

POLICY BRIEF

Opportunities for collaborative and integrated planning processes for climate-resilient urban WASH in informal settlements

DECEMBER 2022



KEY MESSAGES FOR POLICYMAKERS

Current status

- There are existing **urban planning processes in Melanesian cities**, however they are often **reactionary, out-dated**, and **siloed** from development requirements of specific sectors.
- Those with **responsibility for urban planning mostly don't consider themselves to hold a mandate to be involved in WASH (water, sanitation and hygiene) service planning, or informal settlements**, and water utilities **mostly don't consider themselves as leaders in planning WASH services in informal settlements due to tenure and urban planning constraints**. There are examples of this changing.
- Existing **planning processes for WASH in urban Melanesia mostly don't integrate climate resilience and adaptation information, activities and impacts**.
- There is some **progress being made in Melanesian urban informal settlements with respect to formalisation and upgrading**: Fiji is currently formalising 46 settlements across the country including service provision, Solomon Water has connected over 2,800 households in settlements to piped water in the last year, Papua New Guinea's new Port Moresby Urban Development Plan describes their ongoing settlement upgrade process, and Vanuatu's urban wastewater taskforce is considering sanitation in urban settlements. Notwithstanding progress, **WASH services remain very unevenly distributed** across Melanesian urban centres, particularly in urban informal settlements.

Opportunities

- **Identification of climate-resilient water and sanitation service delivery models should be place-based** and consider user preference, site suitability, and long-term sustainability along the entire service delivery chain. WASH service providers, especially utilities and on-site service providers, need to participate in and collaborate on informal settlement improvement programmes and **partner with civil society or faith-based organisations to improve outcomes for WASH** and break down silos.
- In particular, **service providers need to come together to ensure city-wide service coverage** is achieved through a combination of service delivery options that suit local settings. City-wide inclusive sanitation (CWIS) (and water provision)



FIGURE 1: RESIDENT'S TOILET IN INFORMAL SETTLEMENT IN PORT VILA

URBANWASH RESEARCH PROGRAM

The **Planning for Climate-resilient Water, Sanitation and Hygiene in Urban Informal Settlements** research objective was to investigate how urban planning processes in Melanesia be strengthened through participation and integration to improve the resilience of WASH service delivery in informal settlements within the urban footprint. By doing this, we seek to increase the inclusiveness of WASH planning in urban Melanesia so residents in informal settlements have access to more resilience WASH services.

This study provides regionally appropriate evidence about what kinds of processes and systems could be explored within different urban contexts in Fiji, Vanuatu, Solomon Islands and Papua New Guinea. The mixed methods research included surveys, interviews, photovoice, and stakeholder engagement to understand existing WASH services and preferences, urban planning approaches and the existing political economy of the provision of urban WASH

Based on this 1-year research program, several key lessons have emerged for practitioners and policymaker. This Policy brief outlines some of the most important.

More information about the research program can be found here: [APPLIED RESEARCH WEBPAGE](#)

is a model that can help decision-makers prioritise action to achieve this outcome.

- Advocates for improving services to urban informal settlements through integration with urban planning can be found across a broad range of sectors. **These advocates need to be provided with the space to share solutions and support each other in their advocacy.**
- **Datasets and spatial tools to support climate-resilient urban planning and WASH planning are becoming more widely available, shareable and applicable** – for example SPC's Nexus platform, Open Street Map and QGIS tools. Governments and utilities must ensure their staff are sufficiently supported to take advantage of such tools.
- The **lack of local climate hazard data**, of sufficiently fine resolution needed for local WASH service planning, can be **compensated for with local experience and knowledge of residents.**

- WASH planning and analysis tools such as **shit-flow diagrams, WSP/SSP and WASBATS** can be useful advocacy and communication tools to share with those that have urban planning responsibilities, as a way to break down sectoral silos and join development agendas.
- Sanitation by-laws and building codes, as part of urban planning processes, should be strengthened or developed in urban areas that consider not just safely managed sanitation service options including onsite sanitation, but also climate resilience of services. **Instruments could be developed as part of an integrated, cross-department collective or taskforce, such as in Port Vila, to increase buy-in from diverse stakeholders.**
- Affordability of planned WASH services and urban planning upgrades is vital to be accessible to the most vulnerable residents in informal settlements. Financing options like **prepaid water** and **small-scale sanitation loans** are two examples.
- There is opportunity to take advantage of **significant amounts of increased climate financing** for programmes in the Pacific, from several global and regional funding agencies, to tie provision of resilient WASH services in informal settlements to the climate change agenda.
- Tackling planning for informal settlements will require **political will, integration across key ministries and service providers, local community participation, and diversity in solutions.**

EXISTING URBAN PLANNING PROCESSES FOR WASH NEED UPDATING AND TO BETTER CONSIDER CLIMATE RESILIENCE

The integration of urban planning and public health, including WASH sectors and professionals, is an ambition once lauded as strong; *“That this miracle of **collective political will, urban planning and engineering bravura** is so much taken for granted is a credit to the public health engineers, planners, civic administrators and politicians who made it possible”* (Evans and Mara, 2011, p.8). However, as we face increasing urbanisation and climate change, and this integration is even more critical, it is failing to deliver outcomes for citizens, including city-wide access to improved water, sanitation, and hygiene services.

In many cities it might be all three aspects that are failing – a lack of political will; outdated or ineffective urban planning processes, and inappropriate engineering solutions – overlaid with challenges of insufficient financing, social norms, and competing priorities. Further, some have suggested urban planning and public health including WASH have been diverging in scope and objectives over the last century, although recent events such as the ongoing Covid-19 pandemic appear to be going some way to reconnect the two (Chigbu & Onyebueke, 2021; Corburn, 2009; Mitchell, Barth, Ho, Sait, & McEvoy, 2021).

Across Melanesia, urban planning is not keeping up with the fast pace of urbanisation that has been occurring in cities like Port Moresby, Suva, Honiara and Port Vila (Trundle, 2020). Much of this urban growth has resulted in the expansion of urban informal settlements across the cities and on their peri-urban fringes, all developed outside any formal planning processes or development strategies. Town planning processes do exist across the four countries and cities but are insufficient; for example, the Suva town plan has not been updated since 1979, and Port Vila’s 2016 zoning plan is yet to be gazetted for use. Neither are specific about water and sanitation services aspects.

Despite the general disintegration of urban planning and WASH, there are examples of how governments and service providers are attempting to approach such issues to achieve better outcomes for settlement residents:



- In 2020, the National Capital District Commission (NCDC) of Port Moresby released “Port Moresby Towards 2030 – One City, One People, One Future” which identified a vision and key priorities to make Port Moresby a ‘liveable’, ‘productive’ and ‘sustainable’ city. One focus for the Port Moresby Plan is to turn ‘urban village’ settlements into suburbs as part of a connected and strategically planned city – a planned upgrading of urban informal settlements that includes subdivision, land titling and service provision including WASH.

When we talk about urban planning, we mean both the planning model (could be rational, pragmatic, collaborative, advocacy based or others – see ISF-UTS and SNV (2016) for more details), as well as the planning support systems that underpin the model and allow it to be functional. Planning support systems (PSS) are seen as frameworks of integrated systems of information and technology-based instruments to support a planning task – they might include planning or zoning schemes, datasets, geographical information systems (GIS), public participatory GIS, participatory methods for data collection, communication forms and other tools and instruments (Geertman & Stillwell, 2013). All of these are relevant to WASH – in that such systems allows all stakeholders to share a consistent basis required for infrastructure development and service provision.

Importantly, urban planning processes should have mechanisms to include so-called “informal” structures and knowledge – because we know innovation and adaptation on the household and community scale can be amongst the most effective and sustainable in the face of climate change (Trundle, 2020).



- In Fiji, the government is upgrading 46 settlements on iTaukei land in a process called the Informal Settlement Upgrade and Formalisation Programme (ISUP). Five have been completed, and nine are currently under development. The process includes on-site upgrades, 99-year leases and service provision.
- The Pacific Community (SPC), New Zealand's National Institute for Water and Atmospheric Research (NIWA) and ADB in 2015 was leading training and capacity building for national and municipal government representatives in climate and disaster resilience of urban development planning in Fiji and Port Vila, including the use of hazard and risk identification tools.

Beyond integrating urban planning and public health, there is a real need to ensure climate change information and impacts are incorporated into urban planning processes, particularly with respect to water, sanitation and hygiene services. Vanuatu is globally known as highly vocal and active with respect to climate change, and throughout all levels, from national to local government, climate change is considered. Notwithstanding, the lack of overall urban planning strategies or plans hinders the cohesiveness of the urban response to climate change. Integration of climate change considerations into urban WASH planning processes in the other three cities is not very clear at this stage, though progress is being made.

WHERE ARE THE OVERLAPS BETWEEN WASH, CLIMATE CHANGE AND URBAN PLANNING FOR INFORMAL SETTLEMENTS?

Urban planning can provide a way to choose and improve land uses by bringing together knowledge and values across a range of stakeholders. Hence, planning provides one useful tool for integrating WASH and climate change resilience, even in informal settlements where it recognises formal planning processes often are not applied. However, those with responsibility for urban planning mostly do not consider themselves to hold a mandate to be involved in WASH service planning, or informal settlements, and water utilities mostly don't consider themselves as leaders in planning WASH services in informal settlements due to tenure and urban planning constraints, although, there are examples around Melanesia of coordination between different areas of government when it comes to informal settlements. For example, under the Fiji Informal Settlement Upgrading Programme (ISUP), the Ministry of Housing lead the process and make determinations around what is required, and application is then made to the Water Authority of Fiji (WAF) to support connection of water (and in some cases sanitation) services. In Honiara, Solomon Water have been taking the lead in providing or stimulating water connections and onsite sanitation services in settlements across the urban landscape, in some cases using the Temporary Occupation License scheme to sidestep tenure concerns. The Honiara Planning Scheme also provides recognised mechanisms for Solomon Water to engage with new subdivisions and existing settlements.

Land use planning and zoning plans can provide stakeholders including community members a common basis for the expectations for development in a city. Zoning plans have been criticised as being too focused on rational planning approaches and dismissive of community engagement (ISF-UTS & SNV, 2016), however there is no mandate to require a zoning plan be developed in this way. More participatory approaches can lead to better outcomes, particularly when involving not only residents and commercial land users, but also service providers such as water authorities and private operators. In this way, collaborative or transactive planning approaches, pioneered by Hudson, Galloway, and Kaufman (1979), with more focus on the process rather than the plan, and the relationships rather than the outcomes, could be more useful in arriving at a broad consensus over land use planning in Melanesia.

Cities are situated within one or more water catchments, and thus urban areas and services are affected, and have effects upon, local natural resources; climate change is influencing the nature of these interactions. In Suva, Honiara and Port Vila, the main water sources for the central city supplies are drawn from water resources in their catchments, e.g., Suva relies on offtake from the Rewa river, Port Vila and Honiara rely on shallow borefields. Activities in the catchments, including logging, heavy industry as well as inadequate sanitation, can lead to contamination of these water resources.

Contamination from inadequate sanitation can be significant in informal settlements, where a lack of access to emptying, disposal, and treatment services across all cities under this research contributes to issues of overflowing and leaking septic tanks and pits. Recent research by IWC and USP found that more than 70% of informal settlement residents surveyed across Suva, Port Vila and Honiara had an onsite sanitation model that included a tank or a pit, however only 1.3% of households in Suva and 9.8% of households in Honiara reported ever emptying their containment unit (soon to be published). During drought conditions,

lower river flows and groundwater levels may increase the impact and concentration of these sorts of contaminants. Storms, flooding and sea level rise are also influencing contamination; many residents in settlements were concerned with increasing king tides and localised flooding spreading such contamination throughout their settlement area (Figure 2). Linking urban planning with catchment planning is increasingly critical as climate change hazards such as droughts, storms and floods, influence the water-mediated links between catchments and urban areas.

Urban planning approaches will also be integral in improving faecal sludge management in Melanesian cities. For example, currently, private operators in both Suva and Port Vila cite a lack of road accessibility in informal settlements for trucks to reach septic tanks for pumping out. The Honiara Local Planning Scheme includes road design standards for Temporary Occupation License sites – most of which are in informal settlements – which “should be applied flexibly while still observing the minimum standards” of 3m wide instead of 4m wide. Planning processes will also be required when siting and designing the septage treatment or wastewater treatment infrastructure that is required.

In Fiji, stakeholders raised climate change in urban planning as an important, and by some opinions “new”, consideration, including mentioning how sea level rise is being addressed in part through mandated floor heights. The focus appears to be on resilience, but there is some mention by stakeholders of mitigation also, as well as cross-agency work. It is recognised that by very definition informal settlements rarely adhere to building codes and standards, however such changes to planning instruments can and should be applied in the upgrading and redeveloping processes that some countries have commenced to ensure the upgrading also considers climate resilience. This needs to be extended to WASH service delivery models, whether in the form of updated by-laws, such as in Port Vila, policy positions or project programming.



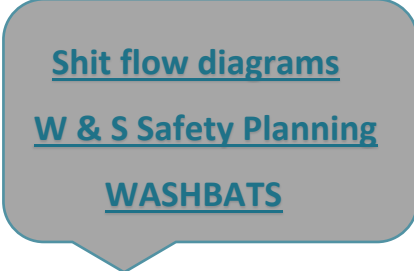
FIGURE 2: STAGNANT WATER IN URBAN INFORMAL SETTLEMENT IN SUVA

DATASETS AND TOOLS ARE BECOMING MORE WIDELY SHARABLE AND COLLABORATIVE

In terms of planning for climate resilient water and sanitation service delivery in the urban environment, a greater uptake of spatial planning using digital tools, and integration of the same with urban planning processes, is required. The existence and expansion of informal settlements in Melanesian cities is unlikely to cease in the near future, however staying current on locations, extents and service provision needs across the urban expanse is not possible without spatial data and planning. Governments and regional organisations across Melanesia are increasing their spatial analysis and GIS capabilities, and it is important for water and sanitation planners to be aware of data from other areas, such as the disaster risk reduction and resilience sector. Integrating these sorts of data into WASH planning can avoid the need for additional data collection and curation. The existence and expansion of cross-department GIS-users’ groups, observed in both Port Vila and Suva, as well as Pacific-led GIS conferences, are encouraging steps.

In particular, it is becoming increasingly common to overlay climate hazard data with maps of urban areas to increase preparedness and planning for resilient services and infrastructure (REF). A range of climate hazard data exists, for example, the Pacific Community (SPC) launched the Pacific Community Resilience Platform, Nexus, which holds some spatial hazard data from around the Pacific, like cyclone tracks and wind maps (Table 1).

However, planning for climate-resilient WASH services requires local-scale climate hazard information that is often not readily available; as noted earlier, climate hazards can vary on very local scales, and the options for climate-resilient service thus also vary. Local knowledge, such as from residents of informal settlements, is critical to complement coarser-scale hazard data. There are examples of citizen science, crowd-sourced data and participatory mapping in urban informal settlements for sanitation planning. In the settlement of Kibera, in Nairobi, Kenya, geospatial data from Open Street Map and the Map Kibera project were used to plan and map a proposed road-based faecal sludge management service that included 158 public toilets. In this way, settlement residents’ concerns and knowledge about land use, access and optimization of routes were addressed and incorporated (Holderness, Kennedy-Walker, Alderson, & Evans, 2016).



Other tools exist to support planning for climate resilient water and sanitation service delivery models, such as shit-flow diagrams, equitable water and sanitation safety planning, and WASH Bottleneck Analysis Tool (WASHBATS) (links provided besides). These tools can provide important data for understanding urban WASH contexts and options, and can provide useful ways to communicate WASH issues to sectors adjacent but important to WASH service delivery in urban informal settlements, such as urban planning, departments of housing, and politicians.

TABLE 1: EXISTING GIS PLATFORMS AND DATA SOURCES ACROSS MELANESIA

Location	Geospatial System/Platform	Owned / Access
Fiji	Vanua-GIS	Government access only for some elements Publicly available: https://vanuagis.lands.gov.fj/vanuaviewonline/
Vanuatu	Vanuatu Globe	Publicly available https://www.nab.vu/lidar-maps-vanuatu-globe
Solomon Islands	<i>No standalone platform apparent</i>	
PNG	PNG Environmental Data Portal	https://png-data.sprep.org/ Supported by SPC/Pacific DataHub and SPREP
Global	Humanitarian Data Exchange	Managed by UN-OCHA https://data.humdata.org/
Regional	The Pacific Hub	Managed by SPC (The Pacific Community) https://pacificdata.org/ Spatial platform https://map.pacificdata.org/#share=s-4l4STnL8mkbvVOSdaE40wZpgEOu Nexus – the Pacific Community Resilience Platform https://nexus.pacificdata.org/#/
Regional	PacGeo	Managed by SPREP http://www.pacgeo.org/
Regional	Open StreetMap for Pacific	Dataset specifically curated by SPREP for the Pacific https://pacific-data.sprep.org/dataset/openstreetmap-data-pacific

RECOMMENDATIONS TO PROGRESS COLLABORATION & INTEGRATION WITHIN PLANNING PROCESSES TO SUPPORT THE CLIMATE-RESILIENCE OF WASH IN INFORMAL SETTLEMENTS

The following recommendations were raised by respondents or emerged through the research process:

- Seek to establish clarity about which government department has overall responsibility for urban informal settlement strategy and improvement, and map out clear linkages to other departments and utilities for upgrades and service provision, including the priorities of other departments.
- WASH actors need to come to the table on informal settlement improvement programmes and partner with civil society organisations or faith-based organisations to improve outcomes for WASH and break down silos, including recognising that a diversity of service types will be necessary to ensure city-wide service coverage.
- Form a specific taskforce of relevant cross-government and non-government stakeholders with a clear mandate to address issues in WASH, urban planning and climate change. This might include collaborating on strategies, bylaws or projects.
- Utilities in Melanesia and elsewhere have preferred a single service type across their service area, but in addressing service area gaps, or expanding into new areas, they will need to offer a diversity of service models or coordinate with other service providers to ensure city-wide accessibility to safe and climate-resilient services.
- When working with informal settlement residents, consider alternative data collection and community engagement tools that are participatory and inclusive, such as photovoice, where our researchers used visual research techniques that allowed residents to communicate their own WASH and climate change concerns in their own voice; social media, for example in Vanuatu, a local climate scientist hosts the Facebook page “Vanuatu Rainfall and Agro-Meteorology Outlook” that disseminates weather and climate information to its over 49.8k members; and place-based prioritisation processes (Norman, Martín, & Artech, 2021).

- Take advantage of increased global and regional climate financing available for projects and programmes in the Pacific by connecting the provision of resilience WASH services in informal settlements to the climate change agenda. Climate change impacts can restrict or reduce access to WASH services in informal settlements, while conversely, good quality access to WASH services can increase residents' overall resilience to shocks and stress that are increasing under climate change scenarios.
- Affordability of planned water and sanitation services and urban upgrades is vital to ensure accessibility to the most vulnerable residents in informal settlements. Financing options like prepaid cash water and small-scale sanitation loans are two examples. Prepaid services are more commonly seen in the electricity sector, though Solomon Water has implemented this strategy successfully over the past few years. Cited benefits for consumers include an increased understanding of their own usage habits, and therefore more ability to conserve and control that usage; a reduction in consumption; a reduction in mistrust and misunderstanding of billing (Quesnelle, 2004). There is no reason these same benefits would not similarly apply to prepaid water services and could have the additional community-scale benefit of improving water conservation in an increasingly water insecure world. However, it is important to recognise the pitfalls of such schemes. Longden et al. (2022) found that indigenous communities in Australia using prepaid power were significantly more likely to have experienced disconnections to their power, even during times of extreme heat. Thus, any such schemes must have fail-safe mechanisms such as 'lifeline tariffs' (a very low cost of the lowest tariff level), or volume-limited free water (above the specified free volume of water, tariffs are applied), to ensure urban residents' access to safe and affordable ongoing water services is not jeopardised. It is further noted that disconnections from water services remains a possibility with post-paid billing – WAF recently made a public announcement that they would be disconnecting customers with unpaid bills – and many of the areas listed are known urban informal settlements.

Climate-resilient WASH should:

F ==> be designed, maintained, and operated to remain FUNCTIONAL under stress & shocks

A ==> be ADAPTIVE – managers, services providers and users learn about relevant risks and responses, and apply lessons

C ==> maintain and (where needed) buffer CONNECTIVITY (geographical & social)

E ==> be EQUITABLE, in recognition that existing vulnerabilities can exacerbate impacts.

D ==> have DIVERSITY and REDUNDANCY built into WASH services

Adapted from Biggs, Schlüter, and Schoon (2015)

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ADDITIONAL RESOURCES

The project has produced other publicly available resources available at <https://www.watercentre.org/research/research-impacts/planning-for-resilient-urban-wash-in-informal-settlements-in-pacific-islands>, including:

- Research brief - [Planning for climate-resilient urban WASH in urban informal settlements in Melanesia](#)
- Technical brief – [Climate-resilient and climate vulnerable water and sanitation service delivery models in urban informal settlements in Melanesia](#)
- Research report – [Policy review – water, sanitation, and hygiene \(WASH\) and climate change in urban planning systems in Melanesia \(October 2022\)](#)
- Technical brief – Pilot study – [autonomous identification of informal settlements in Pacific Islands using machine learning and satellite imagery \(July 2022\)](#)

Other resources of interest include:

- Research Brief – [Investigating the transmission of faecal pathogens in urban informal settlements in and around Port Vila, Vanuatu, recognising biophysical and demographic diversity - WASH informal settlement characterisation](#)
- Research Brief – [Investigating the transmission of faecal pathogens in urban informal settlements in and around Port Vila, Vanuatu, recognising biophysical and demographic diversity - Faecal pathogen transmission exposure typologies](#)
- Working Paper for the World Bank by Dr Regina Souter and Pablo Orams: [Water and Sanitation Services for Informal Settlements in Honiara, Solomon Islands](#)

SUGGESTED CITATION

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Cover images: Front: R.Sanderson (Data collection activities in Blacksax, Port Vila). Below: P.Wells (Septic tank in Port Vila)



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