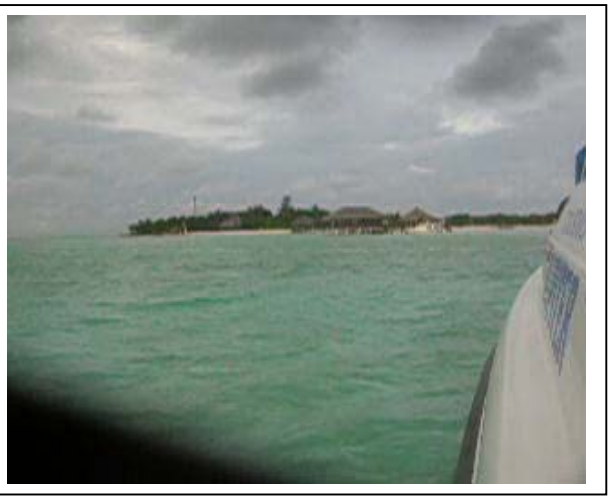
Visit of Secretary(DWS), Government of India and Select State Secretaries incharge of Rural water Supply and Rural Sanitation to Republic of Maldives during 21-23 Nov 2007

A Report

Tour Report of Secretary (DWS) on visit of Maldives November 2007



Purpose of Visit

1. Smt. Santha Sheela Nair, Secretary(DWS) along with State Secretaries dealing with Rural water supply and Sanitation from Andhra Pradesh (Shri Ajay Mishra), Haryana (Ms. Urvashi Gulati), Kerala(Shri Sashidhara), Madhya Pradesh (Shri P.C.Meena) and Rajasthan (Shri Shikar Agarwal) along with Shri D.Rajasekhar, Asst. Adviser(WQ), Deptt. of DWS have visited Republic of Maldives during 21-23 November 2007 for assessment of water supply and sanitation in highly eco-fragile islands.

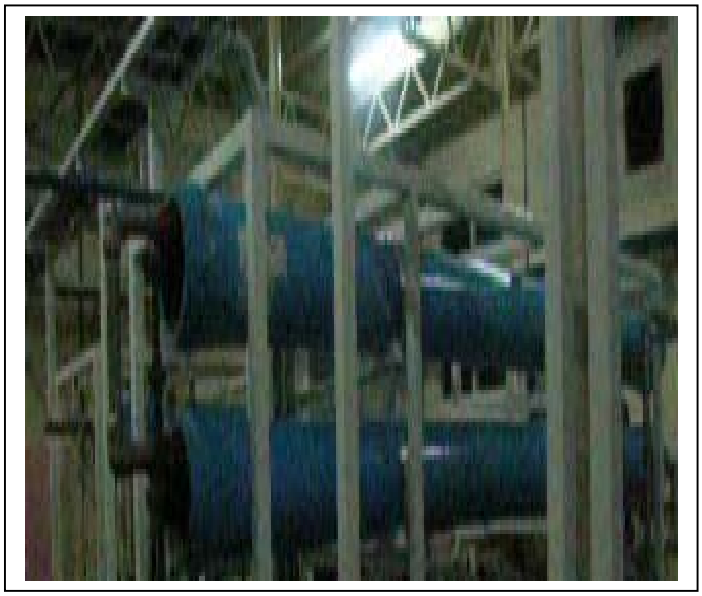
The purpose of the visit was to assess the impact of water supply and sanitation on the fragile environment and to replicate the success stories in India.

About Maldives

1. Republic of Maldives lies about 672 Km South-west of Sri Lanka and comprises of over 1,192 low-lying coral islands with a land area of 300 sqkm grouped into 26 Atolls. 199 islands are inhabited with a population of 2.85 lakh (2003 Census). Female population accounts to 49% of total population. The capital of Maldives is Male' with a

population of 74,069 (2000 census). The President is the head of the Government. Cabinet of Ministers are appointed by the President.

2. Maldives does not have any surface water bodies like rivers or lakes. However, most of the islands have certain groundwater aquifers. However, these may be prone to bacteriological contamination, if the waste-water from septic tanks is not properly disposed off.
3. Maldives is blessed with a rainfall of 1900 mm and is evenly distributed throughout the year except between January-March. Rainwater harvested from roof-tops is the predominant source of drinking water to all islands of Maldives.
4. About 92 Resorts have been set up in each island and the floating population(tourists) is 6 lakh (in 2004), which is double the population of the entire Maldives. Drinking water needs for these tourists is also, one of the big issues.



Administration looking after Drinking Water Supply and Sanitation in Maldives and its Guidelines

The Ministry of Environment, Energy and Water, Government of Maldives is the administrative Ministry looking after water supply and sanitation.

The Water and Sanitation policy statement developed by the Ministry of Environment, Energy and Water emphasizes the importance of providing safe drinking water to all people. It also highlighted the community and household rainwater tanks with first flush disposal system and other protected rainwater catchment systems are one of the favourable methods of providing safe water for drinking and cooking purposes and other domestic uses. The objective of the Government is to ensure access to 10 litres per capita per day of safe water for drinking and cooking for the whole population and in islands where groundwater is contaminated, provision of 40 litres per person per day is to be provided.

Saga of drinking water supply in Maldives

Roof-top rainwater harvesting is the predominant source of drinking water in all inhabited islands.

- The first RWH tanks was commissioned in 1906 and the second in 1909 in Male'.
- By 1974, 15% of households in Male' have rain-water tanks.
- Due to outbreak of Cholera and Dysentry in 1978 & 1992, Male' Water Supply and Sewerage Project was initiated in 1985.
- Between 1974 and 1995, more than 1,200 community tanks with a total storage capacity of over 12,000 KL and 3,500 household tanks

with a capacity of 20,000 KL were provided under the joint programme of Government of Maldives and UNICEF.

- Later on, Government of Maldives with the financial assistance from UNICEF, constructed 1,925 ferro-cement tanks with a total capacity of 1.93 lakh KL for community use in 200 islands.

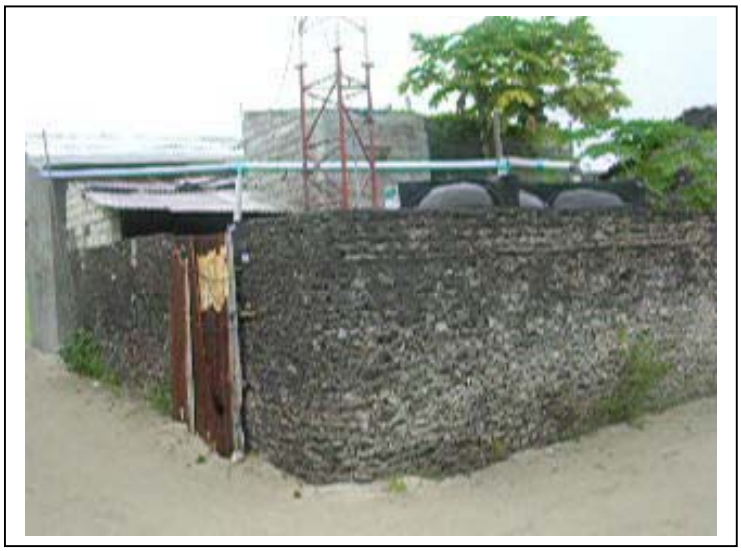
- Since 1994, HDPE tanks have replaced the ferro-cement tanks due to its durability, ease of handling, mobility and community acceptance.
- In 1995, Government initiated a revolving fund to Atolls to assist private persons buy house-hold HDPE tanks over a period of time.

- By 2004, Ministry of Health, Government of Maldives has provided 7,400 HDPE tanks for community and private persns.

Impact of Tsunami – Dec 2004 and Post-Tsunami measures

- Tsunami of Dec 2004 has damaged all the fragile fresh ground water aquifers by inducing huge amount of salinity. The total loss was estimated at 13.1 million US $.

- The total cost of reconstruction of water and sanitation infrastructure was estimated at 45.6 million US $.
- As on date, 90 islands has been provided with more than 17,000 household rainwater tanks. International Federation of Red Crescent Societies (IFRC) have provided more than 15,000 tanks to 79 islands.



- UNICEF has provided 1,500 household tanks to 8 islands
- Maldive Island Development Authority has provided 115 household tanks to one island
- JICA Alumni Society of Maldives has provided tanks to 2 more islands.

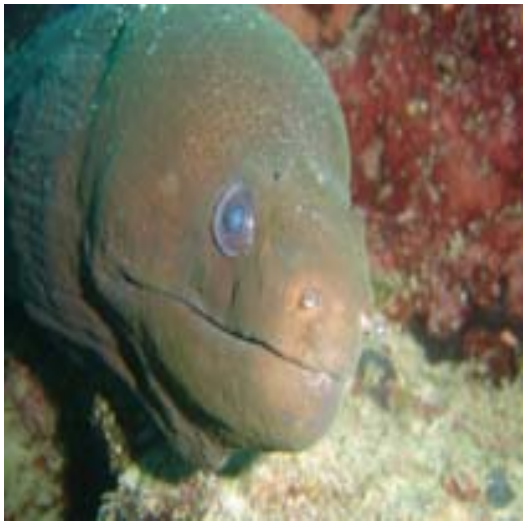
At present, household rainwater harvesting tanks are yet to be provided to 104 islands comprising of 23,000 families. The Government with assistance form local authorities is working to monitor the installation of these tanks.

Site Visits

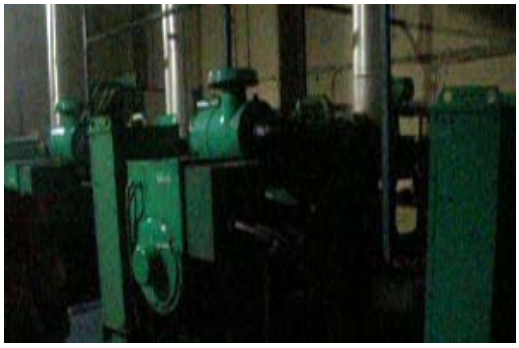
1. Taj Exotica island

The purpose of visiting Taj Exotica island is to understand how the Hotel authorities are managing to provide 1,000 litres of safe water every day per person and technologies adopted for providing safe drinking water and sanitation. Mr. Santhosh Kutty, General Manager of the Taj Exotica has been kind enough to explain all details along with his officials, the Chief Engineer looking after Water supply, Sanitation & Electricity and Asst. Manager. The Team places on

record the hospitality extended by Mt. Kutty and his officers for explaining all details. The Hotel has 62 luxury villas which include 24 Lagoon Villas, of 71 sq mts each, along a series of two adjacent villas on the lagoon in the island.



The total water requirement for the Hotel is estimated as 1.4 lakh litre per day. Out of this, through rainwater harvesting, about 60,000 litres per day is harnessed for use. Remaining 80,000 litres per day water requirement is obtained from a Sea Water Reverse Osmosis Treatment. Treated water is then mixed with rainwater, chlorinated and supplied to all rooms and swimming pools. When converted to Indian currency, the average electricity cost per day works out to Rs 1.2 lakh. However, this is affordable, as the minimum room rent per day collected from tourists is US$ 620 per day and it increases to about US$ 10,000 per day in peak season. Only cause of concern is that the brine is disposed off into the sea through a 40m pipeline on the other side of the island. It is noted that the quality of treated water is regularly checked by the Ministry of Environment, Government of Maldives. The Ministry follows the WHO guidelines on drinking water quality.

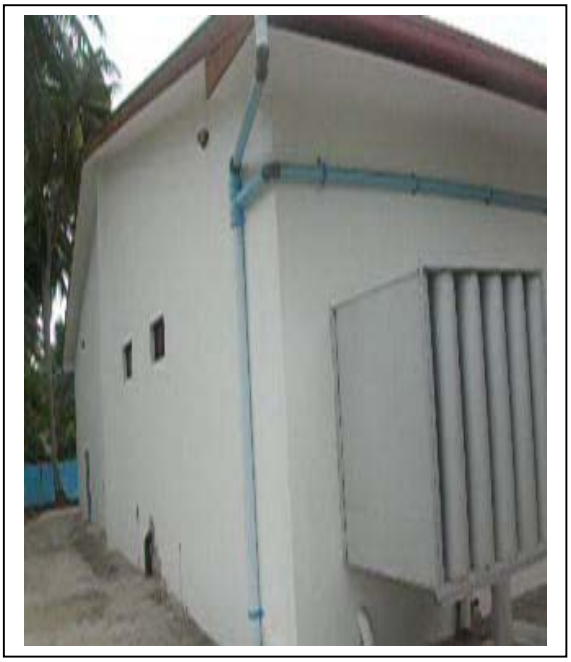


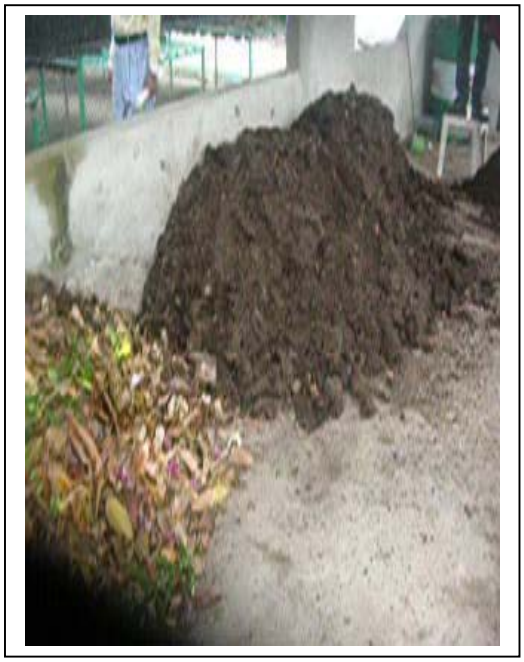
The sewage/ waste-water emanating from the island is led to a Treatment plant. Primary treatment include unit processes like bar screens, collection cum equilization tank, aeration tank, , clarifier and chlorination. Secondary treatment include sludge holding tank and sludge drying beds. Tertiary treatment include Multigrade sand filter and Activated carbon filter. The treated water is used for gardening purposes.

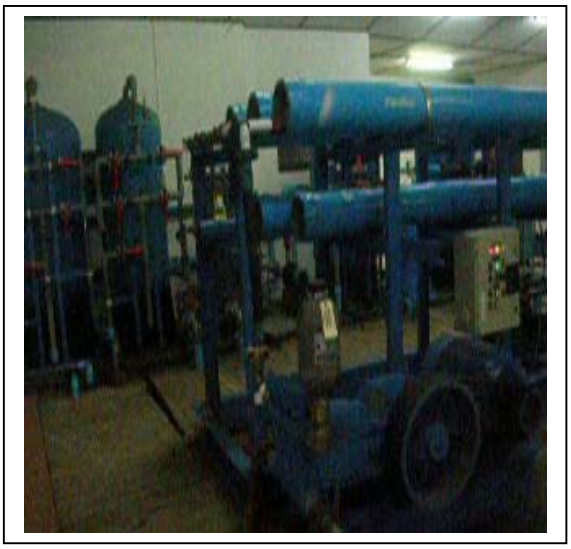
There is no method of composting available with the Hotel. The solid waste generated is collected and sent to another island for land reclamation. Pollution aspects of this island may require studies like bio-assay tests. Flowcharts of the Treatment plant is enclosed as attachment.

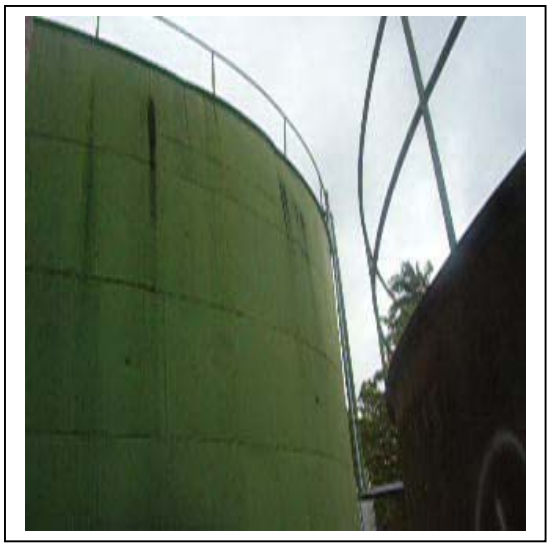
2. <u>Kurumba Resort island</u>

The visiting Team from India was provided accommodation in this island by the High Commission of India in Maldives. This island also require 1.2 lakh litres per day. Half of this water requirement is met from roof-top rainwater harvesting structures attached to every room and every building. Remaining half water requirement is met from Sea-water based Reverse Osmosis plant. The rainwater is mixed with RO plant treated water before it is distributed for use.





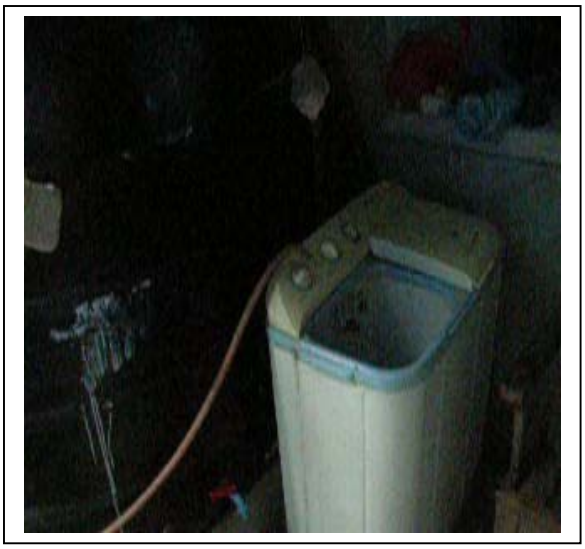




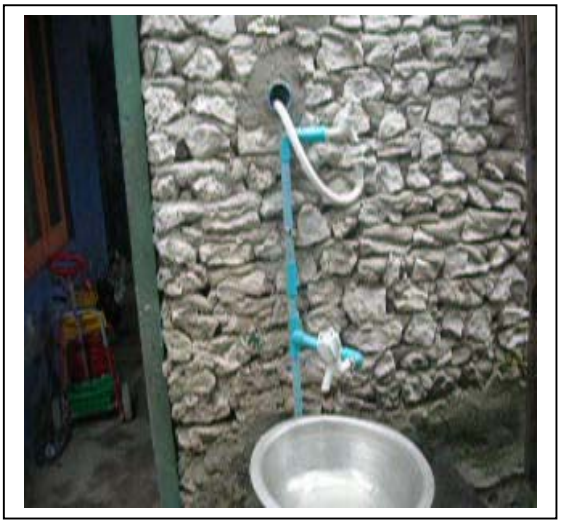
A local Manager supervises the operations of Water and Sewage treatment plant. The solid waste is segregated for biodegradable matter, which is then pulverized and sent to composting pits. The manure is used for gardening purposes. The non-biodegradable matter is sent to another island for land reclamation. One borehole was being drilled to tap the ground water available in the island. Every care is to be taken as the resources are too less and if over-tapped, it would adversely affect the plantation on the island. Noteworthy point in this island is that all roof-top collection systems are designed ergonomically and aesthetically so that appearance does not have adverse impact on the visitors.

3. Thilafushi island

Only local people inhabit this island. There is no resort available on this island. Roof-water harvesting is the only available source for drinking and domestic requirements. Every house in this island is having a roof-water collection system. Some of the houses have two tanks of 20 KL capacity each. Ferro-cement tanks constructed prior to 1994 (10 KL capacity) is also under use. All material like HDPE tanks, pipes, valves, bibcocks are imported from India.



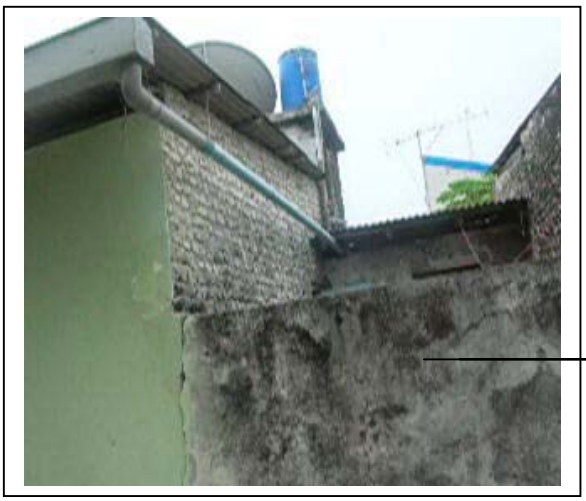
Interesting aspect is that people use roof-top collected water for running even the washing machine. Another interesting aspect is that local people listen Hindi songs and they heard of Hindi actors like Shah Rukh Khan and Amir Khan.

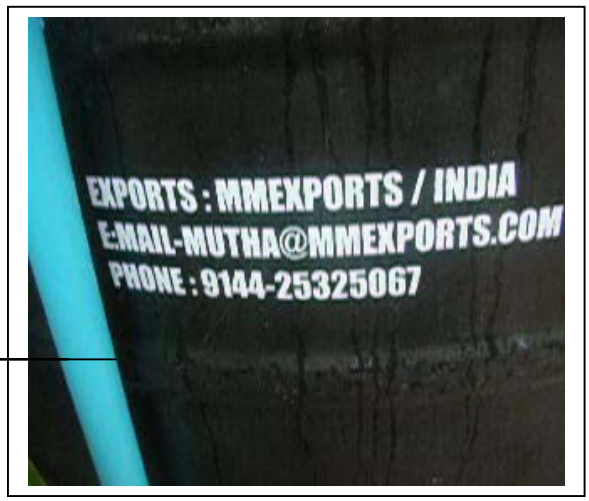


Toilets are conventional pour flush model connected to septic tanks. Unless proper treatment if envisaged, the effluent emanating from the septic tanks would pollute the ground water regime.

Discussions were held with Atoll Chief. He said roof-top water is the predominant source of drinking water though some ground water is being extracted. The local people are also conserved about the domestic

sewage pollution. An aeration based treatment plant is being constructed.





Lessons learnt ::

- Rainwater is the purest form of water available and it should be tapped for drinking before it is discharge into land.
- Roof-water collection can bring in drinking water security in villages/islands during the entire year.
- People are aware of non-rainy season of January-March and they use water judiciously during this period.
- RO Plants are not only capital cost-intensive but its maintenance cost is just not affordable by the local poor people.

- Ecologically fragile coral reef systems get disturbed/ impacted on continuous discharge of untreated sewage water/ brine solution from RO plants.

Way Forward

- Andhra Pradesh, Haryana, Kerala, Madhya Pradesh and Rajasthan would take up pilot projects based on individual/ community based roof-top rainwater harvesting systems, arrive at water budgeting based on demand projects by the community, link up to other traditional water harvesting structures and bring in drinking water security.
- These success stories would then be upscaled to the entire country stating the message that "collect rain water before it gets polluted and require treatment and pumping to reach the villages".

The Visiting Team to Maldives place on record the hospitality extended by Shri Avanindra.K.Pandey, High Commissioner of India in Maldives and his Team during the period of stay.