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Climate Resilience Pathways:

Water Security and WASH in Asia Pacific

Sanitation in challenging urban environments in the Pacific

TUESDAY 29TH APRIL – 16:00

ROOM 1 – ID20

IWC International WaterCentre

Griffith UNIVERSITY Queensland, Australia

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rise REVITALISING INFORMAL SETTLEMENTS AND THEIR ENVIRONMENTS

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Welcome and session overview

- Introductions and welcome
- WaterAid Australia – Tara Bartnik
- USP Fiji – Camari Koto
- RISE – Isoa Vakarewa
- Plan International – Tom Rankin
- Short panel session
- Close and thanks

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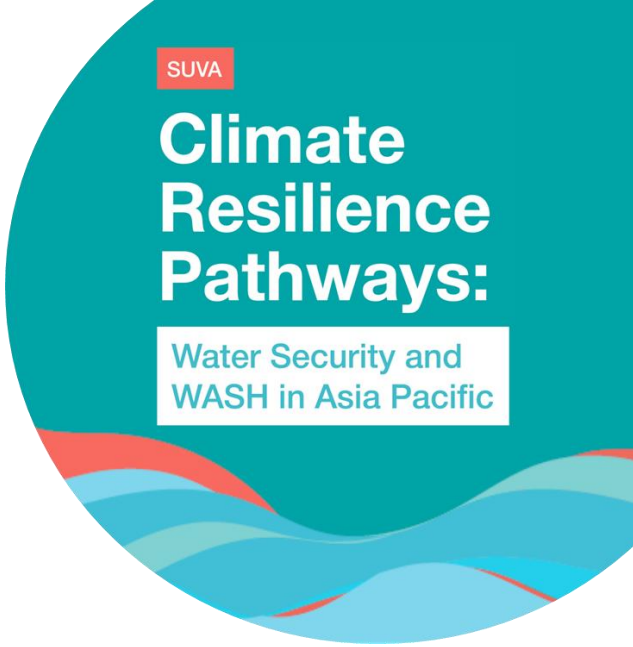

Sanitation and Climate Resilience

Highlights from Healthy Environments, Resilient Communities Report

Meredith Hickman for Tara Bartnik, WaterAid

IWC International WaterCentre

Griffith UNIVERSITY
Queensland, Australia

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UTS Institute for Sustainable Futures

Wildlife Conservation Society

World Vision®

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Pacific countries in this study

Figure 2 - The 15 Pacific countries primarily discussed in this paper

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Why climate-resilient sanitation matters

Sanitation strengthens climate resilience by protecting freshwater and marine ecosystems, food chains and human health

Hekoi Boio, 48, earns an income by spear fishing at the beach in Pari, Central Province, Papua New Guinea, April 2024.

Economics

- 1.6% of GDP annual economic losses in Pacific due to inadequate sanitation.
- $10 economic return for every $1 invested in basic sanitation in the Pacific.

Health

- 3% global disease burden associated with poor sanitation and water

Safely managed sanitation protects freshwater and marine ecosystems (e.g. wetlands, rivers, lakes, mangroves, coral reefs) by reducing the risk of pollution from human **excreta**
This improves **security of marine food chains** and **protects marine biodiversity**

Why climate-resilient sanitation matters

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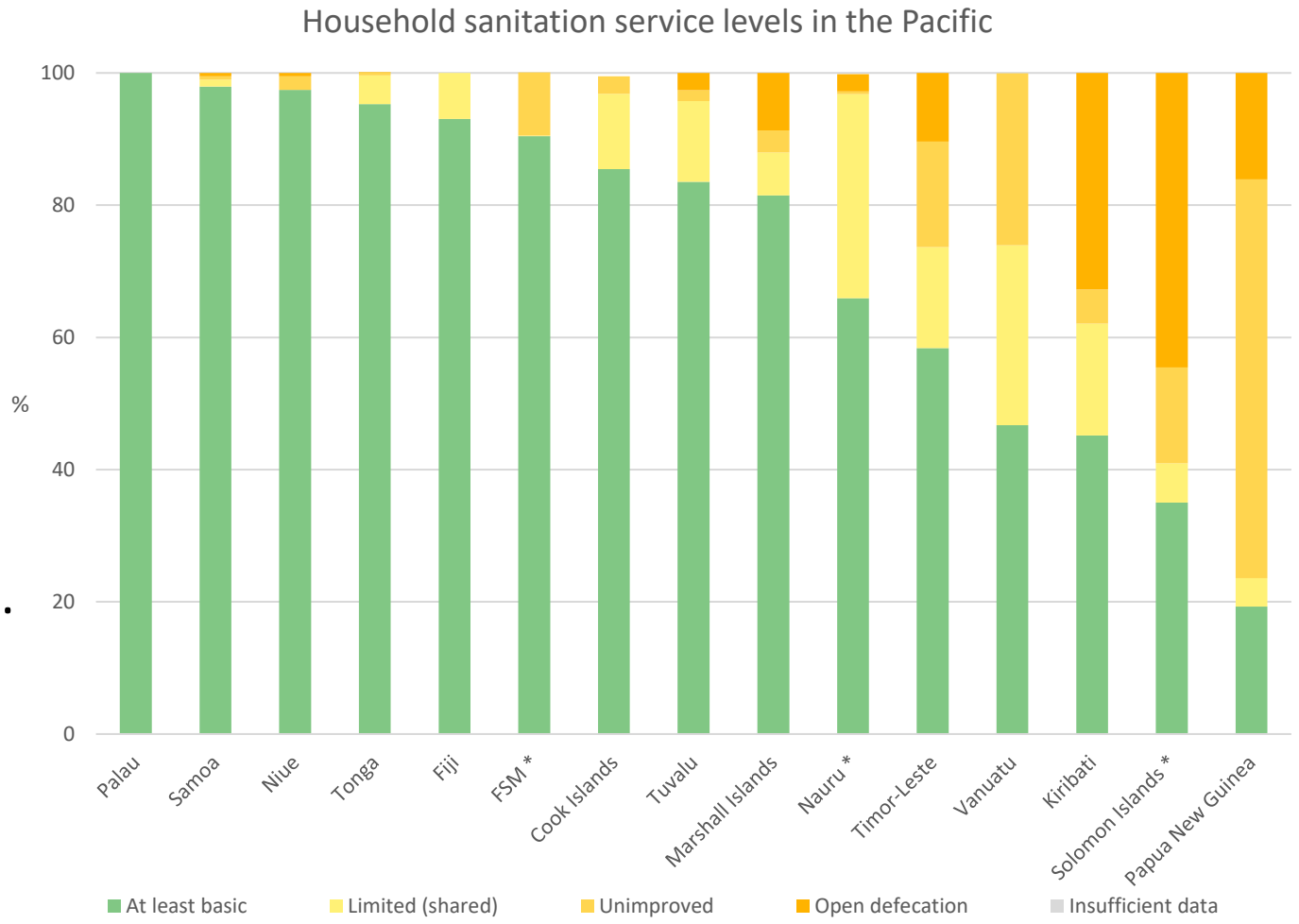
"Safe sanitation underpins the very feasibility of Pacific Island Countries ... our national and international development goals are unlikely to be met without increased advocacy and financial support for water and sanitation, which will require renewed leadership and investment at the national, regional and international level."

Pacific Island Country Statement to the 2nd Asia-Pacific Water Summit, 20 May 2013

Sanitation in the Pacific is off-track and it's not improving fast enough

- 70% of the population lack access to basic sanitation
- 40% of schools have no sanitation service at all.
- The Cook Islands is the only country with basic sanitation in most of its health care facilities.
- Sanitation gains have historically been outpaced by population growth.
- Open defecation rates are increasing in Papua New Guinea faster than any other country in the world.



Urban sanitation in the Pacific is off-track and it's not improving fast enough

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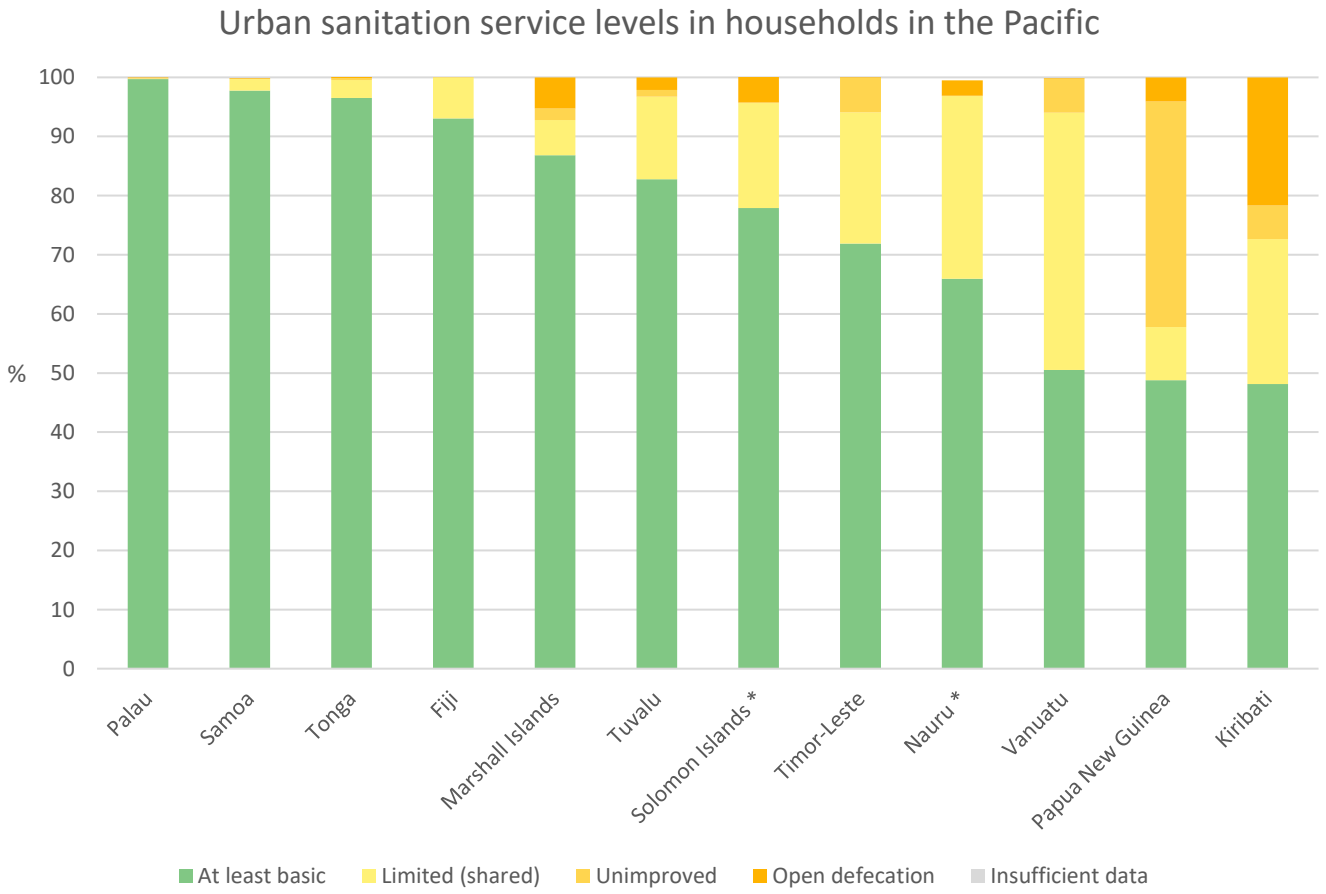
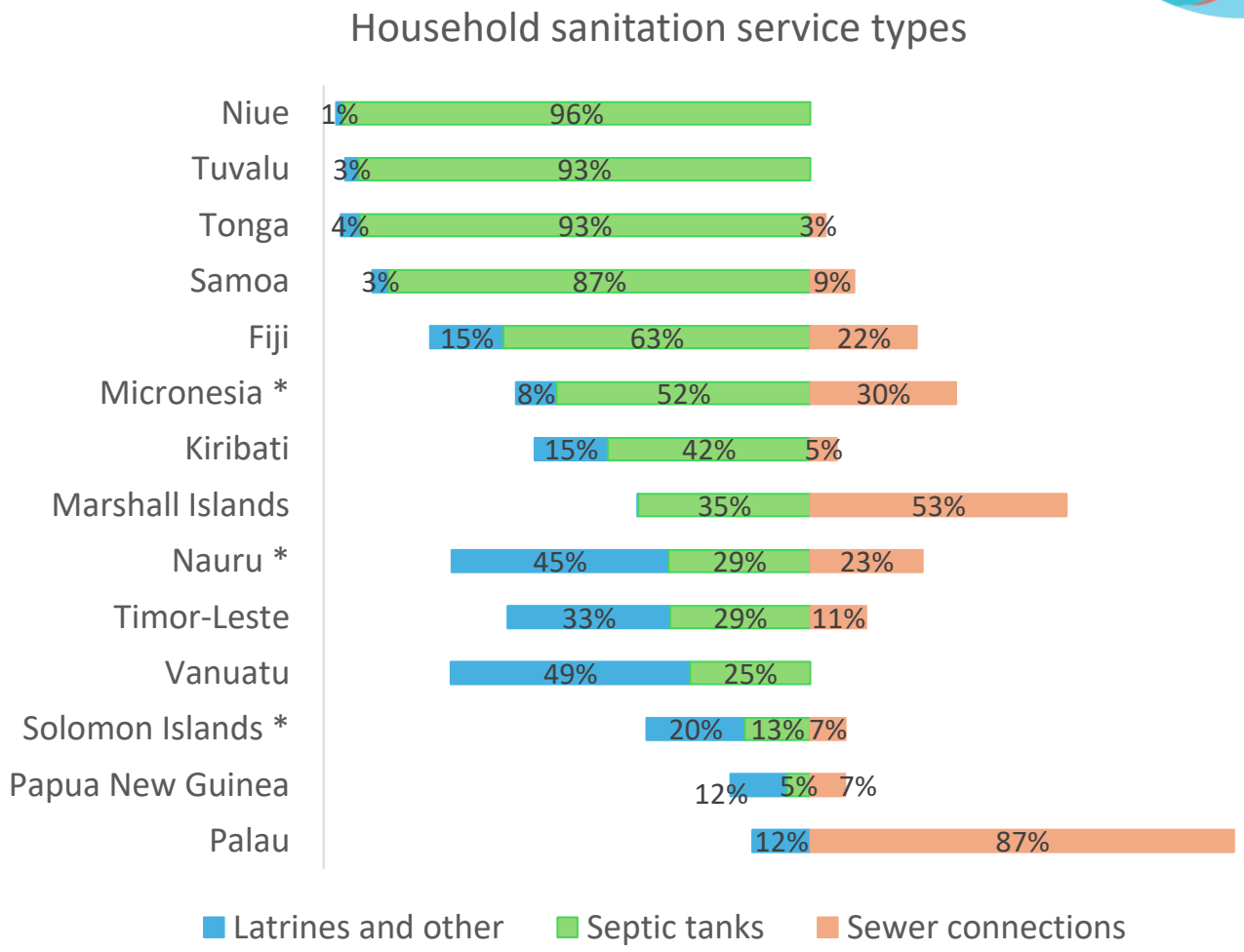


Urban sanitation in the Pacific

- In many Pacific countries there is a stark divide between urban, peri-urban and rural sanitation services.
- Urban populations (except Tuvalu) are much more likely to have access to basic sanitation services than rural populations. This is particularly pronounced in Kiribati, Solomon Islands and Papua New Guinea.
- Urban areas are more likely to be serviced by sewered sanitation.



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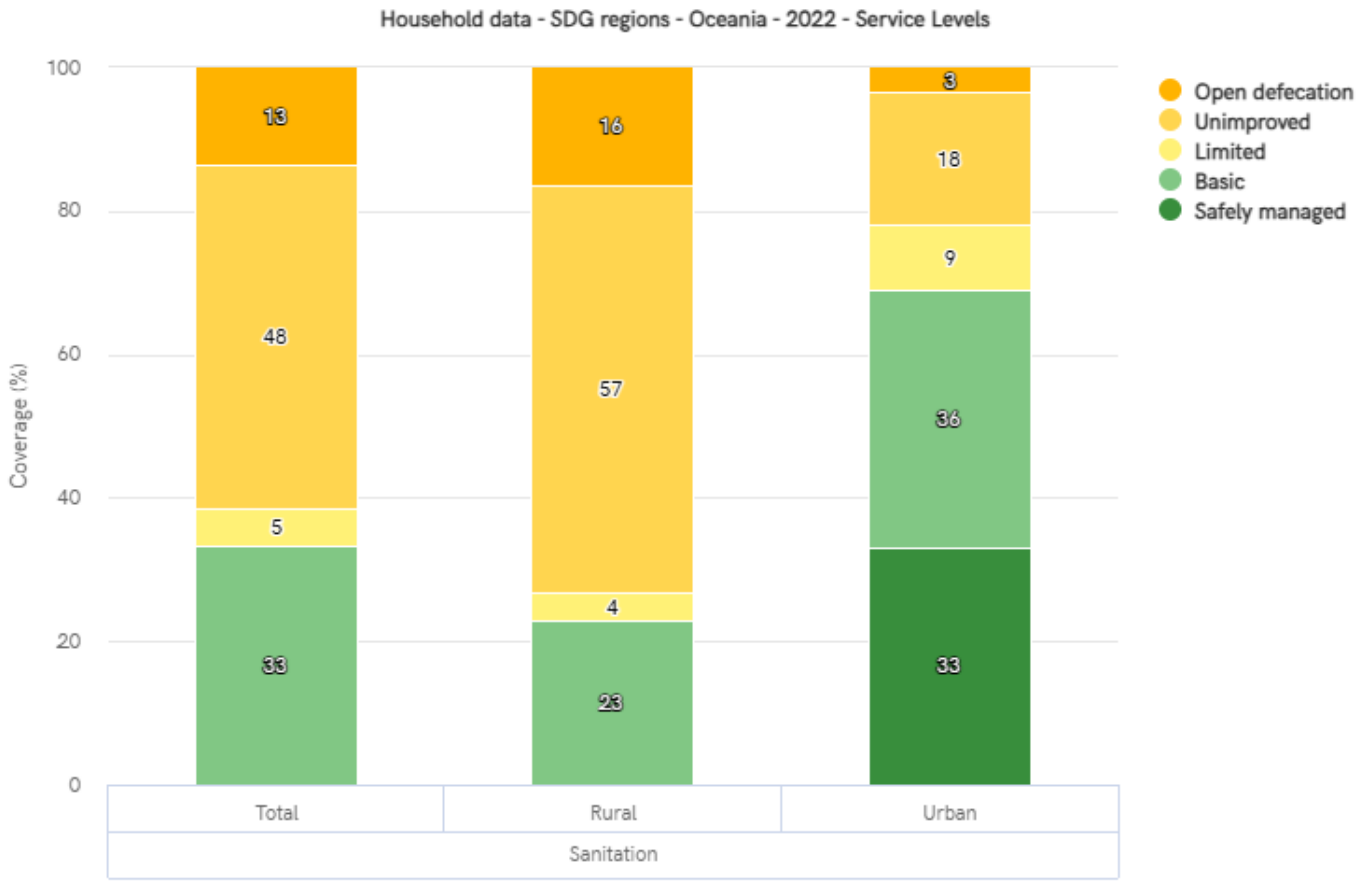
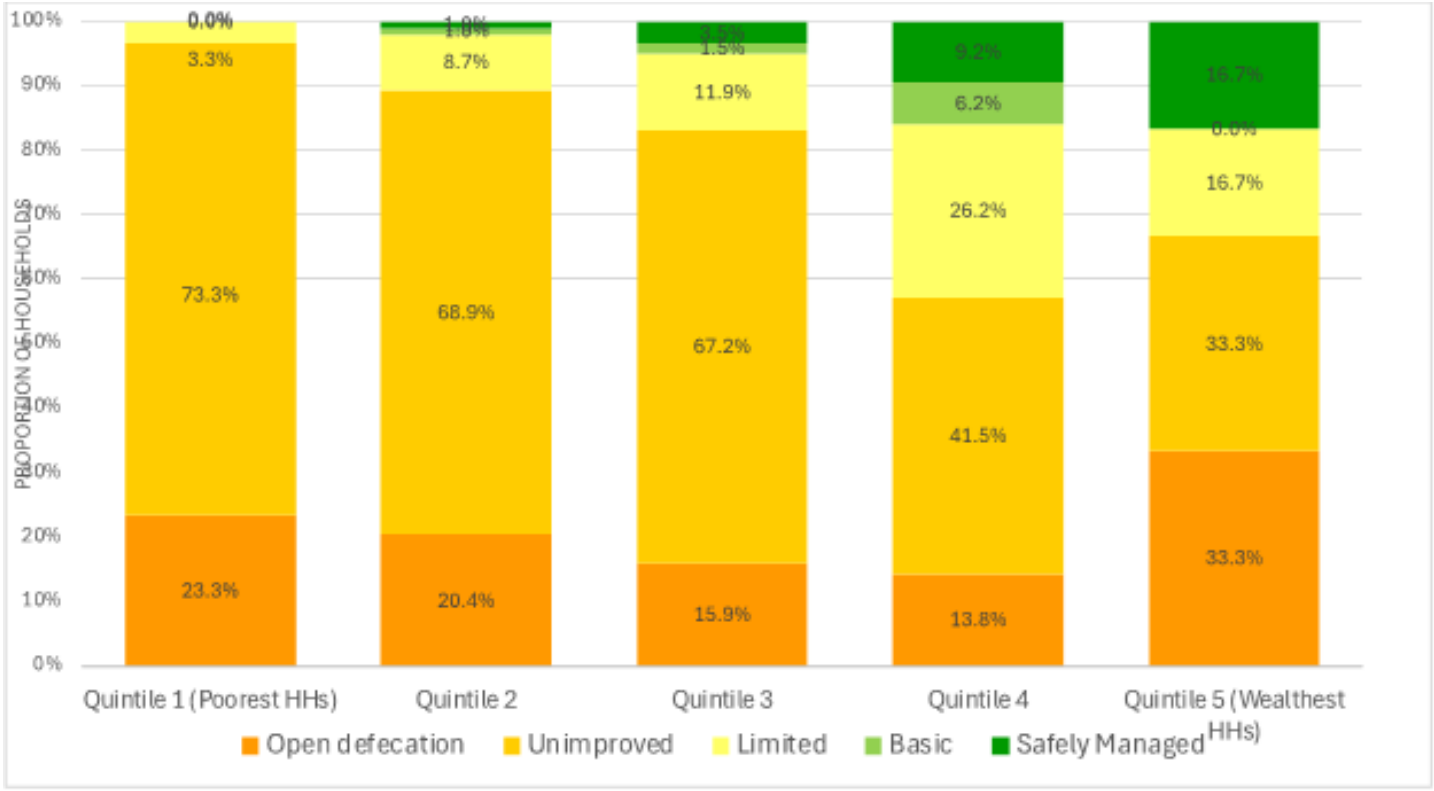


Peri-urban sanitation in the Pacific

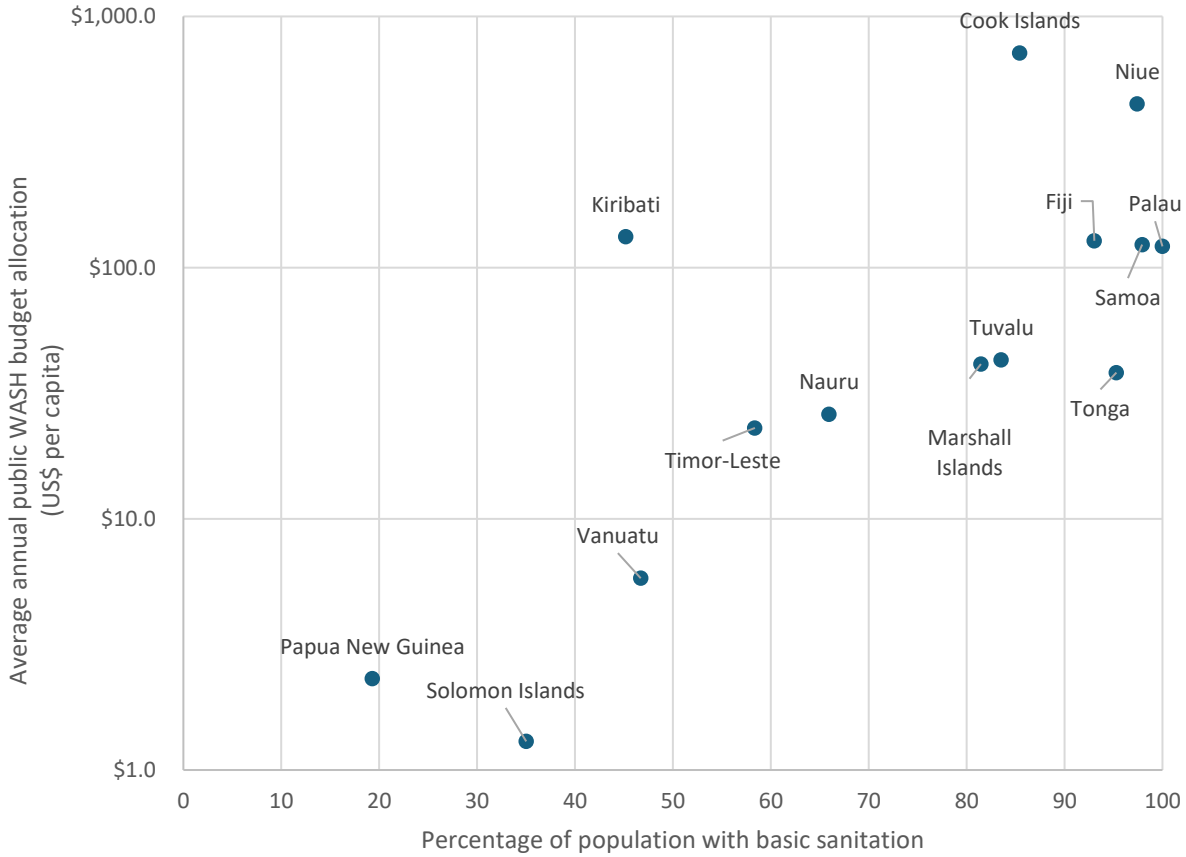
WaterAid's experience in PNG shows:

- A range of socio-economic enablers influence sanitation status
  - Land tenure and ownership
  - Geography
  - Housing permanency/quality
  - Safety and security concerns
  - Wealth quintiles
- Household wealth typically correlates to sanitation service levels



Enablers to get sanitation back on track

- Political prioritisation
- Underinvestment
- Challenging geographies require contextually-appropriate sanitation technologies
- Market access and costs of doing business
- Cultural taboos
- Social structures and norms



What can be done

Pacific Island Governments can:

- Increase per capita investments in sanitation, especially focused on mobilising household investment
- Lead the development of national sanitation roadmaps
- Convene sanitation actors in their country to map the appropriate sanitation service models
- Prioritise sanitation in funding requests to donors especially for basic sanitation services.
- Consult widely and identify vulnerability hotspots to climate change risks.

Funders and donors can:

- Fund a Pacific sanitation coalition
- Support capacity development of government and sanitation service providers
- Fund upgrades to wastewater and faecal sludge treatment plants, serving urban centres
- Increase the proportion of funding dedicated to basic sanitation service systems, including within climate financing commitments and Loss and Damage funding.

Climate change causes significant economic and non-economic impacts on sanitation

Economic Losses:

- Income
- Physical Assets

Non-Economic Losses:

- Individuals
- Society
- Environmental

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Further reading and resources

Sanitation protects freshwater and marine ecosystems and food chains

- Scan the QR code below to access full report, policy briefs and future resources:

For further information contact:
Fraser Goff – fraser.goff@wateraid.org.au

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Climate resilient urban sanitation

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Exploring the sanitation situation for residents in informal settlements in Suva and Port Vila

Camari Koto

Researcher and Lecturer

University of the South Pacific, Fiji

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UPNG

UACS www.uacs.com.au

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Context to our research

What data, information, communication and tools can support **planning (decision-making) for improved (climate-resilient & inclusive) water and sanitation in urban informal settlements**?

Research methods – activities and data

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Settlements (case study locations)

Household survey

Focus Groups – targeted issues

Water quality monitoring

Participatory GIS mapping of hazards

Mapping & risk assessments - piped water

Water & sanitation services

Impacts of water & sanitation services

local knowledge & experiences wrt service & resilience

Local & climate hazards

Spatial data (remote sensing, open sources)

- Settlement locations
- Local & climate hazards (flooding, sea level rise)

Planning tools

- GIS to integrate & understand w/s services and resilience
- Localised framework of resilience of different water & sanitation services
- Participatory / collaborative planning (Case study application - Fiji

Political economy

- Political economy analysis (WASH in unplanned urban settlements – Vanuatu, Fiji)
- Public media content analysis – what are people in society saying, what are leaders saying?

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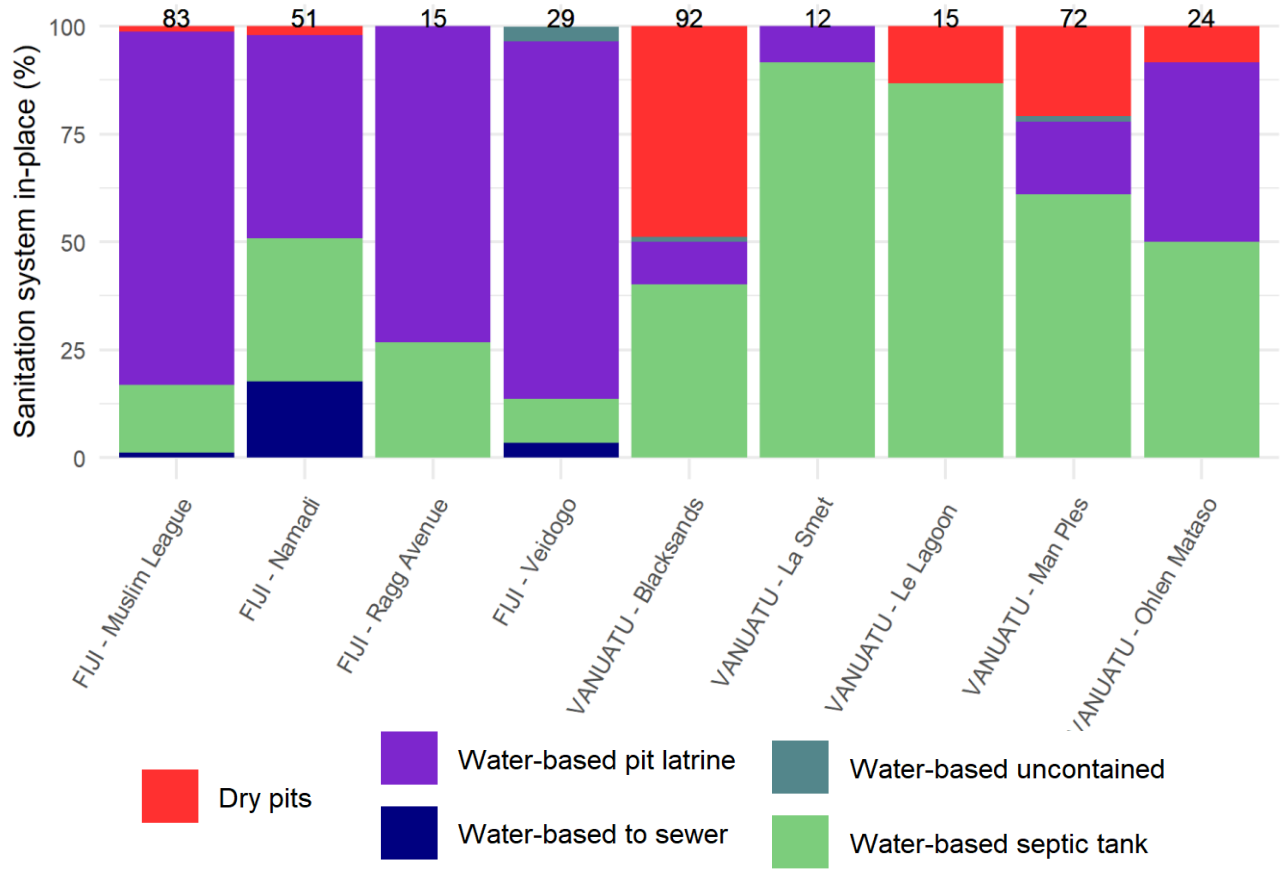
Research snapshot - what we found

Based on the multi-country survey across 9 settlements in Fiji and Vanuatu:

- Over **70%** of sanitation systems rely on **on-site solutions**—mostly poorly constructed or maintained pit latrines and septic tanks.
- In many cases, these systems **do not adequately contain or treat waste**, especially during heavy rain or flooding.
- Less than **10%** of households reported any form of faecal sludge management (FSM) services.
- High **variability between towns** in both sanitation access and FSM services, but common themes of informality and risk.



Research snapshot - what we found

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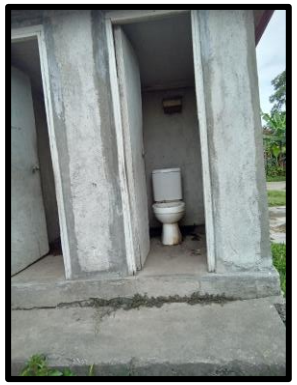
~10% of respondents did not know what system they relied on *i.e. mismatch reported vs observed*

- ***Fiji:*** Mostly **waterbased pit latrines**, followed by septic tanks and some sewer connections (in settlement outskirts)
  - ~ 11% sharing of toilets with other households
- ***Vanuatu***: Primarily **septic tanks**;
  - **Dry pits** present in most settlements and more common in **Blacksands (~50%)**, with **half lacking adequate slabs**
  - **~ 64% of households share toilets**





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Climate risks – sanitation under pressure

- ***Fiji***: Reported **sanitation impacts** were **low**, except **Veidogo**, where **~25%** reported **minor damage** from floods, heavy rain, or cyclones
- ***Vanuatu***: **Higher report of impact**, with **20-50%** of respondents across all settlements reporting **moderate to severe damage to sanitation systems**

***Vanuatu*: Dry pits were 80 to 90% (4:1 to 8:1 odds) more likely to sustain moderate or heavy damage compared to septic tanks, especially from cyclones**

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Climate risks – sanitation under pressure

"For hygiene it is a big topic and regarding this place we are crowded and we have no space to keep the place clean. When we have a sunny day, this place is fine but when it rains this place is very muddy. For my view like in terms of hygiene here is not really good." *(male: Vanuatu)*

"We have been using flush toilet before but then cyclone Judy and Kevin came and destroyed everything and the toilet tank was also destroyed and we didn't fix it until today and now we are using pour flush toilet." *(female, Vanuatu)*

Photo: Silke von Brockhausen/United Nations Development Program
https://www.abc.net.au/listen/programs/futuretense/after-pam:-vanuatu-struggles-to-rebuild/6686574

Participatory planning in practice

- Undertook several participatory approaches to integrate both local and climate-linked risks into WASH planning at the community level (e.g. photovoice, participatory planning, PGIS mapping)
- Example: In **Fiji**, community mapping exercises revealed “hotspots” where sanitation systems were routinely failing and Photovoice revealed other sanitation challenges.
- These tools helped **communities think through actions**—e.g., raising latrines above flood levels, improving FSM services, and planning for inclusive sanitation.

Climate resilience is challenging – but imperative!

URBAN (FORMAL) HOUSEHOLDS

Climate-linked hazards
e.g. sea level rise, heavy rainfall, storms

→ Impacts on water / sanitation service

URBAN INFORMAL SETTLEMENT HOUSEHOLDS

Climate-linked hazards
e.g. sea level rise, heavy rainfall, storms

\+

Local (on-site) hazards
e.g. poor drainage, sub-standard housing, unsafe sanitation waste containment

\+

Sub-standard water / sanitation infrastructure and services
(e.g. unprotected water pipes, vulnerable sanitation waste containment)

→ Impacts on water / sanitation service

Key messages for pathways forward

- We need **context-specific, locally-led** sanitation and WASH planning that integrates **climate risk** from the outset.
- **Data gaps** remain a major challenge—supporting routine monitoring and baseline data collection is essential.
- Climate-resilient sanitation is not just about infrastructure—it's about governance, inclusion, and planning (though we need good infrastructure!)
- The tools developed through this project offer **a scalable approach** for other Pacific Island towns facing similar challenges.

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Revitalising Informal Settlements and their Environment (RISE)

Climate Resilience Pathways: Water Security and WASH in Asia Pacific Suva Conference

Tuesday 29th April 2025

Isoa Vakarewa
Country Manager
Fiji

rise
REVITALISING INFORMAL SETTLEMENTS AND THEIR ENVIRONMENTS

rise
REVITALISING INFORMAL SETTLEMENTS AND THEIR ENVIRONMENTS

Background

RISE is a transdisciplinary research program working at the intersections of health, environment, and water and sanitation

RISE is trialing a new water sensitive approach to water and sanitation management in 24 informal settlements across Makassar, Indonesia and Suva, Fiji

Working with communities, governments, local leaders and partner institutions, RISE is co-designing location-specific solutions that integrate green infrastructure, such as constructed wetlands, to strengthen the whole-of-life water and sanitation cycle.

Underpinned by the emerging discipline of ‘planetary health’, RISE success will be measured by the health and well-being of residents – particularly children under five years of age – and the ecological diversity of the surrounding environment.

Research design

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- Randomised controlled trial (RCT)
- 24 informal settlements: 12 in Suva, Fiji and 12 in Makassar, Indonesia.
- 2 Demonstration sites: 1 in Suva, Fiji and 1 in Makassar, Indonesia.
- Environment and human health monitoring in all settlements for 24 months post-construction (intervention) to monitor and assess the effects.
- Study scope: 990 houses; 4,798 people. (Suva)

More than just water and sanitation.
A holistic approach to urban water management

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- Toilets
- Pressure Sewers
- Waste Water Treatment
- Improved Access and Pathways
- Drainage Improvements
- Flood Management

Designing with the community

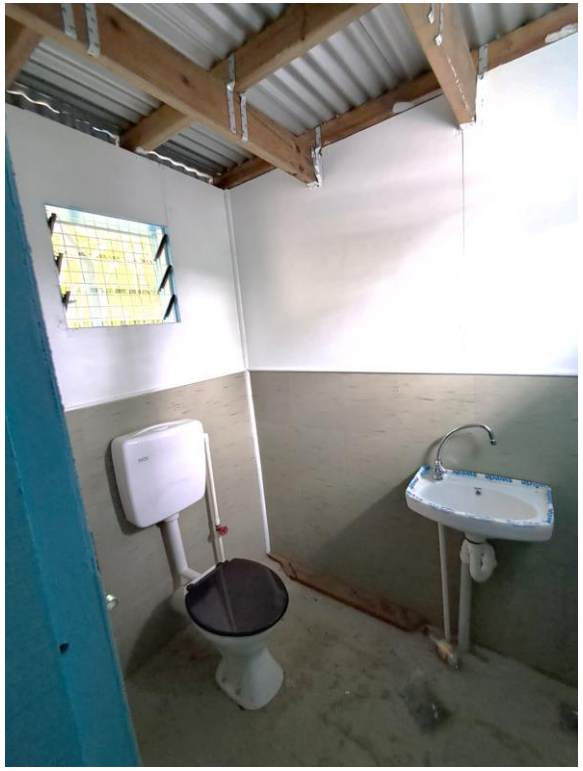
RISE uses a participatory design approach, where residents are partners in planning and design

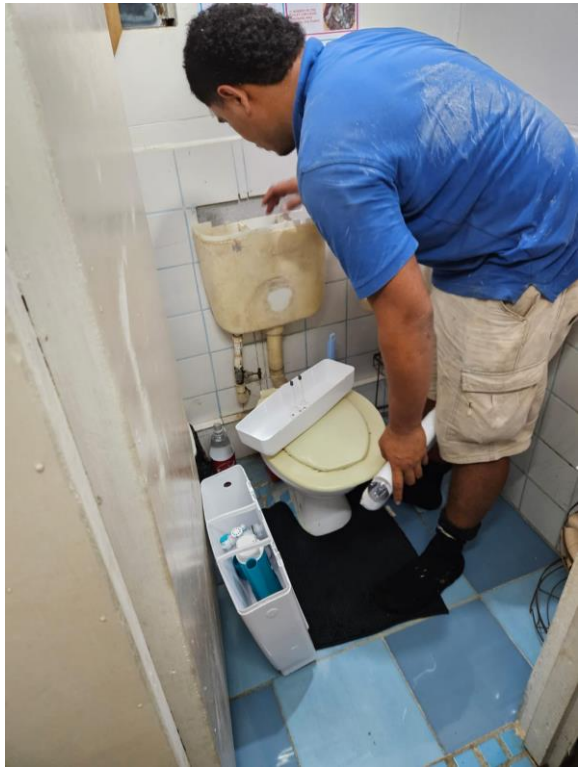
Existing conditions

Significant contamination in the surrounding environment, from both internal and external sources

Very high density, with most houses using ‘informal’ septic tanks

New Toilet Construction & Toilet Repairs

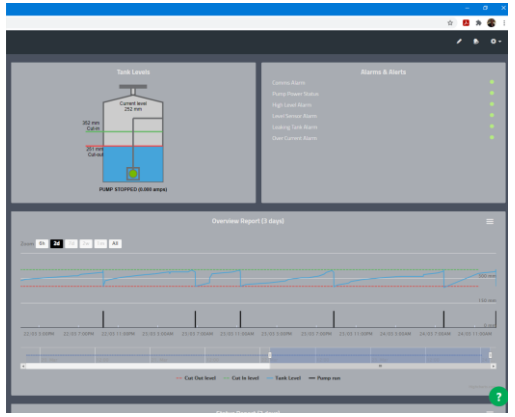




Providing a safe and hygienic toilet to those that don’t have one

Ensuring everyone can be connected to the sanitation system and all wastewater can be collected

Pressure Sewers



Collect waste and pump to sewer or decentralised WW treatment wetland

Informal settlements are typically in low lying areas, with high density, and therefore pumping is required

Smart controllers allow remote monitoring of the sewer network and early troubleshooting

Communal Septic Tank and Treatment Wetlands

Provide local wastewater treatment when sewer connection is not possible

Infrastructure is climate resilient and provides opportunity for urban greening

Improved Access

Reduces exposure to contamination in the surrounding environment

Improves accessibility during the wet season

Improved Drainage

Reduces ponding of stagnant water after rainfall, reducing vector habitat

Reduces community exposure to poor quality water in the drains

Flooding

Improves residents ability to cope with flood events

Key Takeaways

- An integrated approach to service delivery can **concurrently address multiple issues** that impact human health
- Nature-based solutions (NBS) can deliver **basic urban services and have many co-benefits**, including environmental protection and resilience to climate change.
- Decentralised NBS **are scalable and can be delivered in relatively dense environments** and informal settlements.
- Participatory approaches are crucial in ensuring **long term sustainability** of such initiatives.
- Engaging the community fosters **genuine local ownership of assets**, which is essential for the proper maintenance and acceptance of new infrastructure
- In informal settlements, **retrofitting infrastructure poses unique challenges** and necessitates additional contingencies in both time and budget.
- Adopting comprehensive strategies ensure **projects can better align with community needs** and promote sustainable urban development.

Vinaka Vakalevu

Web: www.rise-program.org

A partnership between:

MONASH University

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Rémi Kaupp, director – CBSA

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Improving sanitation in informal settlements in Honiara, Solomon Islands

Tom Rankin

Plan International Australia

ADB ASIAN DEVELOPMENT BANK

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LIVE&LEARN Environmental Education

Solomon Water Safe water for a healthy nation

Sanitation in Honiara

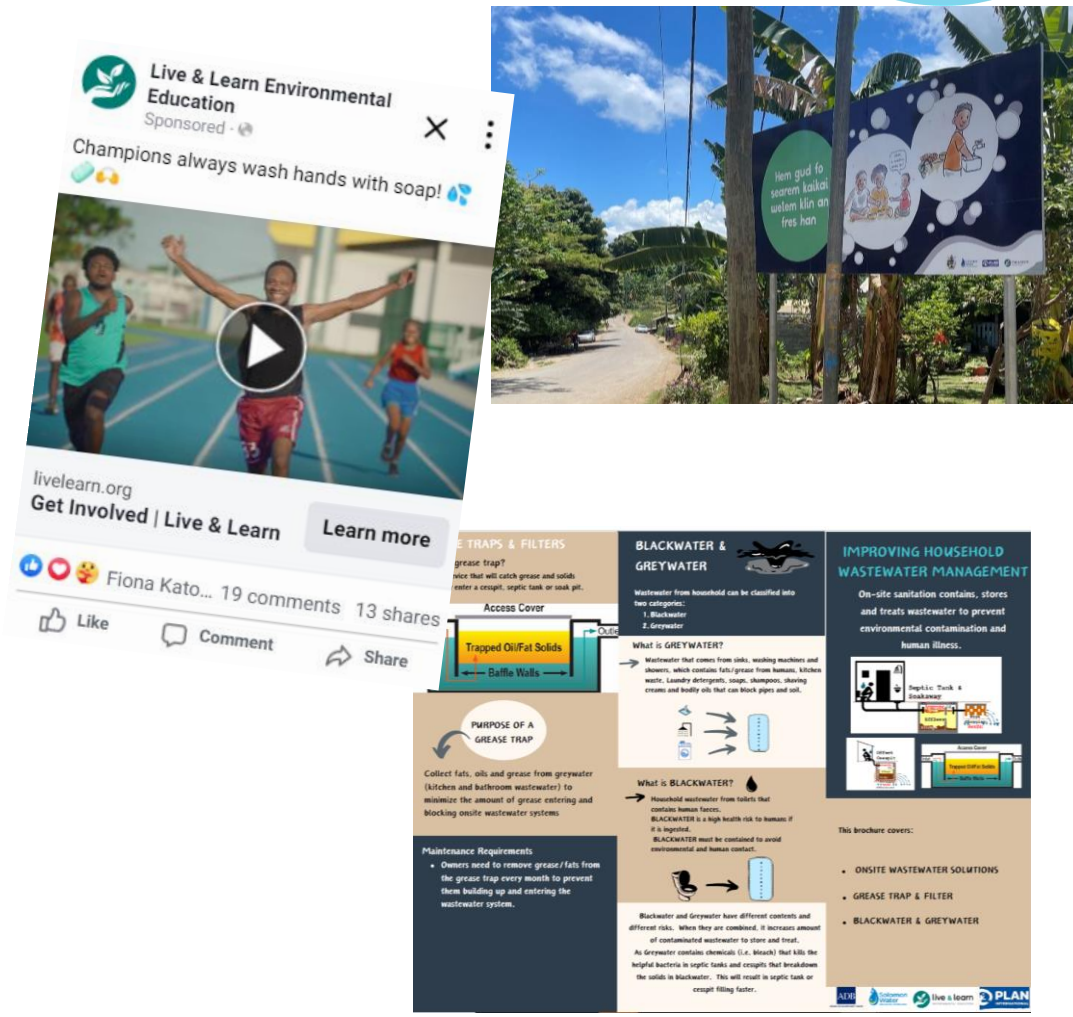
- Urban Water Supply and Sanitation Strengthening Project
  - aims for 30% piped sewer by 2030
  - On-site sanitation critical
  - Water improvements to settlements

- Informal settlements are permanent

- Strong preference for water-based toilets
  - 89% toilet ownership
  - 48% household toilets usable
  - Environmental challenge increased by climate change

Improving sanitation in Honiara's settlements

- Key elements of program
  - BCC
  - Sanitation manual
  - Training local plumbers
  - Sanitation Competition
  - Sludge tests



Sludge tests

- Collaborating with Ministry of Health laboratory
- Tested household cesspits and septic tanks
- Compared to septic tanks, cesspits have
  - Higher density
  - Slower sludge accumulation

- Cesspits are;
  - lower cost
  - use less land
  - Low skill construction
  - anaerobic

Sanitation manual & plumber training

- Technical manuals for septic & cesspit design
- Construction manual for households
- Plumbers technical training
- Awareness raising materials
  - Cesspits
  - Septics
  - Blackwater & greywater

Sanitation competition

- Desirable prizes to attract interest (mobile phone)
- Any level of ‘sanitation improvement’ required for entry
- A transparent lottery draw for prizes
- Community events to draw winners and share stories
- Photo display of toilet improvements

Lessons and recommendations

- Face to face engagement is key
- Low-cost options can be effective
- Competition motivated change
- Many households are motivated
- Finance remains a barrier

Tangio tumas!

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