Water supply	15%	-	0.09	0.23	0.40	0.54	0.66	0.66	0.66	0.66
Sanitation	25%	-	0.28	0.69	1.05	1.39	1.79	1.79	1.79	1.79
Total		**-**	**0.36**	**0.92**	**1.45**	**1.93**	**2.45**	**2.45**	**2.45**	**2.45**
TOTAL BENEFITS		**9.38**	**31.96**	**59.12**	**86.98**	**115.82**	**133.79**	**137.17**	**140.63**	**144.18**
NET CASH FLOW		**- 241.57**	**- 317.68**	**- 309.61**	**- 278.51**	**- 276.08**	**119.29**	**122.67**	**126.14**	**129.69**
EIRR	4.7%									
NPV @ 5%	-$40.07									

Annex B: Review of a Full Diagnostic Approach and Decision Support Tools

The World Bank has documented a full approach to "Faecal sludge management: diagnostic for service delivery in urban areas" [1]. The study developed diagnostic and decision support tools to guide FSM interventions as well as data collection protocols and instruments and TOR. Although prepared for urban areas the approach is valid for rural Fiji (including peri-urban areas) given the need that back-end septic systems deliver safely managed sanitation.

This is consistent with a strategy of City-Wide Total Sanitation, expansion of WAF services in peri-urban areas, and equalisation of the quality of service in urban and rural areas. It also takes into consideration the increase in wastewater due to improved coverage of piped water supply and the preference for flush toilets.

The full sequence of tools and their application to rural Fiji is considered below. It is found that the main focus of concern for rural Fiji is the choice of technology option for faecal sludge treatment.

Table 60 : Diagnostic decision support tools

Tool	Comment
Faecal waste flow diagram	This identifies how much is safely managed and where the unmanaged faecal sludge goes. Some data is available for rural Fiji through the village water point mapping survey and research studies such as the one carried out by WISH Fiji. With this information it is possible to estimate the faecal waste flows. Under the Fiji RWSS Master Plan it is proposed to have detailed village and household surveys, awareness raising for faecal sludge management, and verification of septic systems that need to be upgraded or replaced. It is also proposed that pit latrines be replaced with pour flush toilets and septic tanks.
City service delivery assessment	To determine the quality of service along the service chain. For the Investment Plan prepared with the Fiji RWSS Master Plan report it is proposed that vacuum trucks will be procured, private vehicles licensed/registered, SOPs prepared for emptying and transport, regulations developed for emptying, transport and disposal, and day to day monitoring and reporting established.

1 *Fecal Sludge Management: Diagnostics for Service Delivery in Urban Areas. Tools and Guidelines. World Bank. 2016.*

Tool	Comment
Prognosis for change (political economy analysis)	This identifies any potential interests or incentives that could block action and ways to overcome them The need for improved faecal sludge management is widely accepted amongst all stakeholders in Fiji. The main discussion point is that a more nuanced evaluation framework is required that takes into consideration the context of individual villages and settlements as well as factors at the provincial level. This approach will be promoted under the RWSS Master Plan working with NGOs and research institutions to establish the detailed TOR.
Intervention options assessment	This identifies the alternative technical interventions along the service chain based on the earlier diagnostic work.
Faecal sludge technical tools	To determine volumes and characteristics of sludge, assess market for end products, evaluate collection and transport options, identify treatment processes for resource recovery. This would be carried out under the implementation of the evaluation framework. Under the Fiji RWSS Master Plan a sanitary risk assessment will be carried out at provincial level to determine the quantities, qualities and locations of faecal sludge that need removal and treatment.
Urban sanitation status index	Maps showing the status of sanitation services disaggregated by neighbourhood For the RWSS Master Plan this will be for villages and settlements and be established under the new digital platform and MIS
FSM finance tool	To estimate the costs of faecal sludge management services This will be set out in the RWSS Master Plan investment plan

Annex C: Long List of Potential Interventions (UNICEF 2018)

Natural disaster	Infrastructure design		Construction and installation
	Design factors and location/condition	Structure and materials	
Earthquake	• If possible avoid known fault zones • Build on consolidated soil with adequate load-bearing capacity • Avoid building on highly saturated soil	• Use structures and materials that better resist earthquakes: • Use steel structures rather than concrete • Flexible pipe materials (e.g., polyethylene [PE], polyvinyl chloride [PVC]) • Flexible connections between components • Place heavy structures on concrete bases	• Construct and install to increase resistance to earthquakes: • Ensure dams can resist earthquake • Reinforce wells and lining where possible • Make round pits for latrines and adequately line
Tsunami	• Avoid areas close to low lying coast line • Mangrove forests, coral reefs and rocks can reduce the impact of large waves • Install structures on soils with adequate load-bearing capacities	• Use flexible materials where possible (e.g., PE, steel, PVC), over rigid materials (e.g., concrete, cast iron, brick) • Use flexible connections between components	• Construct/install to increase resilience to tsunami: • Install covers on wells and reservoirs • Construct in resistant materials • Adequately reinforce and brace structures • Allow for cleaning in case of contamination • Install slab around latrine pit • Make round pits for latrines and adequately line
Volcano	• If possible avoid areas close to potentially active volcano eruption or its effects (e.g., lava, ash rains, mudflows and landslides) • Install on soils with adequate load-bearing capacity	N/A	• Build covers on wells, reservoirs or tanks adequately to exclude ash • Protect/bury pipes • Ensure system can be cleaned out in case of entry of ash in system

Natural disaster	Infrastructure design		Construction and installation
	Design factors and location/condition	Structure and materials	
Landslide	• If possible avoid the following areas: below slopes with unconsolidated soils, near natural drainage channels, below deforested areas • Try to build retention structures (e.g., walls near key infrastructure)	• Use materials that can operate with the effects of some mass movement (e.g., galvanized iron and PE pipe)	• Bridge pipes over zones at risk, or alternatively lay pipes in solid rock • Install pipe anchors near areas at risk • Ensure proper backfilling and compacting of trenches • Remove loose rocks and debris that could damage infrastructure in the area
Flooding	drainage paths • Avoid where possible areas close to low-lying coastline • Avoid placing infrastructure on the outer bends of rivers	• Use materials that resist the effects of flooding (e.g., concrete structures with solid foundations)	• Bridge pipes over natural drainage channels, or dig into trenches • Install pipe anchors • Build covers on wells and reservoirs etc. • Reinforce structures • Raise structures at least 0.3m above known maximum flood levels • Maintain pressure in reticulated systems to avoid water ingress • Ensure presence of proper sanitary seals in wells and boreholes • Build impermeable slabs around wells and boreholes • Make round pits in latrines and line to avoid risk of collapse • Install slabs around latrine pit
Subsidence	• Avoid areas where subsidence is very noticeable • Install structures on soils with adequate load-bearing capacity	• Use flexible materials where possible (e.g., PE, steel, PVC) • Use high-quality materials	• Reinforce structures • Make round pits for latrines and adequately line

Natural disaster	Infrastructure design		Construction and installation
	Design factors and location/condition	Structure and materials	
Cyclone/ Storm	• Avoid higher areas, ridges, flat terrain, open ground • Check for loose debris around the area that could damage infrastructure	• Utilize concrete over wooden structures	• Build covers in resistant materials and with locks • Ensure adequate bracing of structures • Anchor structures (e.g., reservoirs etc.) • Ensure roofing material is adequately attached • Secure and reinforce doors
High temperatures	• Water demand will be higher, ensure adequate capacity in the system	• Use materials that can resist the effects of heat	• Ensure wells, reservoirs and tanks can be covered to reduce evaporation • Ensure good ventilation of structures • Shade infrastructure where possible • Painting structures in light colours reflects heat
Drought	• Choose locations for structures that reduce the impact of drought (e.g., place wells and boreholes in areas where groundwater level is relatively high) • Be aware of placement of groundwater near coastal areas • Maximize water-use efficiency (e.g., repair major leaks, re-use waste water etc.) • Increase storage capacity • Implement secondary water sources • Be prepared for changes in water quality	N/A	• Ensure wells, reservoirs and tanks can be covered to reduce evaporation • Ensure all existing water sources are functioning to full capacity, and repair where required

Source: Table 4.3 from Pacific WASH Resilience Guidelines, UNICEF 2018

Annex D: Details of Unit Costs Key Assumptions

This Annex presents the details of the CAPEX and OPEX costs for the water supply and sanitation facilities included in the 25-year investment programme. The main assumptions applied are as follows:

1. Costs are expressed in FJ$ and US$ using an exchange rate of US$1.00 = FJ$2.266 that applied in mid-April 2025.
2. Costs exclude VAT and import and customs duty.
3. Unit costs for components are based on information obtained from the relevant institutions in Fiji, particularly WAF and DWS and also from manufacturers and suppliers of equipment of water tanks, septic tanks, boreholes, etc. A range of international companies were contacted to provide their estimates of a solar-powered desalination plant suitable for Fiji.
4. An allowance for price inflation is included based on the latest Asian Development Bank (ADB) forecast inflation for Fiji for the period 2025 to 2030.
5. The annual operation and maintenance costs (OPEX) for the range of facilities are estimated based on a percentage of the original CAPEX cost for each component of the costs.
6. The costs include the CAPEX investment costs for new and rehabilitated water supply and sanitation assets, support costs for DWS for the management of the sector, and an estimate of the ongoing operation and maintenance costs (OPEX) for the new facilities over the 25-year period.

Water Supply

The compilation of the unit costs for water supply facilities are shown in the following tables.

Surface Water System

This model represents a standard rural water piped scheme with a surface water source and EPS treatment.

Table 1: Surface Water Supply System with EPS

	CAPEX Cost Estimate						OPEX Cost Estimate
	Component	**Unit**	**Unit Cost**	**Qty**	**Total Cost F$**	**% of CAPEX**	**F$ /yr**
1	Dam or weir	item	200,000	1	200,000	0.5%	1,000.0
2	Reservoir	item	30,000	5	150,000	0.5%	750.0
3	EPS	"	50,000	1	50,000	2.0%	1,000.0
4	Clearwater storage tank		50,000	1	50,000	1.0%	500.0
5	Distribution network		50,000	1	50,000	3.0%	1,500.0
6	Household connections	no.	500	100	50,000	1.0%	500.0
7	Public standpipe	no.	6,500	1	6,500	1.0%	65.0
8	Optional HH purification system	no.	500	50	25,000	2.0%	500.0
9	Low level pumps	no.	5,000	2	10,000	25.0%	2,500.0
	Subtotal				591,500		8,315.0
	Design & Construction	%		10%	59,150	0%	-
	TOTAL				650,650		8,315.0

Source: DWS and local sources

Surface Package Plant

A complete package of treatment plant, storage tanks and reticulation system supplying 10–15 m³/day for a population of 600 persons.

This facility is likely to be funded by AFD, who have installed a pilot supplying 10 to 15 m3 per day for two villages with a population of 600 people.

Table 2: Surface Water Package Treatment Plant

	CAPEX Cost Estimate						OPEX Cost Estimate
	Component	**Unit**	**Unit Cost**	**Qty**	**Total Cost F$**	**% of CAPEX**	**F$ /yr**
1	Package treatment plant	item	900,000	1	900,000	3.0%	27,000
3	Clearwater storage tank		50,000	1	50,000	1.0%	500
4	Distribution network		50,000	1	50,000	3.0%	1,500
	Subtotal				1,000,000		29,000
	Design & Construction	%			-	0%	-
	TOTAL				1,000,000		29,000

Source: DWS and local consultation

Ecological Purification System (EPS)

A complete package of treatment plant, storage tanks and public standpipe. The cost may vary depending on location and the contractor.

Table 3: Ecological Purification System (EPS)

	CAPEX Cost Estimate						OPEX Cost Estimate
	Component	**Unit**	**Unit Cost**	**Qty**	**Total Cost F$**	**% of CAPEX**	**F$ /yr**
1	Water source from dam or weir	item	2,000	1	5,000	0.5%	25.0
2	EPS system	item	50,000	1	55,000	2.0%	1,100.0
3	Clearwater storage tank		25,000	1	25,000	1.0%	250.0
4	Public standpipe	no.	6,500	1	6,500	1.0%	65.0
5	Fencing	item	4,864	1	4,864	2.0%	97.3
	Subtotal				96,364		1,537.3
	Design & Construction	%		10%	9,636	0%	-
	TOTAL				106,000		1,537.3

Source: DWS and local consultation

Water Storage Tank

Water storage tank at the village level.

Table 4: Water Storage Tank

	CAPEX Cost Estimate						OPEX Cost Estimate
	Component	**Unit**	**Unit Cost**	**Qty**	**Total Cost F$**	**% of CAPEX**	**F$ /yr**
1	Storage tank (20,000 lt)	item	23,000	1	23,000	0.5%	115
2	Site preparation (tank base)		15,000	1	15,000	1.0%	150
3	Pipework		1,500	1	1,500	3.0%	45
	TOTAL				39,500		310

Source: Rotomould - local supplier

Borehole with Solar Power and Reticulation

Standard rural piped water supply scheme with borehole source and solar power pump.

The cost of boreholes of FJ$35,000 includes the filter, screen and well cap. The additional pump test and water quality test is another FJ$15,000.

Table 5: Borehole with Solar Power and Reticulation

	CAPEX Cost Estimate						OPEX Cost Estimate
	Component	**Unit**	**Unit Cost**	**Qty**	**Total Cost F$**	**% of CAPEX**	**F$ /yr**
1	Borehole, filter, screen, well cap	item	35,000	1	35,000	0.5%	175
2	Pump test and water quality test	item	15,000	1	15,000	0.0%	-
3	Clearwater storage tank		5,000	1	5,000	1.0%	50
4	Distribution network		10,000	1	10,000	3.0%	300
6	Public standpipe	no.	6,500	1	6,500	1.0%	65
7	Optional HH purification system	no.	100	50	5,000	5.0%	250
9	Low level pumps (solar)		5,000	2	10,000	25.0%	2,500
	Subtotal				86,500		3,340
	Design & Construction	%		10%	8,650	10%	334
	TOTAL				95,150		3,674

Source: DWS

Rainwater Harvesting and Storage System

Rainwater harvesting system for an individual household.

Table 6: Rainwater Harvesting and Storage System

	CAPEX Cost Estimate						OPEX Cost Estimate
	Component	**Unit**	**Unit Cost**	**Qty**	**Total Cost F$**	**% of CAPEX**	**F$ /yr**
1	Rainwater tank (3100 lt Rotomould)	item	900	1	900	0.5%	5
2	Concrete tank base	item	5,000	1	5,000	0.5%	25
3	Pipework, house guttering, downpipes		5,000	1	5,000	1.0%	50
4	Rainwater harvesting set (First flush diverter, leaf eater, tank gauge)	no.	275	1	275	1.0%	3
	TOTAL				11,175		82

Source: Rotomould and DWS

Desalination Plant

Solar-powered seawater or brackish water desalination plant. Production capacity 4000 lt/hr, 24 - 40 m3/d depending on sunlight availability - usually 6-10 hr/day.

Table 7: Solar Desalination Plant

	CAPEX Cost Estimate						OPEX Cost Estimate
	Component	**Unit**	**Unit Cost**	**Qty**	**Total Cost F$**	**% of CAPEX**	**F$ /yr**
1	Desalination reverse osmosis plant	item	325,000	1	325,000	2.0%	6,500
2	Integrated solar system 34.4 kWp capacity	item	150,000	1	150,000	2.0%	3,000
3	Onsite commissioning	item	12,000	1	12,000	2.0%	240
4	Remote monitoring system	item	5,000	1	5,000	2.0%	100
5	Sea freight to Suva	item	17,000	1	17,000	0.0%	-
6	Basic water collection point	item	2,000	1	2,000	2.0%	40
7	Training and capacity building	item	30,000	1	30,000	0.0%	-
	TOTAL				541,000		9,880

Source: MOERK Australia and DWS

Sanitation Facilities

New Household Septic Tank System

Standard household septic system with soakaway to replace an existing cesspit, drum toilet and install a complete new toilet.

Table 8: New Household Septic Tank System

	CAPEX Cost Estimate						OPEX Cost Estimate
	Component	**Unit**	**Unit Cost**	**Qty**	**Total Cost F$**	**% of CAPEX**	**F$ /yr**
1	Individual septic tank (4550lt Rotomould)	item	5,000	1	5,000	0.5%	25
2	Latrine set (latrine riser and bowl)	item	500	1	500	1.0%	5
3	Installation	item	7,500	1	7,500	0.5%	38
	TOTAL				13,000		68

Source: Rotomould and DWS

Upgrade Household Septic Tank System

Standard household septic system with soakaway to upgrade an existing non-compliant septic tank system.

Table 9: Upgrade Household Septic Tank System

	CAPEX Cost Estimate						OPEX Cost Estimate
	Component	**Unit**	**Unit Cost**	**Qty**	**Total Cost F$**	**% of CAPEX**	**F$ /yr**
1	Individual septic tank	item	5,000	1	5,000	0.5%	25
2	Cistern flush or pour-flush toilet	item	500	1	500	1.0%	5
3	Installation	item	5,000	1	5,000	0.5%	25
	TOTAL				10,500		55

Source: Rotomould and DWS

Communal Septic Tank System

Communal septic system with infiltration trench or wetland serving several households.

Table 10: Communal Septic Tank System

	CAPEX Cost Estimate						OPEX Cost Estimate
	Component	**Unit**	**Unit Cost**	**Qty**	**Total Cost F$**	**% of CAPEX**	**F$ /yr**
1	Septic tank	item	15,000	1	15,000	0.5%	75
1	Cistern flush or pour-flush toilet	item	1,500	5	7,500	1.0%	75
1	Installation	item	1,500	1	1,500	0.5%	8
	TOTAL				24,000		158

Source: Rotomould and DWS

Faecal Sludge Treatment Plant (FSTP)

Treatment plant for the centralised treatment of septic tank sludge with drying bed. The CAPEX and OPEX costs are based on the costs of a similar plant implemented in India with a CAPEX cost of US$3.50 per capita and OPEX of US$1.65 per capita.

Table 11: Faecal Sludge Treatment Plant (FSTP)

CAPEX Cost Estimate						OPEX Cost Estimate	
Province	**No. Plants**	**Population served**	**Unit**	**Unit Cost F$/capita**	**Qty**	**Total Cost F$**	**OPEX / capita**	**F$ /yr**
Bua	1	16,271		7.93	1	129,045	3.74	60,836
Cakaudrove	2	50,880		7.93	1	403,529	3.74	190,235
Macuata	2	48,596		7.93	1	385,415	3.74	181,696
Tailevu	1	17,864		7.93	1	141,679	3.74	66,792
TOTAL	6	133,611				1,059,669		499,558

Source: Consultants (based on India example)

Mobile Sludge Treatment Unit (MTU)

Mobile treatment plant for use in isolated areas with low volume of septic tank sludge.

Table 12: Mobile Sludge Treatment Unit (MTU)

CAPEX Cost Estimate						OPEX Cost Estimate	
	Component	**Unit**	**Unit Cost**	**Qty**	**Total Cost F$**	**% of CAPEX**	**F$ /yr**
1	MTU	item	106,502	1	106,502	40.0%	42,601
	TOTAL				106,502		42,601

Source: Consultants

Vacuum Tanker Truck

Vacuum Tanker Truck for collection of septage from septic tanks.

Table 13: Vacuum Tanker Truck

CAPEX Cost Estimate							OPEX Cost Estimate
	Component	**Unit**	**Unit Cost**	**Qty**	**Total Cost F$**	**% of CAPEX**	**F$ /yr**
1	Vacuum truck	item	102,000	1	102,000	40.0%	40,800
	TOTAL				102,000		40,800

Source: Consultants

Mini Septage Collection Tanker Truck

Mini tanker for collection of septage from inaccessible sites.

Table 14: Mini Septage Tanker

CAPEX Cost Estimate							OPEX Cost Estimate
	Component	**Unit**	**Unit Cost**	**Qty**	**Total Cost F$**	**% of CAPEX**	**F$ /yr**
1	Mini tanker	item	11,350	1	11,350	40.0%	4,540
	TOTAL				11,350		4,540

Source: Consultants

