

Water Security Progress and Success Stories



FATHIMATH SHAHUZA
WATER & SANITATION DEPARTMENT
MINISTRY OF ENVIRONMENT & ENERGY
REPUBLIC OF MALDIVES

Country Overview

The country

1190 islands, **26** natural atolls, **20** admin div.

194 inhabited & **105** resorts

1/3 less than **500**

70% less than **1000**

3 islands < **5000**

Geography

Average size of island: **0.25** sq.km.

Average elevation: **1.8** m

5% of world's reef area

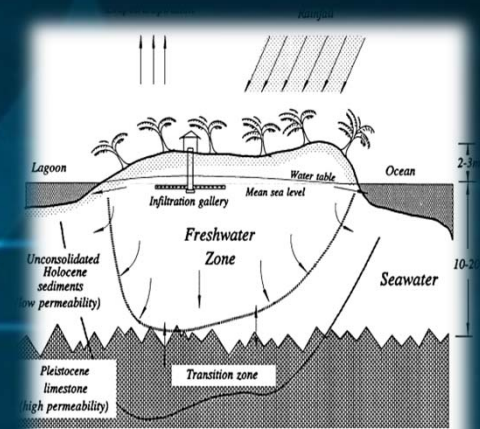
Demography and development

Population: **330,652** in 2012

1/3 lives in capital Male'

Maldives

- Groundwater is a scarce resource because of hydrology
- Surface freshwater is lacking expect few wetland and swampy areas
- Traditionally depended on shallow wells for potable and other purposes
- Annual average rainfall is more than 1900 mm (NAPA, 2006)
- Rainwater is widely used in the islands & accounts for more than 94 % use (MPND, 2006).
- In Male' & few islands desalinated water is supplied to households
- One of the most water scarce countries



Falkland: science direct



What is expected for Maldives



Current Water & Sewerage Situation

Maldivian Constitution (Article 23)
recognizes the right to Safe water and
Adequate Sanitation to every citizen.

Draft Water Act is in the process of
enactment

Desalinated piped water → 5 islands
(across the outer atolls)

Improved sewerage systems → 30
islands (across the outer atolls)

Cost of 30 sewerage systems → **47
million USD** → **97% funded by
donors**



Current Water & Sanitation Situation

Rainwater harvesting system → 2500 L water tank (HDPE) in each household



Emergency desalination plants (without piped network) → 25 islands



Currently 08 projects under implementation in different islands



52 new water and sewerage projects are planned to be implemented this year



Public and multilateral investment into water and sewerage development planned for 2013 alone totals USD 64.2 million.

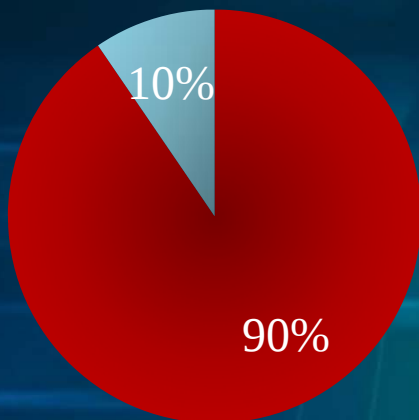


Water and Sanitation coverage

Percentage by population with access to piped water supply and improved sanitation systems (excluding Male')

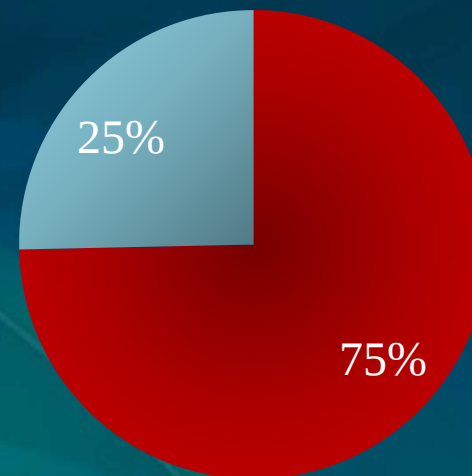
Water Supply

- Without Water supply Network
- With Piped Network



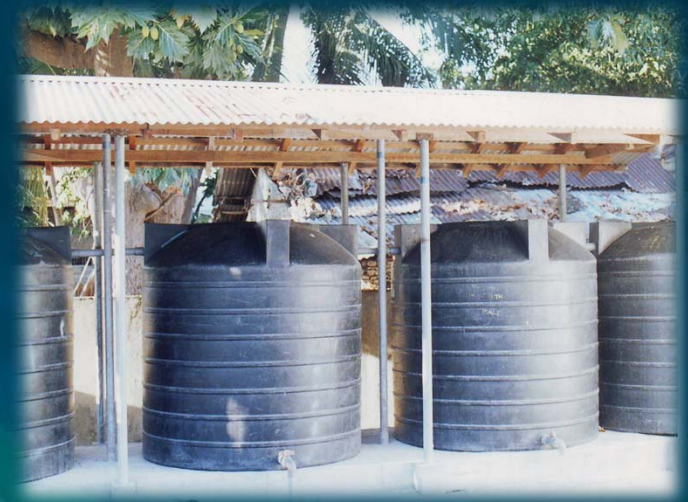
Sewerage

- On-site
- Sewerage network



Island Water Situations are Complex and Diverse

- In the outer islands, households obtain water from a range of sources:
 - local and imported bottled water
 - desalinated seawater using reverse osmosis plants
 - rainwater harvested from roofs and stored in household and community rainwater tanks, and groundwater.
- The choice depends on the season, the use, and household finances.
- The per capita household demand for potable water has generally been estimated at 10 liters per person per day (L/p/day).
- The total per capita demand for non-potable water (including bathing, washing clothes, and toilet flushing) is estimated at about 100 L/p/day to 120 L/p/day (Bangladesh Consultants, 2010a, b, c and d).
- A survey of 70 islands in 2010 reported that household groundwater is contaminated in most of the islands and not suitable for drinking (MEE, 2011).
- Piped water coverage in the outer islands remains low, with no more than 23 percent of the population serviced via piped connections in any atoll outside of Greater Male' (MEE, 2011).

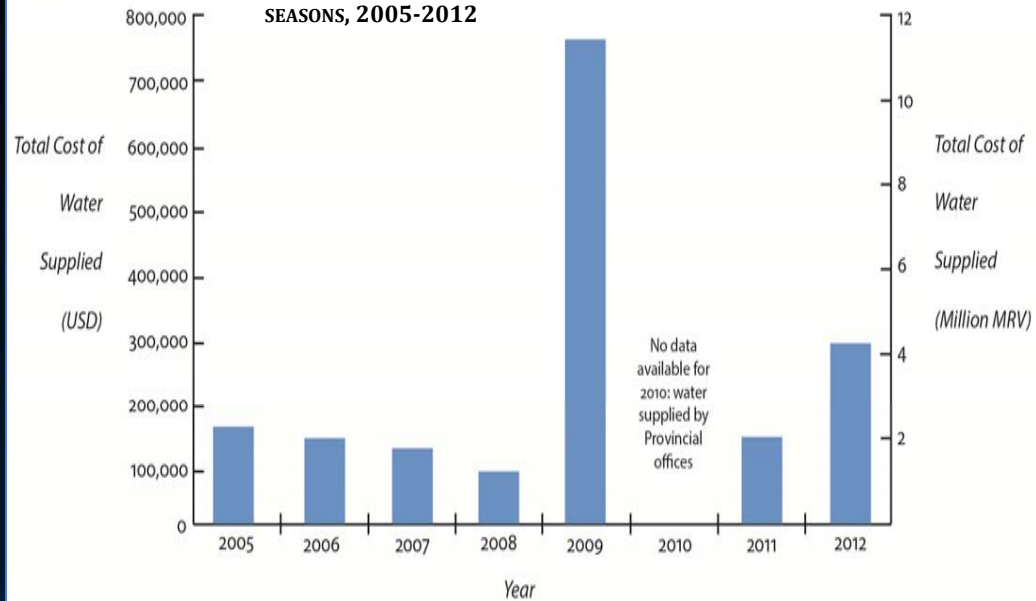


Island Water Supplies

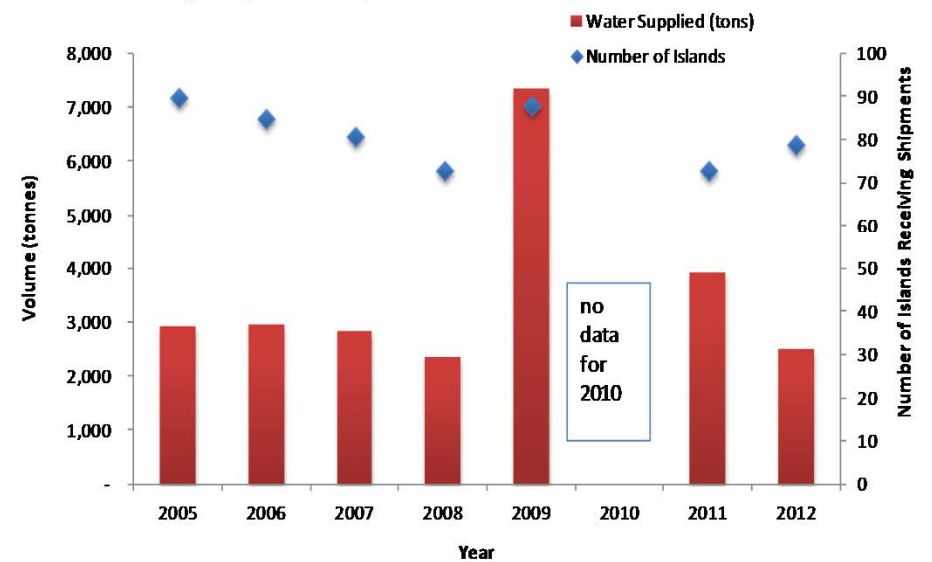
- Rainwater harvesting: popular yet unreliable on its own
- Due to decreased use of groundwater, relying on rainwater harvesting alone is insufficient in many islands.
- Data on the exact shortage of rainwater supply in dry seasons is not available for the post-tsunami period
- The shortages in supply from both household and community rainwater tanks can be gauged from the number of islands requesting NDMC's emergency water deliveries between 2004 and 2012.
- The continued annual deliveries suggest rainwater storage capacity is inadequate at both household and community levels to supply water through normal dry seasons.
- Water supplied to more than 55 islands 2012 (NDMC, 2012)



COST OF "EMERGENCY WATER" SUPPLIED TO INHABITED ISLANDS DURING DRY SEASONS, 2005-2012



Emergency Water Shipments: Volume and Number of Islands



Issues and Challenges

Wastewater disposal systems

- mainly septic tanks and soak pits
- high groundwater contamination → from on-site sanitation



Tsunami, Sea swells & storms

- 2004 Indian Ocean tsunami → destroyed approximately 50% of rainwater tanks → rendered entire island populations without access to safe drinking water & severely degraded groundwater quality and soil fertility.
- Damage to water and sanitation infrastructure
- Contamination of groundwater



Issues & Challenges

80% of land area <
1m above MSL

Thin layer of
permeable aquifer
sediments → 1-2m
below ground

Porous sandy soil
→ susceptible to
pollution,
contamination from
human activities &
saltwater intrusion.



Issues & Challenges

More than 44% of settlements, 42% of pop , 70% of critical infrastructure are within 100m of shore line



Between 2000-2006- 45 islands flooded with heavy rain



19% inundated at least once a year



The estimated cost of coastal protection in the 43 critical islands is 42 million US Dollars.



Issues & Challenges



Groundwater pollution from human activities and septic tanks



Water supply capacity failing to meet the annual dry season



70-90 islands requesting water shipments each year



2005-2012 – Cost of water shipments during dry period is USD 2 million



Average annual cost of 7 years with data is USD 242,000.00

Issues & Challenges

Leaking septic tanks contaminate → groundwater



Low operation and maintenance of water & sanitation facilities



Inappropriate sewerage system → difficult to operate and maintain → several types of systems used eg: CGS, Vacuum systems..



Unskilled personnel to maintain the systems



Expensive to provide improved sewerage systems in all the islands



Issues & Challenges

Costly to provide, monitor and manage services effectively for all islands due to dispersed population.



Cost-recovery and sustainability of services prove to be challenging – government has to provide subsidies.



Lack of institutional and financial capacity → establishment, operation & management of water and sewerage services.



Inappropriate treatment & disposal of sewage → groundwater pollution



Issues & Challenges

Extraction of groundwater exceeds sustainable yield
→ saline water intrusion into freshwater aquifer



Lack of regulatory framework, guidelines and standards



Lack of capacity to respond in emergencies
→ water shortages during dry periods

