

# Household Water Treatment for Water from Surface Water: Ponds in Salinity Affected Areas

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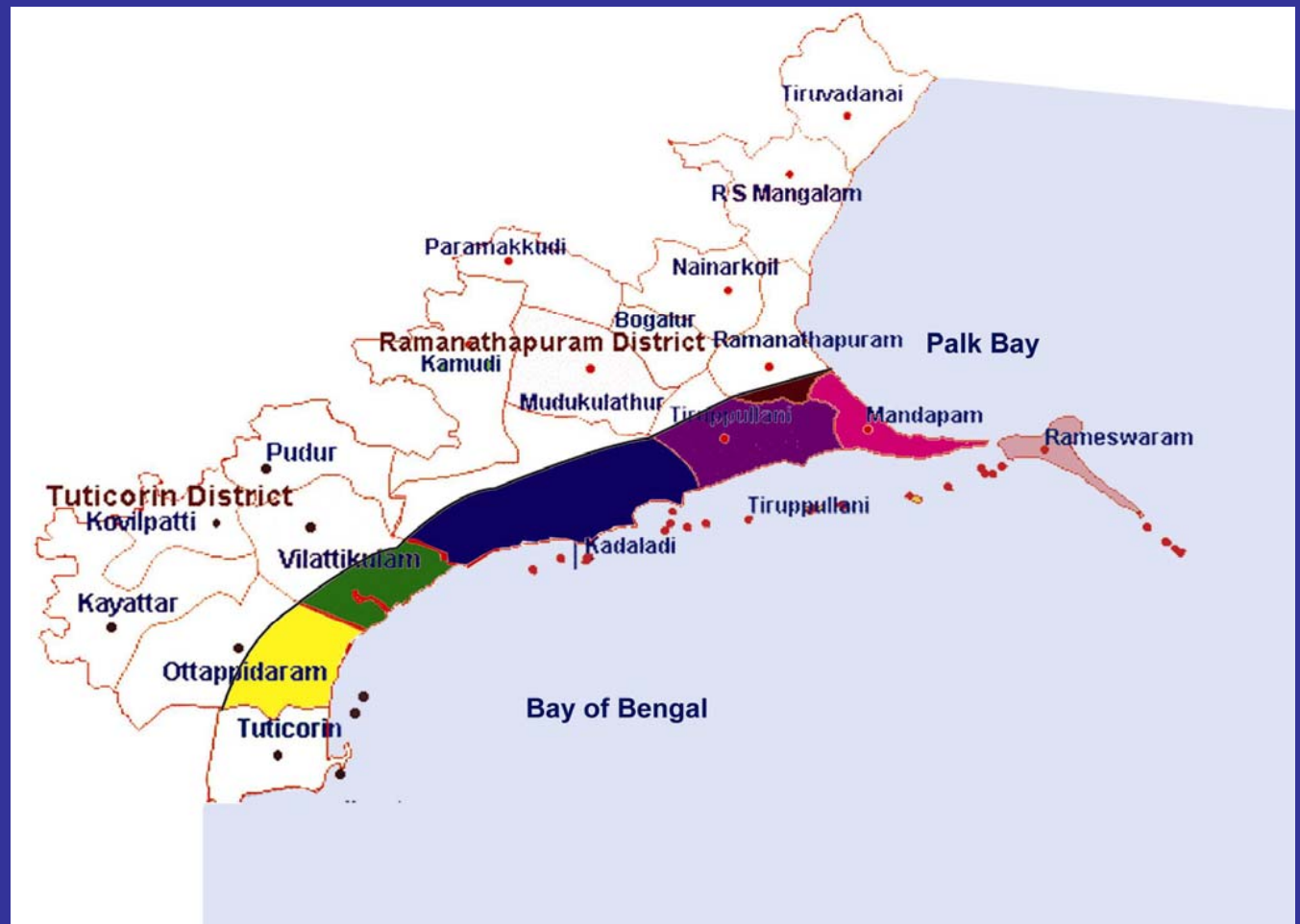
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# Tanks and Ponds in Southern India



# Coastal Districts of Ramanathapuram and Tuticorin in southern India



# Coastal areas of Southern India

- Geology is fluvi-marine zones, mostly with saline ground water
- Closer to the sea, water is mostly saline and not fit for consumption of animals and men
- Soils are deep vertisols with black clay
- Surface water is mostly muddy with high turbidity – suspended colloids of the black clay

# Present Drinking Water Sources

Ground water below 3 m is highly saline

- Surface water from rainfall runoff harvested in open village ponds
- Shallow ground water from wells closer to the ponds
- Water oozing from top soil layers in the depressions dug out from the dried river beds

# In the Indian state of Tamilnadu

- Around 3 Million people still depend on water from the ponds as their source for drinking water due to
  - Non availability of any other source – ground water
  - Taste preference over the available source of water
  - As a customary and traditional use

# Ramanathapuram in Southern India

- Coastal and drought prone district around 2000 sq.km
- 2010 habitations (villages) with 1 Million people
- Groundwater is saline.
- Drinking water: A survival issue
  - Lack of access to water more than 68% of the population have no access to safe drinking water
  - Burden on women
  - Drain in public money

# In search of Drinking Water: A common scenario



# Waiting endlessly for water



# All in One Village: Government Efforts to Provide Water

- Desalination plants - reverse osmosis plants
- Combined drinking water supplies linking several villages
- Several (average 6 per habitations) hand pumps
- Bore wells fitted with motors and overhead tanks

None of them working

# DHAN Foundation Programs

- Revival of Village Ponds
- Deepening
- Technical improvement to hold more water
- Fencing

Around 40 village ponds revived serving around 50,000 population for drinking and domestic use

# **Results of IWMI's Research on Ponds revived by DHAN Foundation 2003**

- **One of the most innovative solutions**
- **Most preferred, Superior in quality, Low Cost, Reliable and affordable solutions compared to Desalination, Combined drinking water systems**
- **A Savings of 2.5 hours every day in fetching drinking water**
- **Quality needs to be improved. TDS and Bacterial contamination are the major threat.**

# How do villagers get their drinking water ?



# Pond with a well in Ramanathapuram, Southern India



# A Pond with a Well, Ramanathapuram, Southern India



# What does the water contain ?

Parameters	Standards	Pond water
Turbidity (NTU)	5-10	98 - 472
PH	6.5 - 9.2	8 - 9
TDS (mg/l)	500 - 2000	<500
Chloride (mg/l)	200 - 1000	<100
Faecal coli form per 100 ml	Nil	>300

# Turbidity

Turbidity can not be removed by filtration

- Water contains suspended fine clay in colloidal state comprising of Quartz, illite-smectite
- Take very long time may be weeks to get the particles settled

# What do the villagers do ?

- There are no collective or village level water treatment mechanisms for treating the pond water.
- Since the government declares the ponds as unsafe, no development work undertaken with a view to make them as a source of water.

**Household water treatment**

# Household Water Treatment

Clay removal is the biggest treatment at the households – pathogens are not removed

1. Use of seeds *Stychnos Potatorum*- a peanut sized seed is enough for 1 pot of 12 litres
  - Scratch the pots holding water and the mud settles – the taste of the water does not change – no control of pathogens

# Household water treatment

2. Add 1 litre of saline water for a pot of 12 litres –
  - taken from the nearby hand pumps and the mud settles – the taste of water changes to saline and no control of pathogens
3. Adding burnt Kankar – a calcareous rock powder
  - Add around 10-20 grams of the powder for a pot of 12 litres and stir the water – no change in pathogens and the taste of the water changes

# No filter mechanism works

- Due to the presence of clay none of the filters work – they are prone to immediate failures
  - Candles made of ceramic and carbon choke up immediately – even a residual amount of clay chokes the candles
  - Biosand filters marginally reduce the clay but does not get choked

# Considering the difficulties in candle filters.....

- Biosand filter is introduced and promoted
  - Households use the same clay removal mechanisms by seeds or adding saline water or the powder from the calcareous rock
  - Then the water is put into the Biosand filters

# The Filter Project



# Use of Biosand filters

- It is affordable Rs 750 (18 USD) to make them in the village
- Does not get choked due to the clay
- Plans for deploying around 1000 filters to develop an institutional model for large deployment