

GC0006 Sustainability: Society, Economy & Environment

Module 5

Water – Availability and Sustainable Management of Water Resources

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The Blue Planet



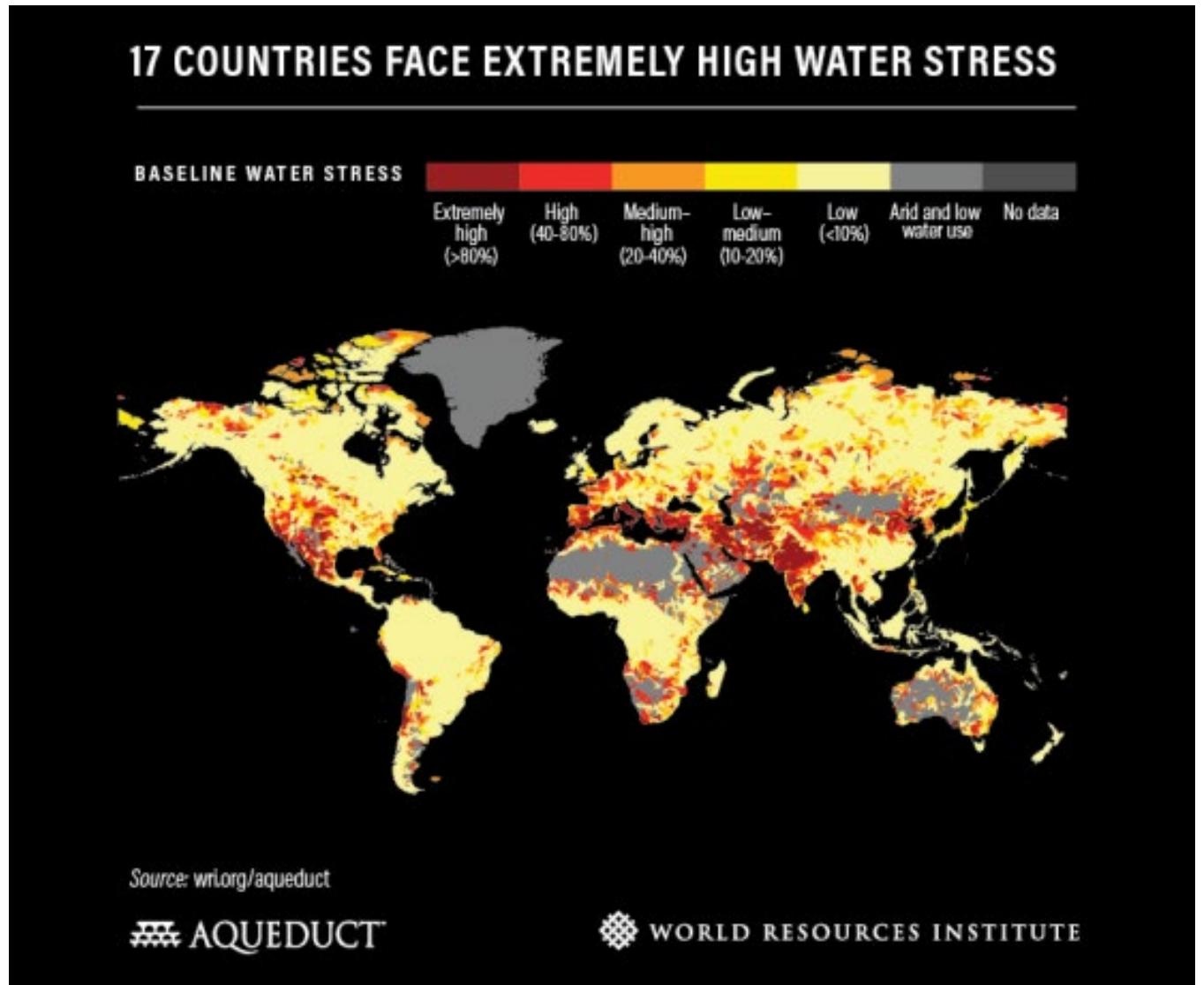
Overview

- What are the major concerns?
- A global concern on water resource
- How to manage water resource: A Singapore's Story

What are the Major Concerns?

Water stress levels around the world

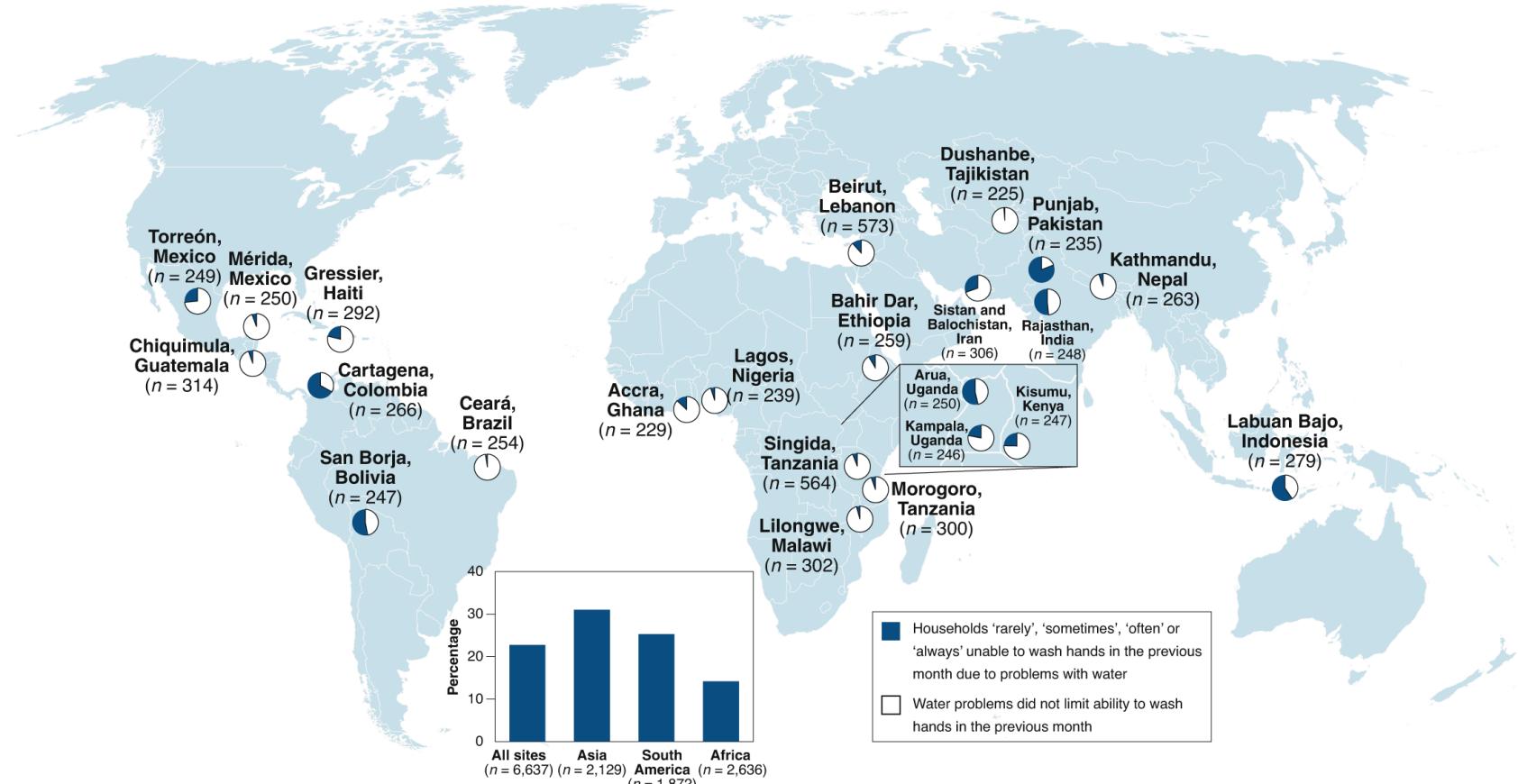
- 17 countries face high levels of baseline water stress
- 44 countries face a high-level stress



What are the Major Concerns?

Water and sanitation for all in a pandemic

- Some families reported that available water was unaffordable or inaccessible
- For some, handwashing was forgone due to unexpected shutoffs or contamination



UN Sustainability Goal 6:

Ensure access to water and sanitation for all



A Global Concern



ENSURE AVAILABILITY AND SUSTAINABLE MANAGEMENT OF WATER AND SANITATION FOR ALL

BEFORE COVID-19

DESPITE PROGRESS,
BILLIONS STILL LACK
WATER AND SANITATION SERVICES



2.2 BILLION PEOPLE
LACK SAFELY MANAGED
DRINKING WATER
[2017]



4.2 BILLION PEOPLE
LACK SAFELY MANAGED
SANITATION
[2017]

COVID-19 IMPLICATIONS



3 BILLION
PEOPLE WORLDWIDE
LACK BASIC HANDWASHING
FACILITIES AT HOME
↓ ↓ ↓
THE MOST EFFECTIVE METHOD FOR
COVID-19 PREVENTION



SOME COUNTRIES EXPERIENCE
A FUNDING GAP OF 61% FOR ACHIEVING
WATER AND SANITATION TARGETS



TWO IN FIVE
HEALTH CARE FACILITIES
WORLDWIDE HAVE
NO
SOAP AND WATER OR
ALCOHOL-BASED
HAND RUB
[2016]



WATER SCARCITY
COULD DISPLACE
700 MILLION PEOPLE
BY 2030



A Global Concern

Water pollution

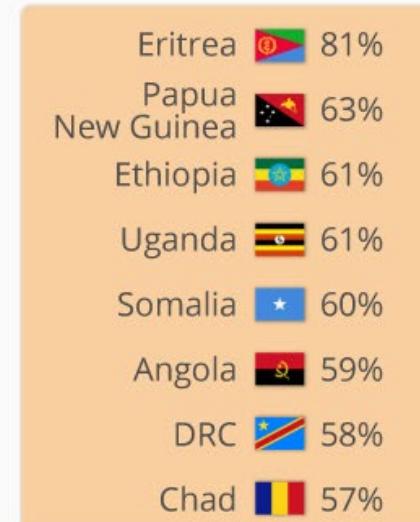
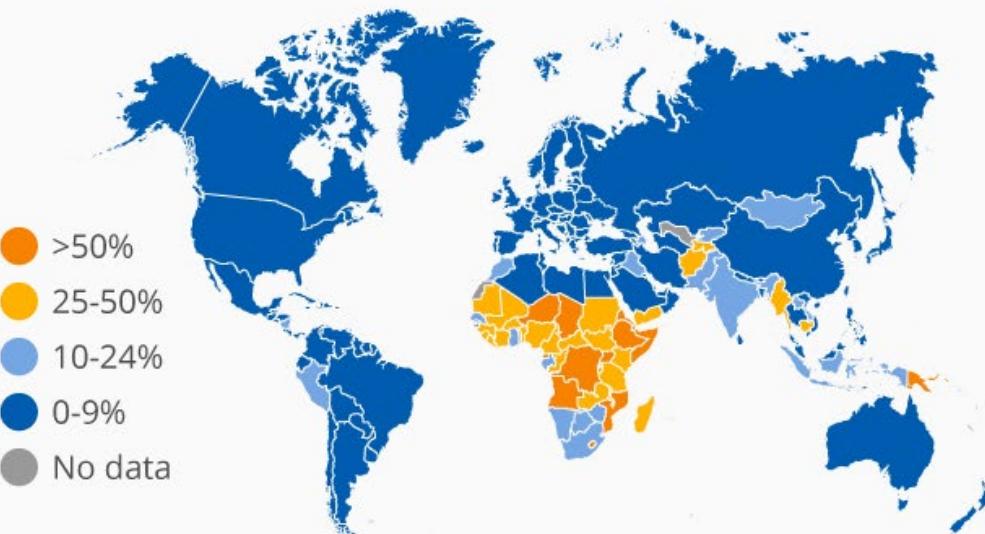
- An “invisible crisis” that involves water inequality and gender inequality

Unsafe Water Kills More People Than Disasters and Conflict

Average number of deaths per year, by selected sources (1980-2015)



Share of people without access to at least basic drinking water service in 2015*



2015 is the latest year available

* defined as water from protected wells or springs in less than 30 minutes distance

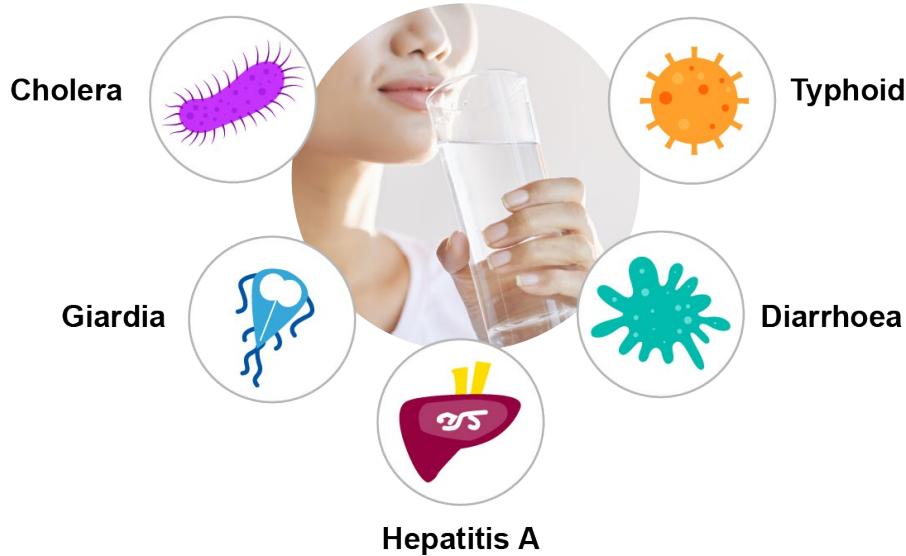


Sources: WHO/UNICEF, Emergency Event Database via PBL

statista

A Global Concern

Disease Caused by Drinking Polluted Water



Pollutants of Poverty

Sanitation-related bacteria
Trash and litter in waterways



80% of the world's wastewater is released to the environment **without treatment**

Pollutants of Growing Prosperity

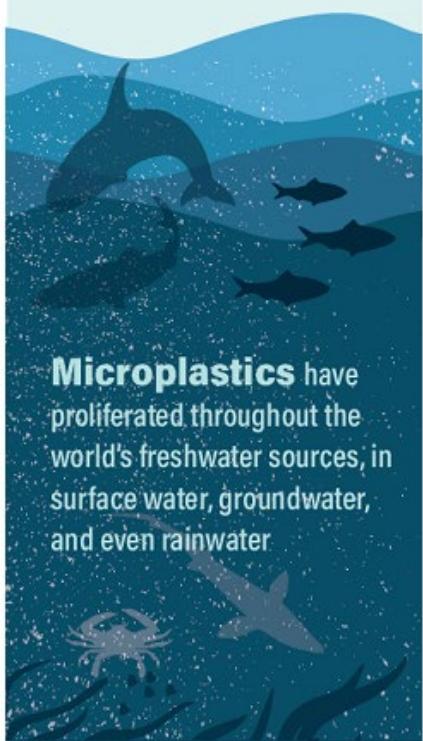
Chemicals and waste from industry; Agricultural fertilizers and pesticides



The use of **nitrogen as a fertilizer** has increased by more than **700%** since 1960 with nearly all of that growth occurring in Asia.

Emerging Pollutants

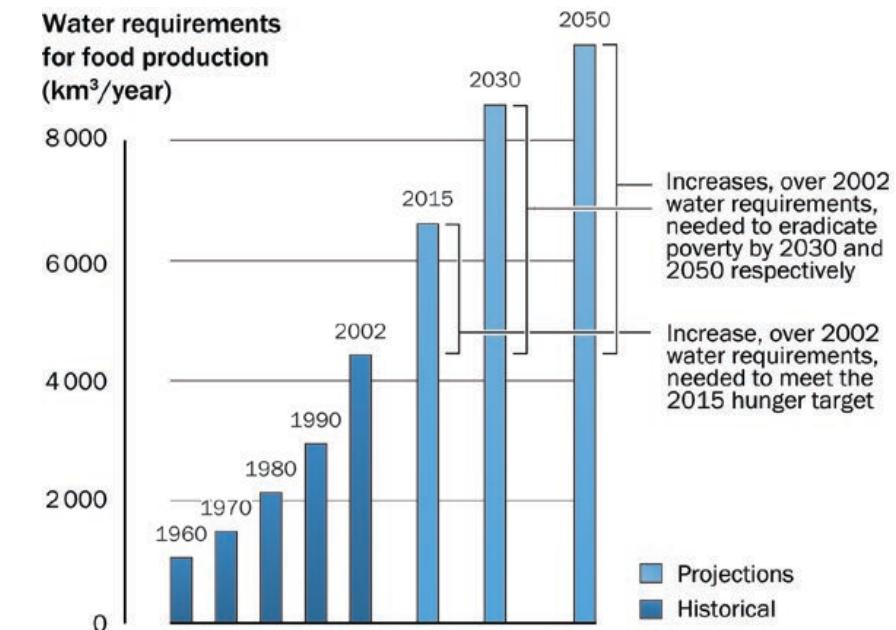
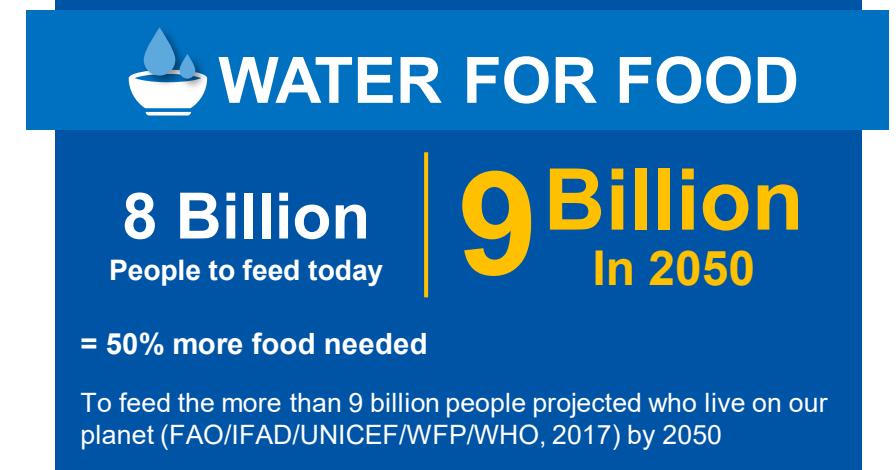
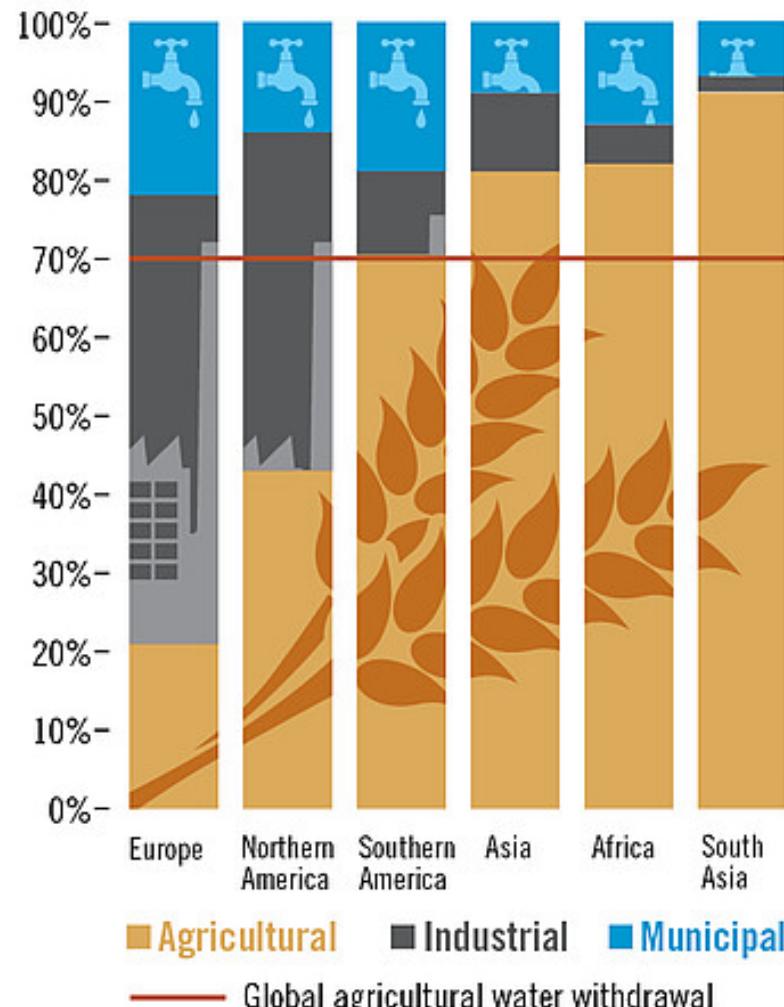
Micro- and Nano-plastics
Pharmaceutical Drugs



A Global Concern

Competition for water demand for other essentials such as food production

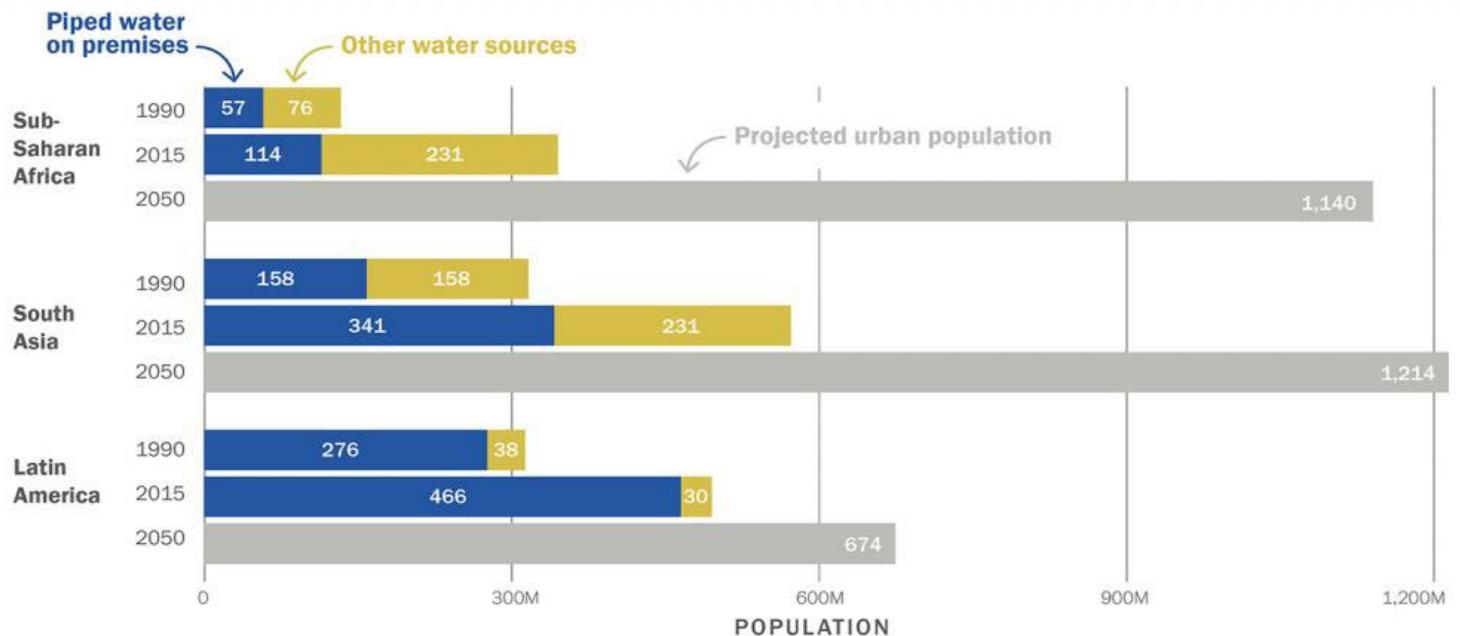
- Agriculture is the largest water user, but there is a shortage of funds to maintain irrigation facilities
- New approaches to economic development and infrastructure planning



A Global Concern

A non-traditional threat: Water scarcity in urban area

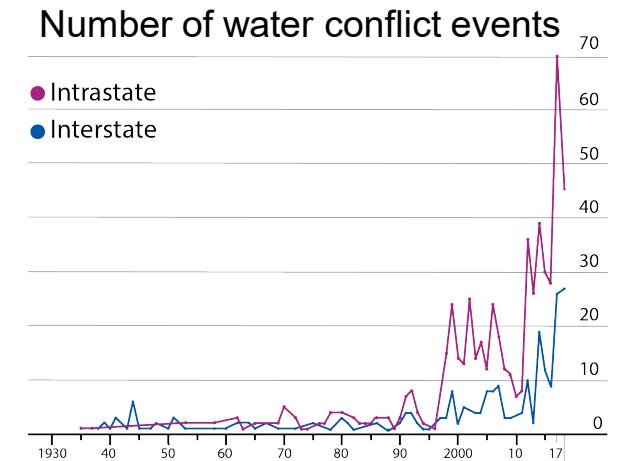
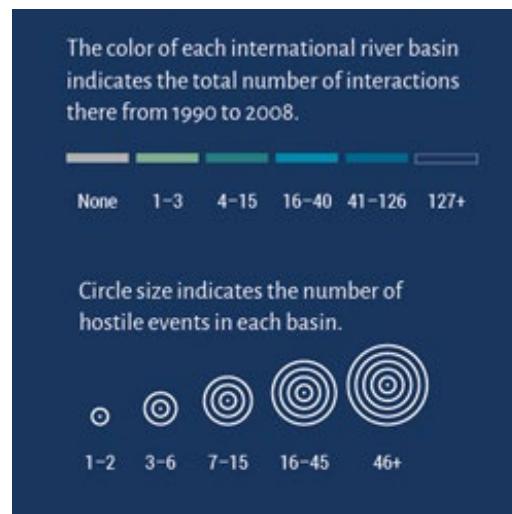
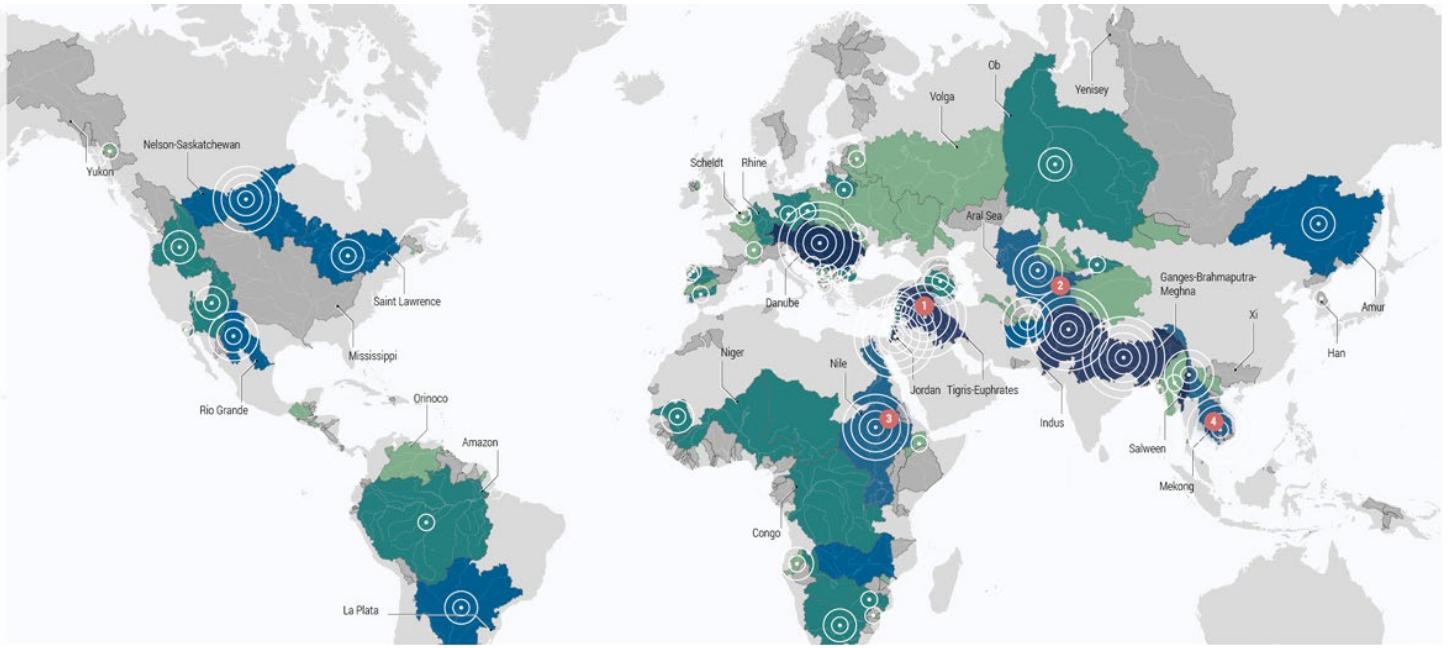
- More than 40% of residents in cities of the Global South lack quality water daily
- Lack of access to piped-in water means that families must buy water that needs financial cutbacks on other needs



A Global Concern

Transboundary water conflicts

- Future wars will be over water
- The matter of water diversion was a devastating issue of life and death
- Lack of communication over natural resource can be a bad sign for cooperation

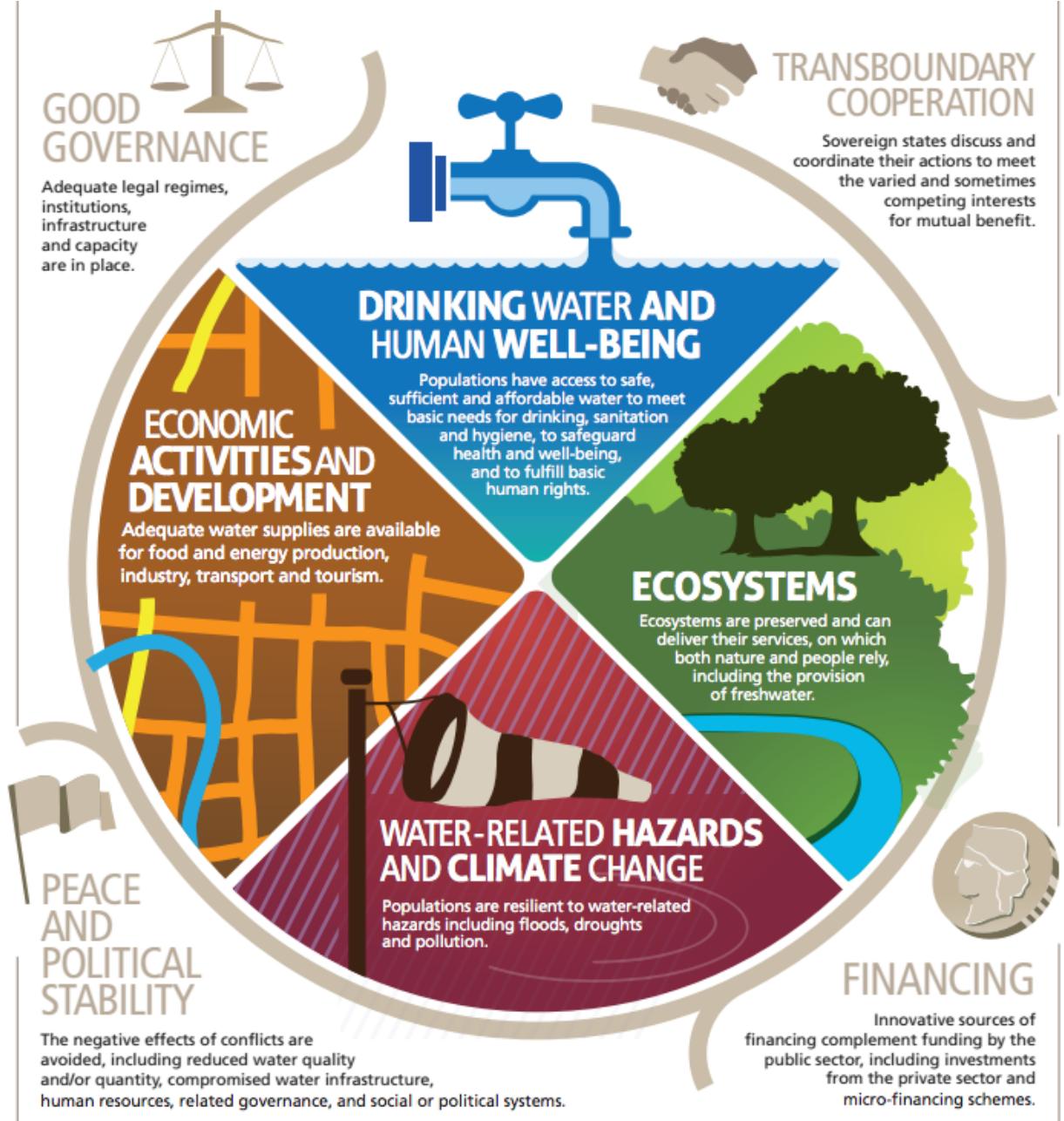


Water Conflict Chronology, 1930-2018

A Global Effort

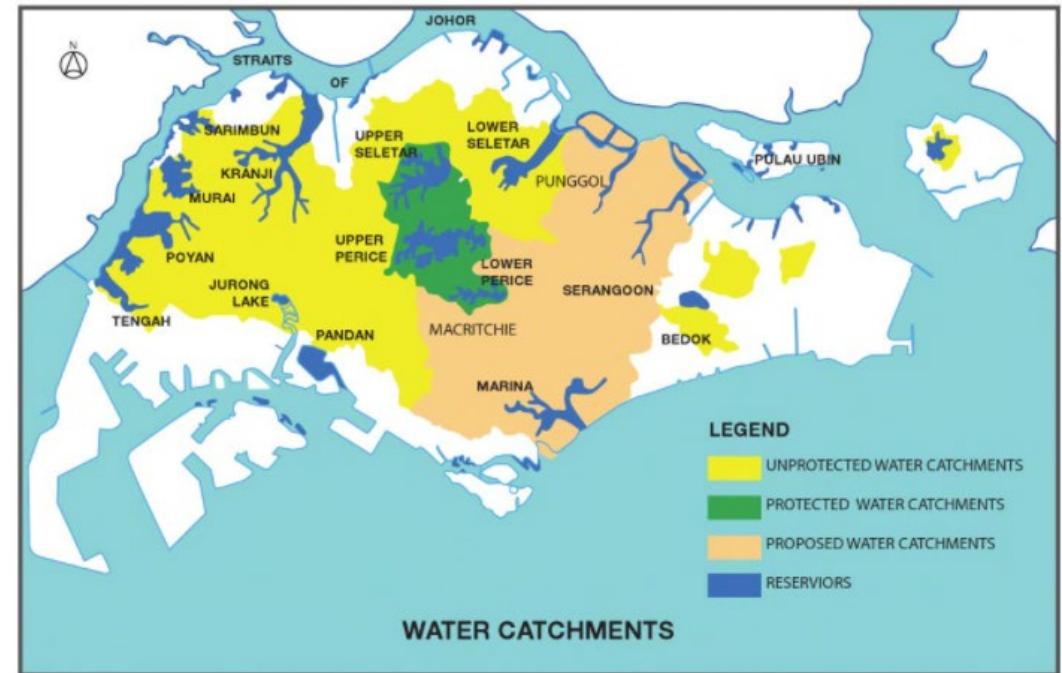
Water security and sustainable development framework

- Individuals , decision makers, and national and international organisations must find ways to ensure that finite water resources will continue to sustain our planet's human, environmental and economic needs



How to Manage Water Resource: Singapore's Story

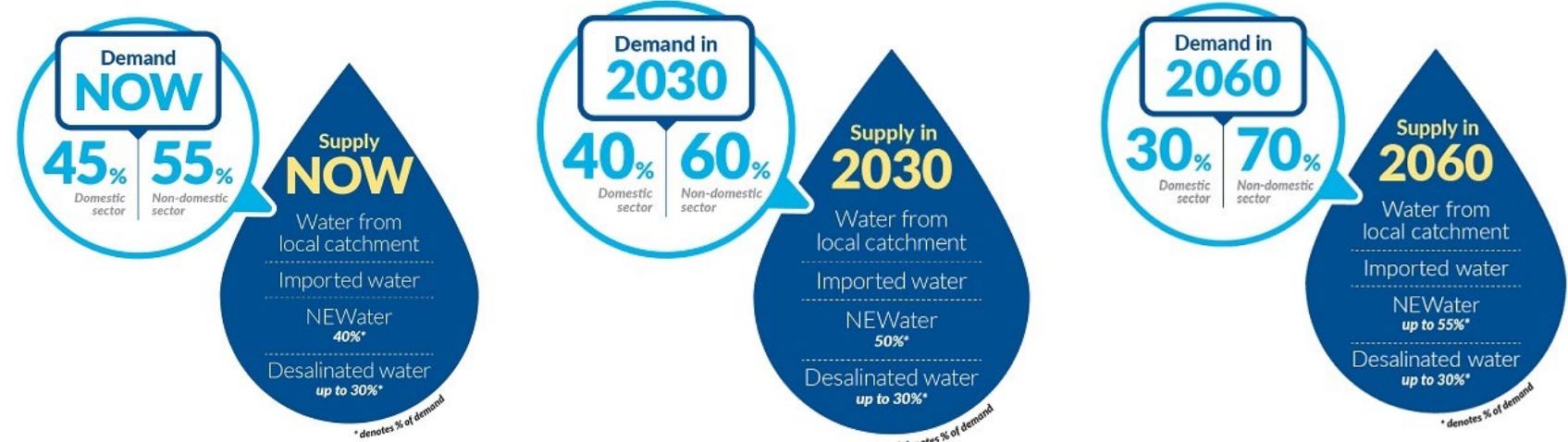
- Collecting every drop
- Total of 17 reservoirs, including the largest Marina Catchment 10,000 ha
- Catchment area currently makes up two-third of Singapore, and will occupy 90% of Singapore's land area by 2060
- How about underground water storage?



How to Manage Water Resource: Singapore's Story

Water demand and management

- As water demand continues to increase in tandem with population and economic growth, we need to plan and implement water infrastructure well ahead



WATER FROM
LOCAL CATCHMENT



IMPORTED
WATER



NEWATER



DESALINATED
WATER

How to Manage Water Resource: Singapore's Story

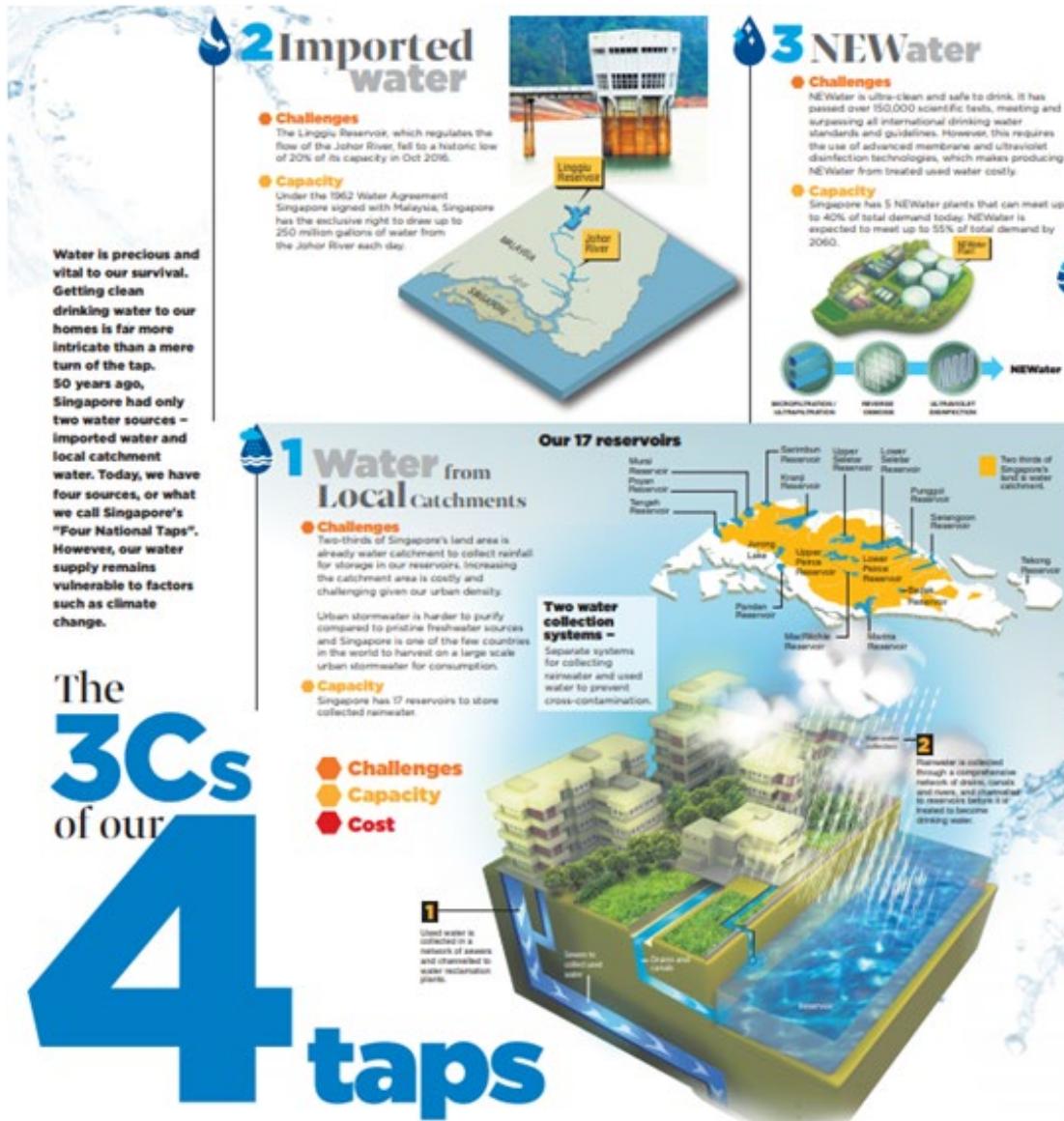
Four taps:

1. Water from local catchments
2. Imported water
3. NEWater
4. Desalinated water

Three Cs:

1. Challenges
2. Capacity
3. Cost

The 3Cs of our **4** taps



4 Desalinated water

Challenges
Desalination is the most energy-intensive of our four taps. This makes desalinated water the most costly to produce.

Capacity
We have three desalination plants which can meet up to 30% of total demand today. Two new plants will be built by 2030. Desalinated water is expected to meet up to 30% of total demand by 2060.



•Cost

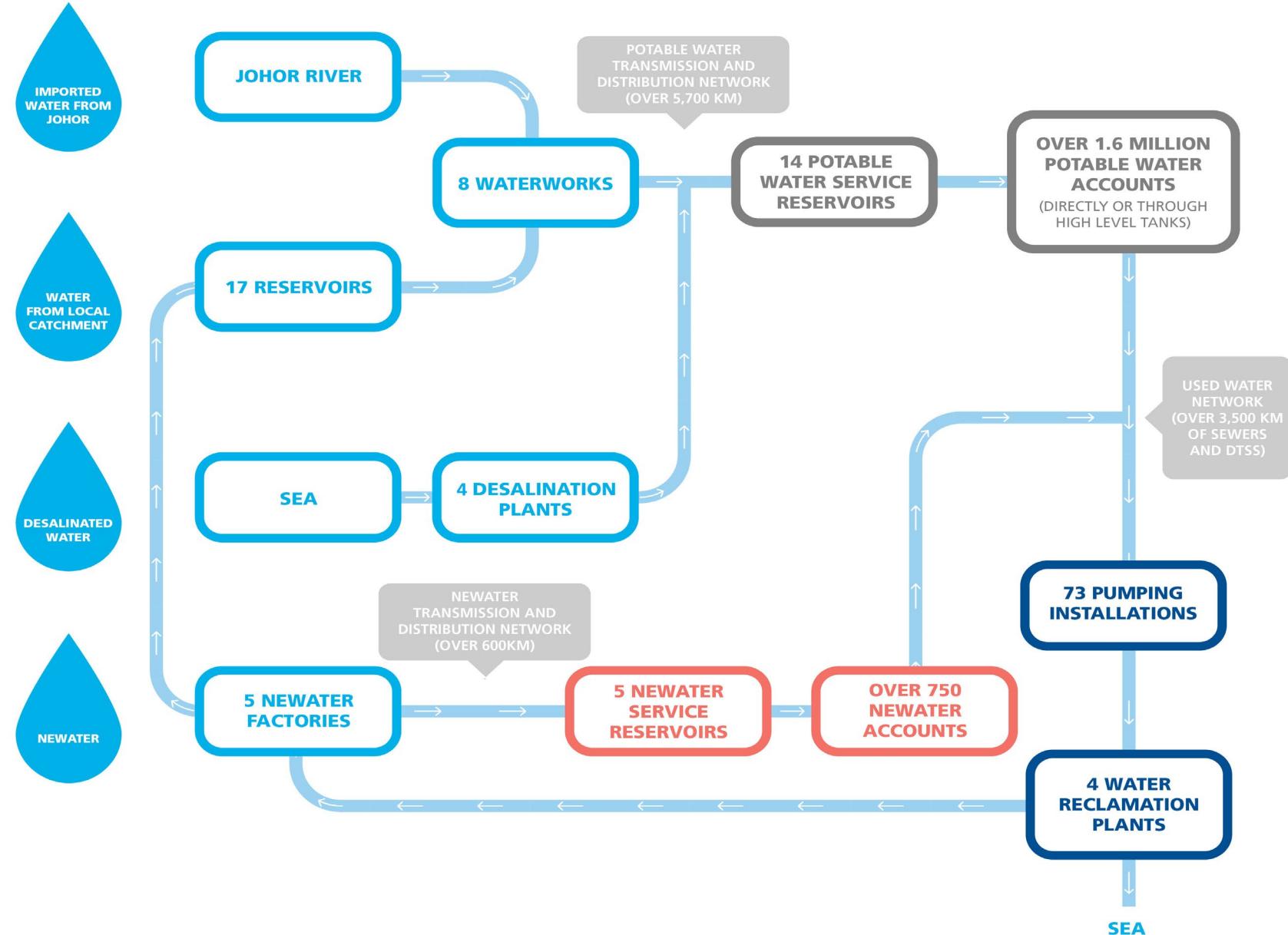
In 2015, it cost \$1.3 billion to operate our water system, almost three times more than in 2000.

To meet increasing demand, PUB has to continue investing in our water infrastructure by building new plants, upgrading existing ones and expanding potable and used water networks.

From 2000 to 2015, \$7 billion was invested in water infrastructure. In the next five years (2017 - 2020), PUB will invest a further \$4 billion in water infrastructure.

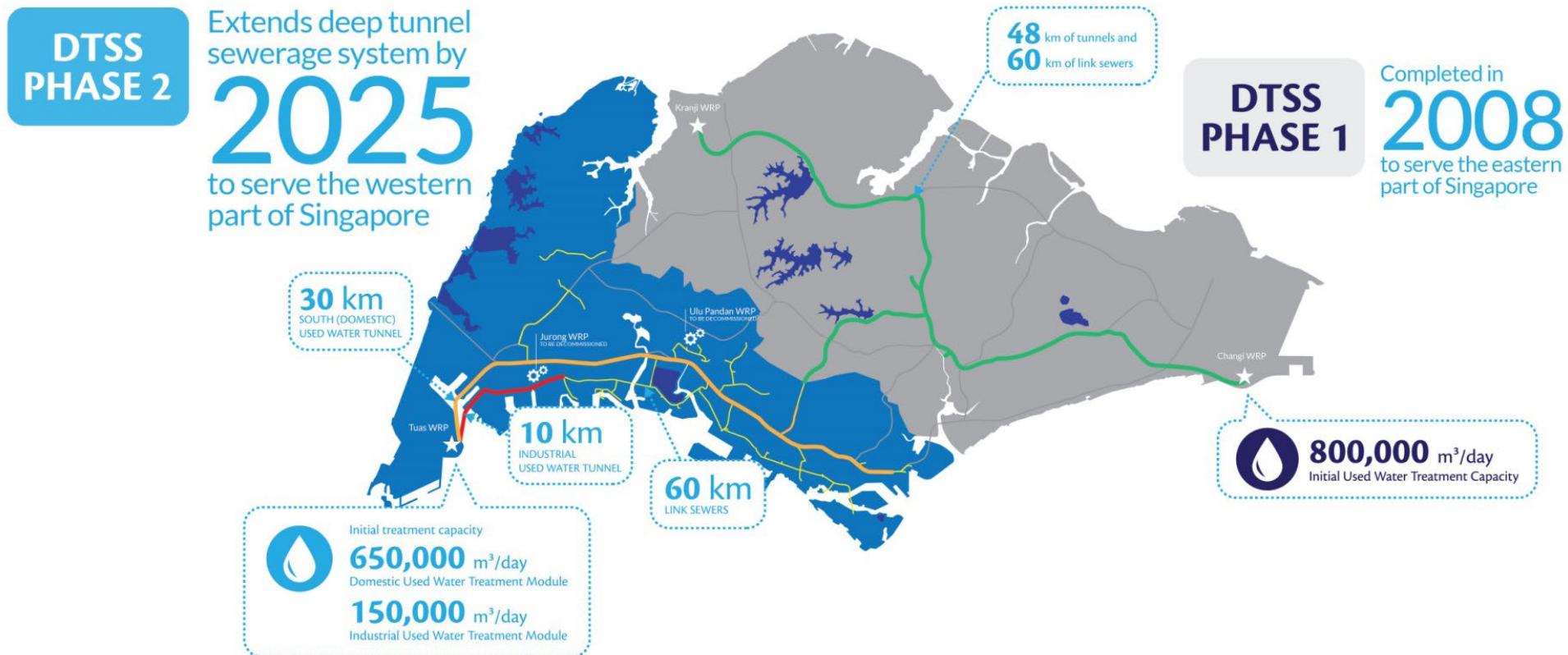
Our future water supply will come largely from costlier water sources, namely NEWater and desalinated water. These are weather-independent sources that will strengthen the resilience of our water supply against the effects of dry weather caused by climate change.

How to Manage Water Resource: Singapore's Story



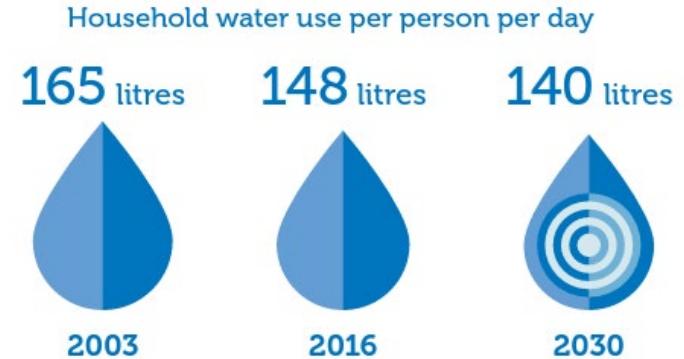
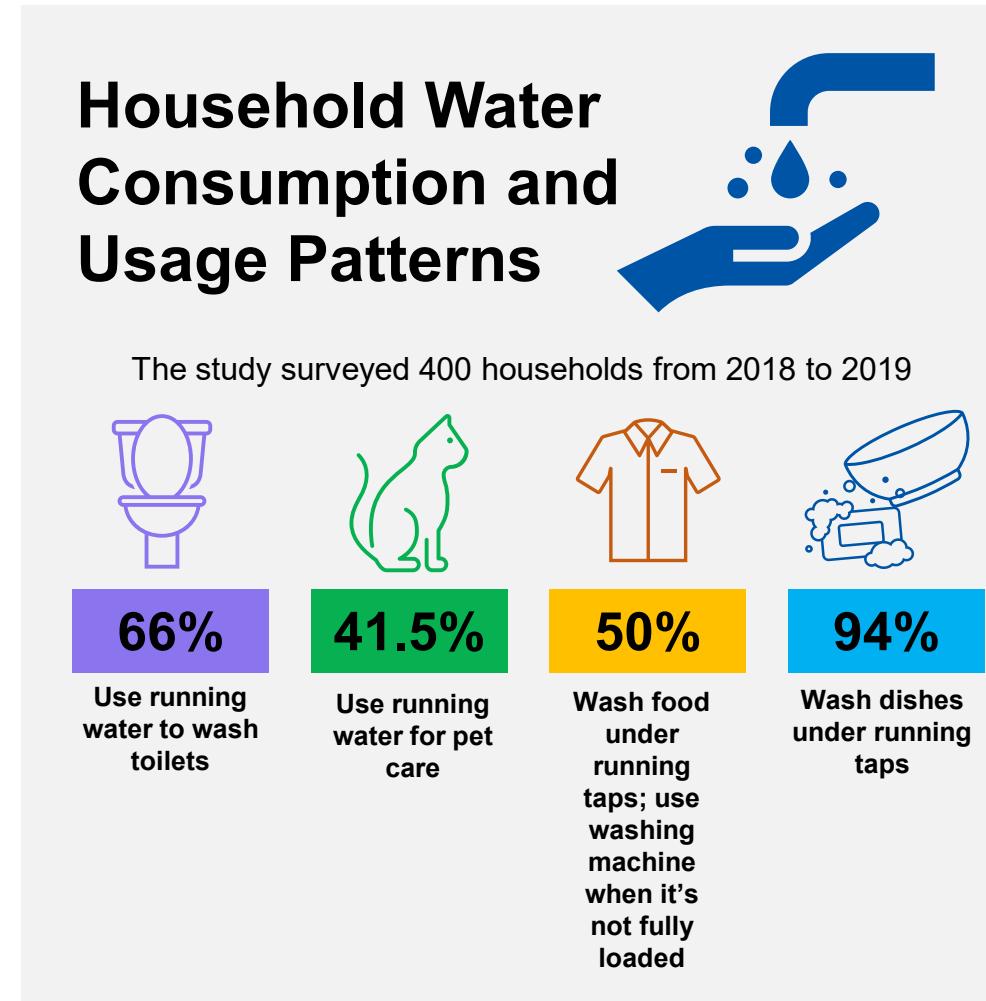
How to Manage Water Resource: Singapore's Story

Deep Tunnel Sewerage System (DTSS)



How to Manage Water Resource: Singapore's Story

We need to adopt various approaches to improve our water consumption habits



**PRICING
MANDATORY
MEASURES
ENCOURAGING
WATER
CONSERVATION
PRACTICES**

How to Manage Water Resource: Singapore's Story



CLIMATE CHANGE AND SINGAPORE



Dry Spell

13 Jan to 8 Feb 2014: Singapore experienced a record 27-day dry spell. Our desalination and NEWater plants had to operate near full capacity to meet our water needs.

Plankton Bloom

2015: Hot weather caused a plankton bloom in the Johor Straits, resulting in mass fish deaths.

Heavy Rainfall

2010, 2011 and 2013: Heavy rainfall contributed to major flash flood events in these three years, resulting in significant damage.

How to Manage Water Resource: Singapore's Story

- Singapore has achieved prosperity through hard work.
- The four National Taps serve to supply 100% of our population with potable water at the tap with 100% sanitation.
- Integrated urban and water planning to enhance the quality of our living environment (ABC programme).



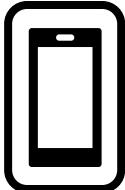
Final Thoughts

- How can we meet the rising demand for clean water from a growing global population while at the same time reducing its environmental footprint?
- Climate change and environmental degradation are altering the regional and seasonal availability and quality of water. The resulting competition over water use may lead to transboundary conflict and sometimes violence. How can we find peaceful solutions to resolve such a dispute?
- Most of us living in Singapore can easily access clean water, and few have experienced water shortages. So, why should we think about water security and sustainability?



Better Feedback, Better Outcomes

1-min Feedback for the lecture



SCAN ME



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