Behavior Adaptations to Climatic Variability in the Use of Water for Drinking and Sanitation in the Dry Region of Sri Lanka

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One of the most urgent challenges facing the world today is ensuring an adequate supply and quality of water for the people.

In addition to growing demand on water, climatic variability has intensified the problem.

But there are still major gaps in our basic understanding of water availability, dynamics, and the impact of changing climate on human activities.
In this sense, the understanding of behavior patterns of the people in response to climatic variations will be very important when we plan, Community Water Development Projects in regions where water is a scarce resource.
What is happening in Sri Lanka?
Sri Lanka experiences remarkable climate variations.

Such variations preliminary affect rainfall pattern, runoff in river basins, surface water, water storages and ground waters.

As a result, a large population of rural communities living in the Dry region is suffering from water problems. (especially traditional tank villages)

Behavior patterns, attitudes and perceptions on water, and water utilization techniques have remarkably changed.

These changes indicate significant adaptations to the climatic variation.
Sri Lanka – Climate in general

- Climate is characterized by double monsoon with two regimes - South western monsoon - May to September
- Northeastern monsoon – November to February
- The rest of the year, experiences uncertain convectional rainfall or no rainfall
- High temperature- over 28°C throughout the year
- Distinct short wet and long dry periods
Due to high temperature couple with high evaporation (4.8 per/day) - rapid loss of water from surface and storages

Long term (1950-1980) mean annual temperature is 27°C
In the Dry Zone 30°C
Wet Zone 28°C

Long term annual rainfall - 3000mm
In the Dry Zone - 1500 mm
In the wet zone - 4600mm
Increasing trend of rainfall (mm)
Rainfall amount increased but with unfavorable intensity (mm/ per rainy day) has increased - this means heavy storms within short times.

- 1990-1999: 09 mm/per day
- 1999-2005: 11
- 2005-2012: 15

Extreme amount of water availability confines to a short period while longer period of the year experiences lack of water.

Change of monsoon rainy periods
Northeastern- monsoon (generally 04 months duration from November to February)

- 1900-1999: 04 month (November to February)
- 1999-2000: 03 months (October to December)
- 2000-2009: 03 months (December to February)
- 2009-2012: 02 months (November to December)
How these, impact on water resources?
Impact on tanks (reservoirs)

- Drop up rate of water storage due to evaporation loss has increased
  
  - 1990 - 3.36 mm / per month
  - 1999 - 4.20 mm / per month
  - 2010 - 4.68 mm / per month
  - By 2012 most tanks were status of dried up to their dead levels
A dried up tank
Ground water

- Water table has subject to distinct fluctuations
- When rainy times, water table rapidly rises but in dry seasons, remarkably drops down.
- In the most part of the year, open domestic wells are in the status of completely dried up
Open dug well
# Changes in the use of water sources

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<th>Past. prior to 1900</th>
<th>Purpose 1 Drinking and sanitation</th>
<th>Purpose 2 Agriculture</th>
<th>Purpose 3 Home gardening</th>
<th>Purpose 3 Animal husbandry</th>
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<td>Present After 2000</td>
<td>Rainwater harvesting (Roof and ponds) Community water supply schemes Public water supply</td>
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<td>Rainwater harvesting</td>
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? problematic sources
Changes of attitudes and behaviors

In the Past...

- Tank was the central point of the village life. Water was regarded as a sacred thing. Tank was protected and conserved by villagers themselves.

- Physically they lived in close proximity to the tank. They maintained a specific landscape based on the tank.

- Water was mainly used for two season cultivation. Water itself and the tank were managed by village community themselves.
A modeled Old Tank Village Landscape in the Dry Region of Sri Lanka

- **Catchment forest**
- **Tank**
- **Settlement dwelling**
- **Paddy field**
- **Downstream**
- **Irrigation channel**

Stream
Now..

- People have no concern of irrigation tanks – because of paddy cultivation has been neglected.
- Now - much water not need – because of gravity fed irrigation agriculture has been out of concern.
- No need to live close to the tank – because of it has been abandoned.
- Traditional social organization based on tank has been collapsed – because tank is not now their central point of life.
- Ground water has become the prime source of water for drinking and sanitation.
Evolution of the water use
Permanent well
Hand pumps
A new Agro-well
Roof Rain water tank
A Rainwater pond
Water pumping
Hard excavation searching for water
Transformation of village settlements
Thanks