

Holistic Approaches To Improve Environmental And Public Health In Informal Settlements In Makassar, Indonesia

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INDONESIA



**WATER
&
WASH** 2023
FUTURES

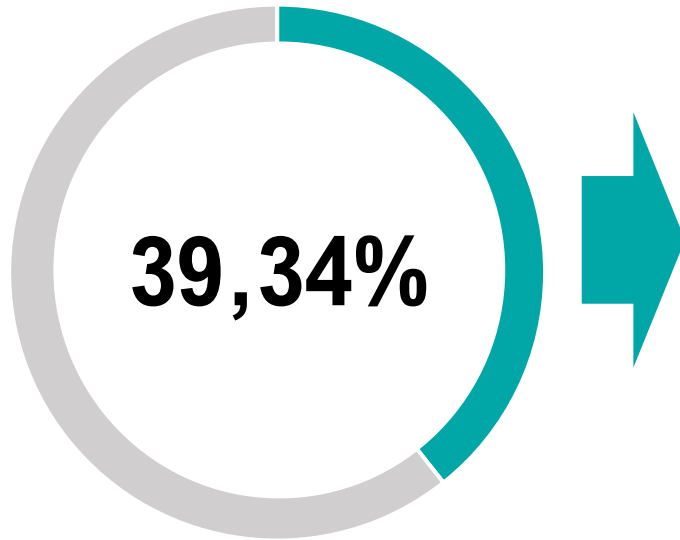
Achieving SDG6 in a Changing Climate



#WaWF23

Water and Sanitation Issues In Indonesia

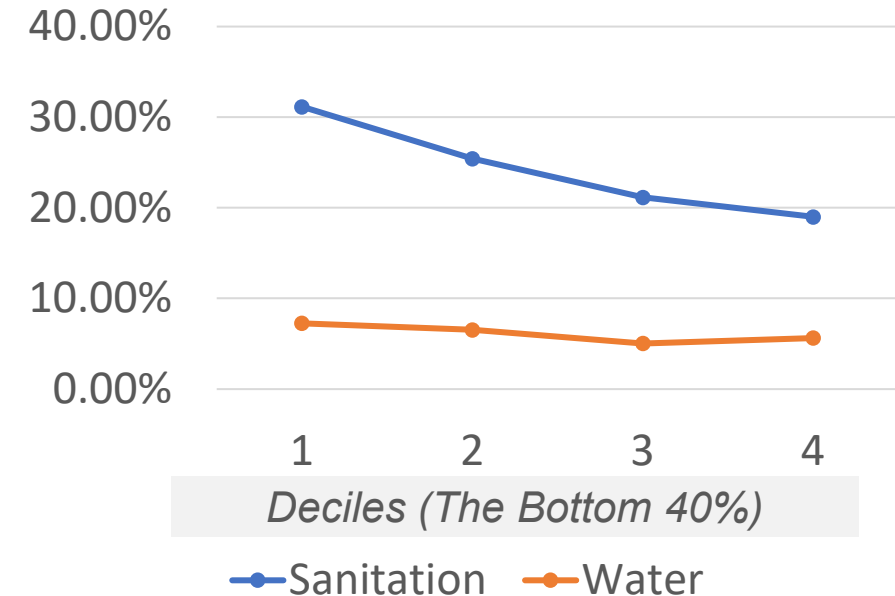
Households Living in Inadequate Housing, 2022



National Housing Indicator, 2022

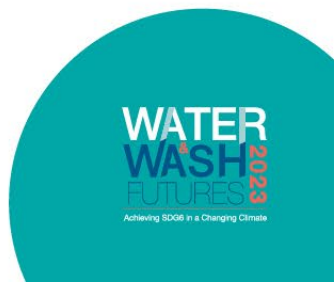
Indicator	% Inadequate
Sanitation Access	19,08%
Building Durability	17,47%
Water Access	8,95%
Sufficient Living Space	7,14%

Inadequate Access to Water and Sanitation – Urban Households, 2022



Source: National Statistic Bureau (2022)

- **Inadequate sanitation access is** the biggest contributing factor to inadequate housing rate in Indonesia
- Lower Household Income = Lower access to decent sanitation and water



National Target and Achievement for Housing and Settlement (2020-2024)

Indicators	Achievement		Progress Status	Target 2024
	2021	2022		
Housing				
Household access to adequate and affordable housing	60,90%	60,66%	●	70%
Water				
Household access to adequate drinking water	90,78%	91,05%	●	100%
Household access to piped drinking water network	19,06%	TBA	●	30,45%
Household access to safe drinking water	11,8%	TBA	●	15%
Sanitation				
Household access to adequate sanitation	80,29%	80,93%	●	90%
Household access to safe sanitation	7,25%	10,96%	●	15%
Household access to adequate waste management in urban areas	Handled: 54,85% Reduced 0,88%	TBA	●	Handled: 80% Reduced 20%
Households that practice open defecation	5,69%	5,86%	●	0%

● On Track

● Moderately good

● Not On Track

National and Global Policy Direction

SDGs Goal 6

to ensure availability and sustainable management of water and sanitation for all

SDGs Goal 11

Make cities and human settlements inclusive, safe, resilient and sustainable

National Mid Term Development Plan 2020-2024



Inclusive urban revitalization and land consolidation



Development of integrated sector (housing, water and sanitation)



Technology for processing and securing water and sanitation

Ministry of Public Works & Housing Strategic Plan 2020-2024



Livable Settlement



Green Building



Disaster-safe Settlement



Eco-Friendly Technology and Settlement

In line with

RISE PROGRAM

Revitalising Informal Settlements and their Environments

What We Do?

OBJECTIVE

- to trial a Water Sensitive Approach to urban water management, including **nature-based solutions** for wastewater treatment.
- to generate evidence on the link between sanitation and health outcomes

LOCATION

This project is conducted as a large-scale implementation and research trial of the RISE approach across Makassar (Indonesia) and Suva (Fiji).

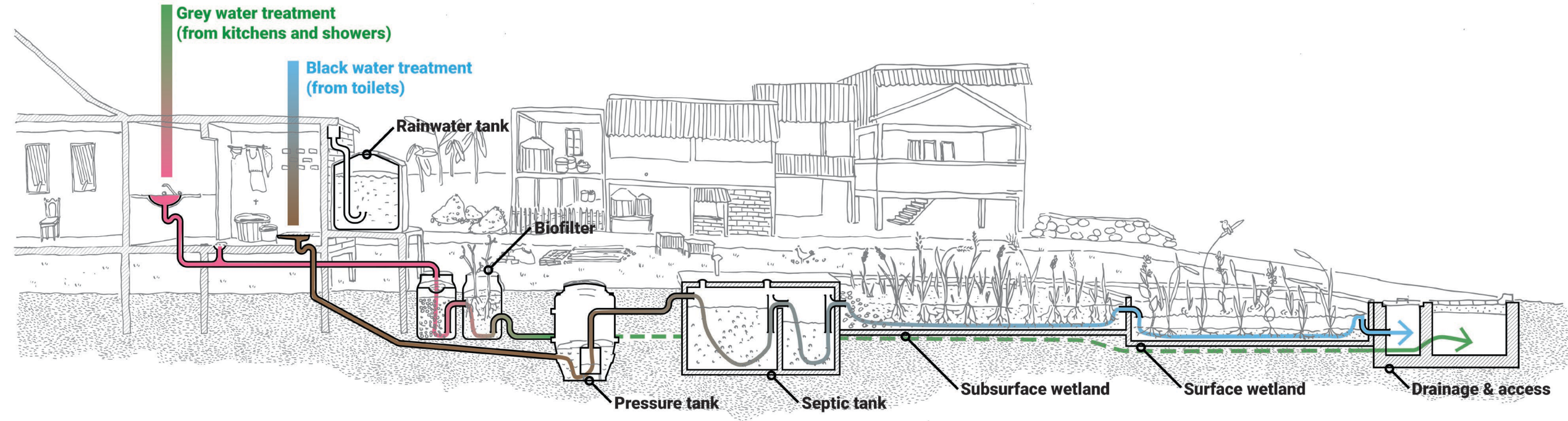
MAIN CRITERIA FOR SITE SELECTION

1. High risk of water-borne and related diseases, poor drainage, and vulnerability to flooding
2. Land tenure security
3. Resident and government consent aligned with slum improvement action plan



Kampung Batua (Makassar) was chosen as the location for the demonstration project

The Sanitation System We Built



Mimics natural system and include constructed wetlands, bio-filtration gardens, stormwater harvesting, and local sanitation system.

Program Result

Location: Batua Site, Makassar City



Lab Result from Batua Pilot Location

Pollutant removal rates are very high, except for ammonia.

Domestic wastewater quality standards			Reduction between effluent and Influent	
Parameter	Unit	Max	% reduction	
pH		6 - 9		
BOD	mg/L	30	85.0	
COD	mg/L	100	85.2	
TSS	mg/L	30	83.6	
Oil and Grease	mg/L	5		
Ammonia	mg/L	10	80.7	
Total Coliform	qty/100mL	3000	99.3	
E.coli	qty/100mL	*	99.7	

Excellent performance with more than 80-99% load reductions, although the concentration of ammonia is still being a concern.

The Uniqueness of RISE Compared to Conventional Models



Mimics natural system and can include constructed wetlands, bio-filtration, stormwater harvesting, and local sanitation system.

**NATURE-BASED
APPROACH**



Started from pilot project, making it possible to draw lessons.

**STARTED FROM
DEMONSTRATION
PROJECT**



Community have a voice and chance to share their visions for the future.

**PLANNING WITH
COMMUNITY**

RISE is more than just water and sanitation..

It is a holistic urban water management that can improve city resilience and liveability by providing climate resilient infrastructure.

Reducing risks faced by poor and vulnerable people from floods, storms, or droughts

Increasing urban greenery to mitigate urban heat

Reducing pollution in downstream waterways

Increased water supply security by providing rainwater tanks and piped-water Connection*

Lessons Learned

1. Space constraints in informal settlements are significant.
2. Optimizing the available space means separating grey water and black water to prioritize the most contaminated water (black water) - requiring additional aeration
3. Despite the challenges, pollutant removal rates are very high
4. Nature-based solutions can substitute a traditional, mechanical WWTP model.
5. The relatively high cost of intervention needs further analysis of cost-effectiveness.
6. Adoption of this approach to national/local program will require better planning, coordination, and more supporting evidence.

NEXT STEPS

- Retrofit design to enhance aeration and further reduce ammonia to below discharge standards
- Continued monitoring throughout 2023.
- Improving cost efficiency of the construction before replicating/scaling up this model to national/local program.
- Strengthening engagement with local and national government is needed, particularly to make this model to be a part of a more comprehensive slum/informal settlement upgrading program.
- Lessons learned will continue to inform the design, construction, maintenance and operation for the next sites.

THANK YOU

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