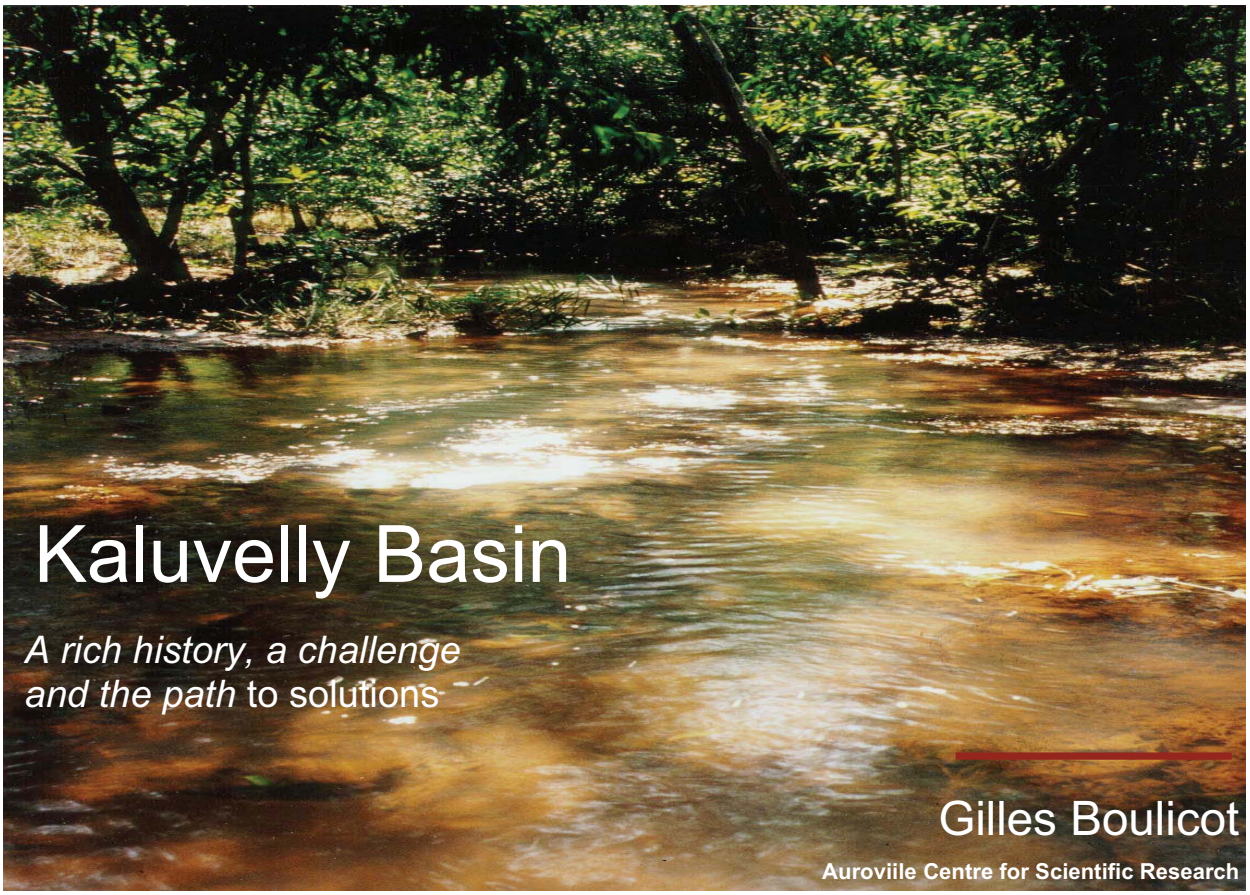
*Presented at*

Auroville
Green Practices

Seminar and Site Visits
26-28 August, 2010



# Kaluvelly Basin

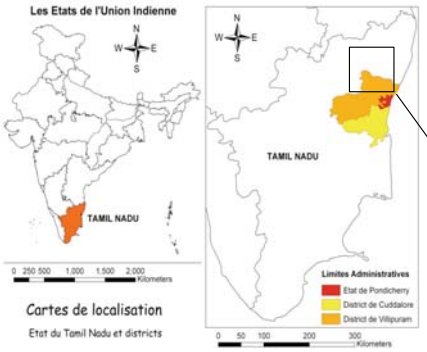
*A rich history, a challenge and the path* to solutions

Gilles Boulicot
Auroviile Centre for Scientific Research

# Context: geography & climate

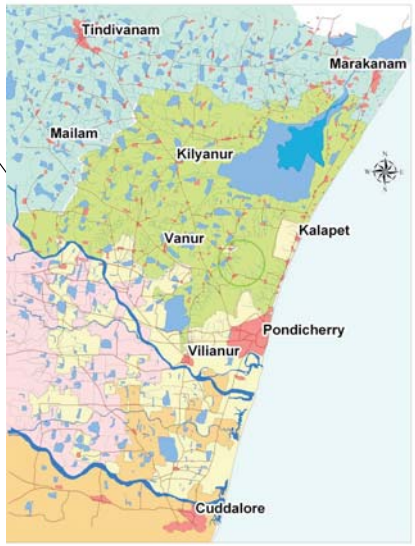

**Tamil Nadu**

Available water resources volume -> 28 000 Mm_
Used water volume -> 32 000 Mm_
=> **A deficit of water already exists**




**Coastal sedimentary basin of Kaluvelli-Pondicherry**

- 1500 km_, 70 km_ swamp
- > 1,2 M inhabitants
- 60% rural



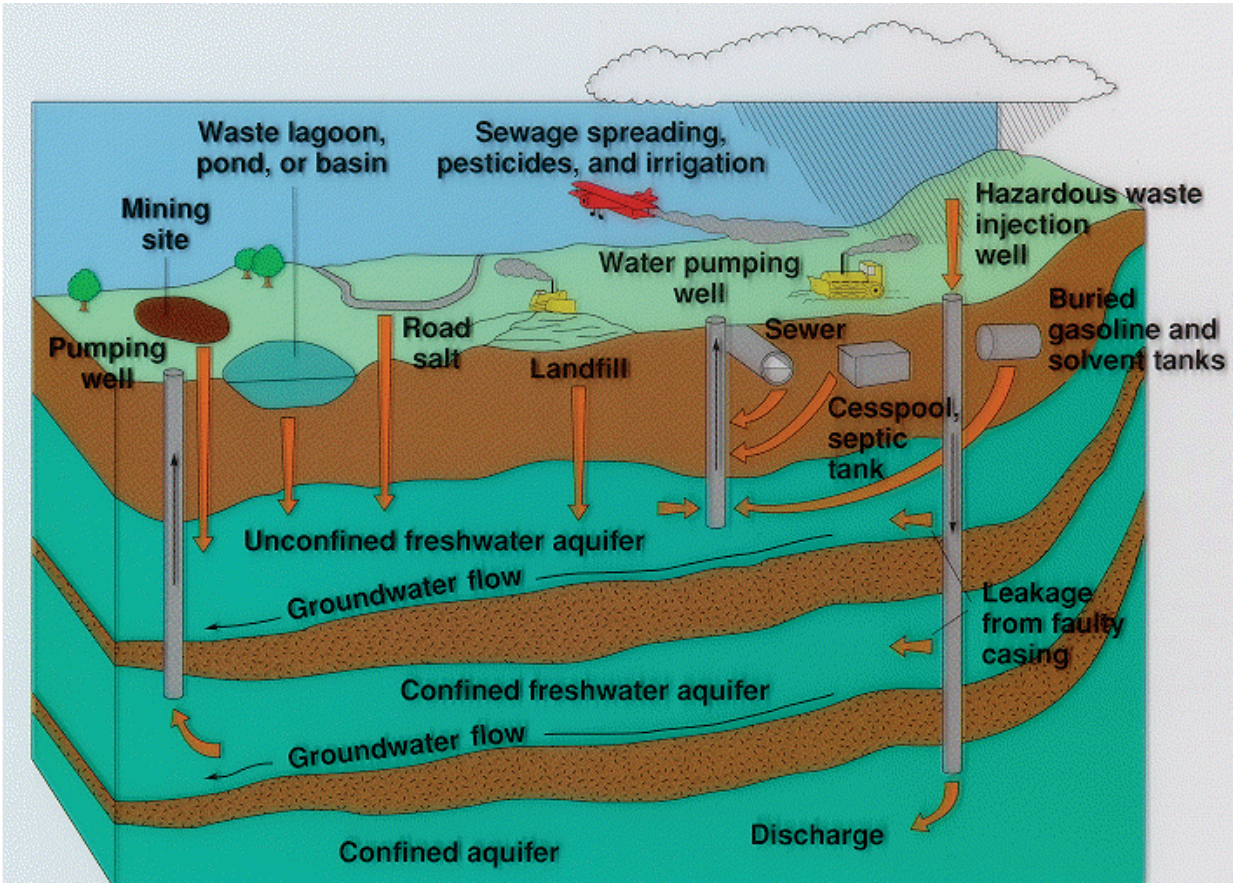

**Climate**

- semi-arid: PET > Rainfall ~ 9 months/year
  Efficient rainfall 3 months/year
- rainfall: ~1300 mm/year with monsoons
  SO (Jul.-Sep., 40%)
  NE (Oct.-Dec., 60%)



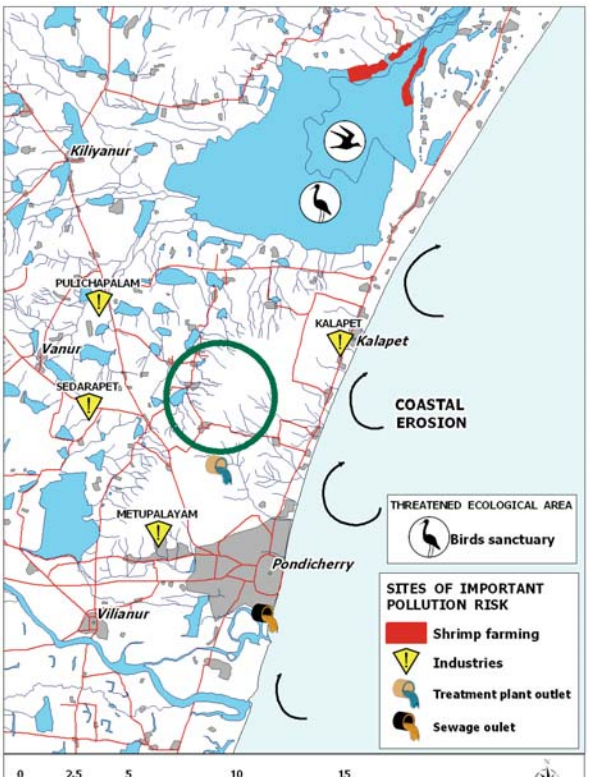
# Coastal zone problems in India

- Population pressure
- Destruction of Mangroves
- Waste water disposal
- Increasing urbanization
- Solid waste disposal
- Coastal constructions
- Natural disasters
- Impact of ports
- Coastal erosion






# Major Sources of Environmental Degradation




- Over exploitation of water resources
- Degradation of surface water structures
- Erosion
- Non Source Pollution
- Solid waste
- Wastewater
- Major infrastructure development
- Endemic plant species eradication

…

# Present situation of land and communities

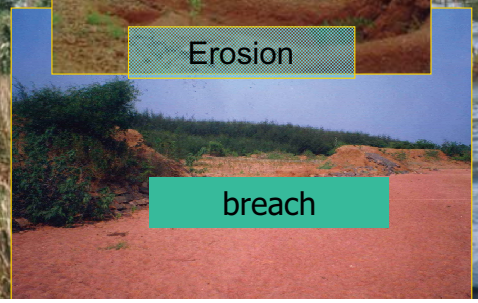
## State of Water Structures in the area


Damaged weir


Erosion

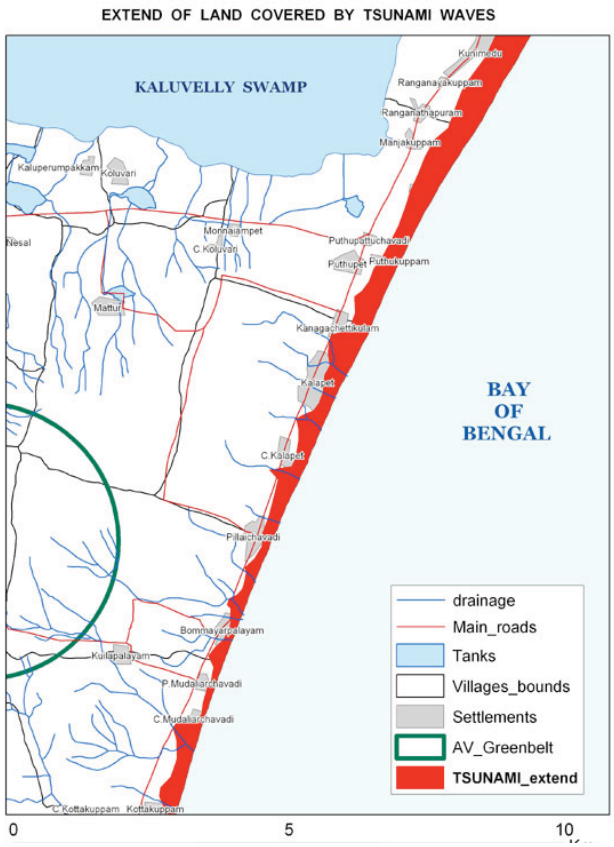

Silted check dam


Weir covered by vegetation

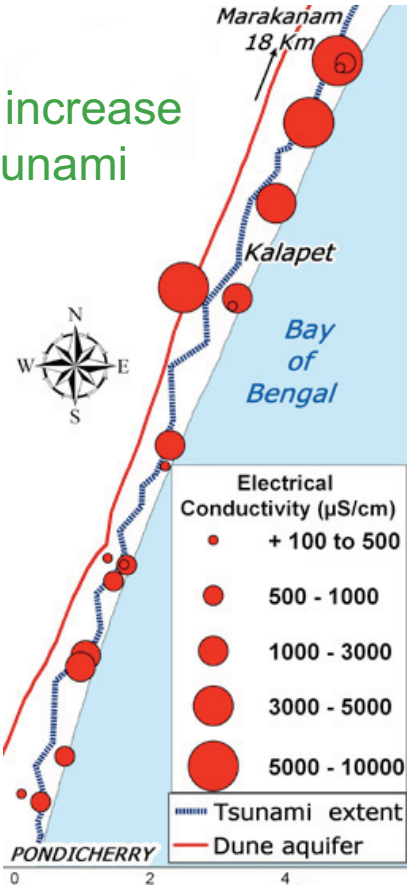

breach

## Difficulties faced by the population

- Land degradation
- Sanitation
- Water access
- Social structure
- Gender issue
- Public health
- Income generation



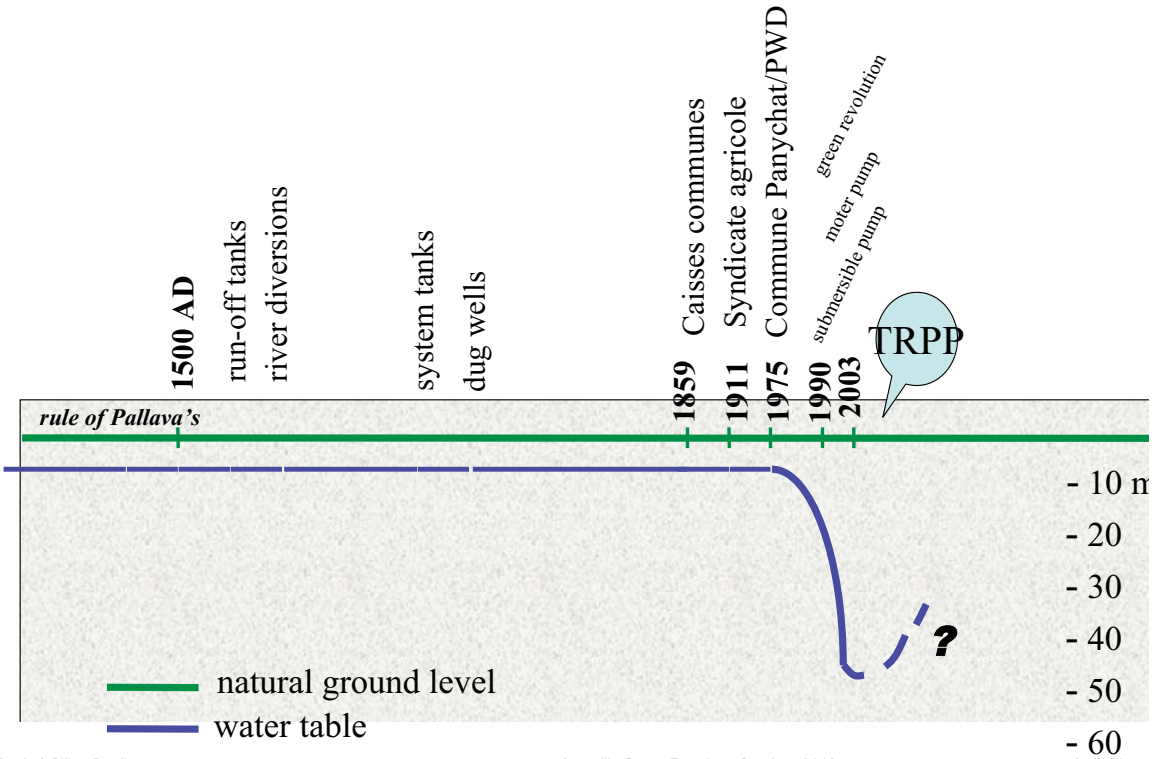

## Salinity increase after Tsunami



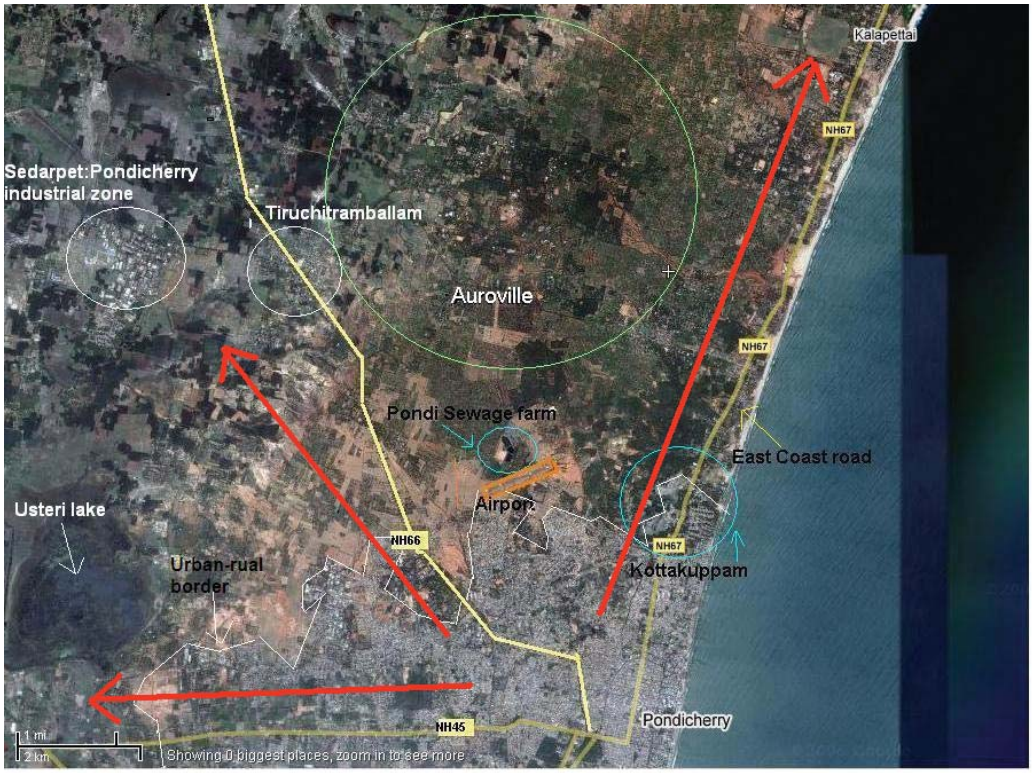



## Time Line

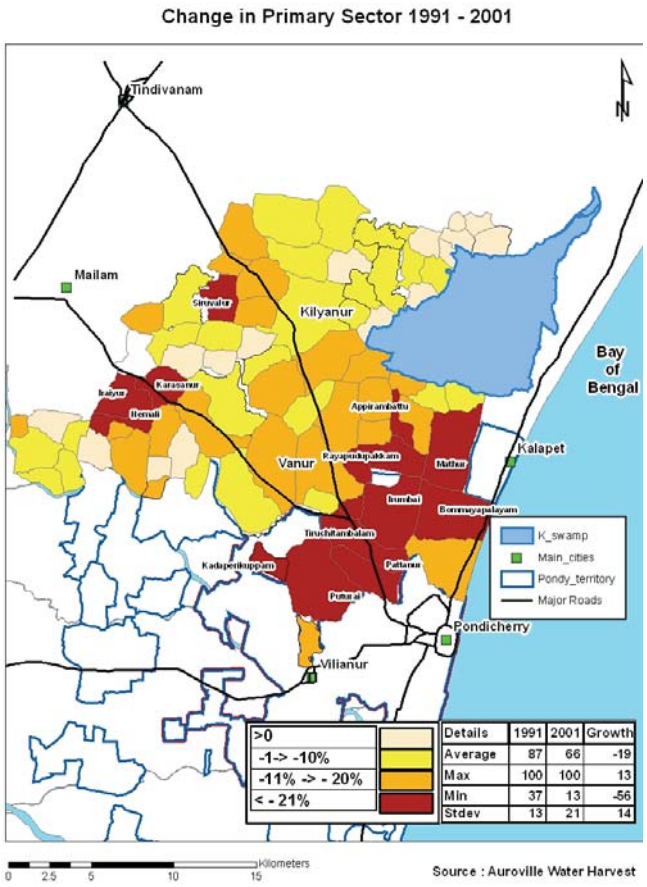
Change in water table in Pondicherry during the last 1000 years



# Urban sprawling

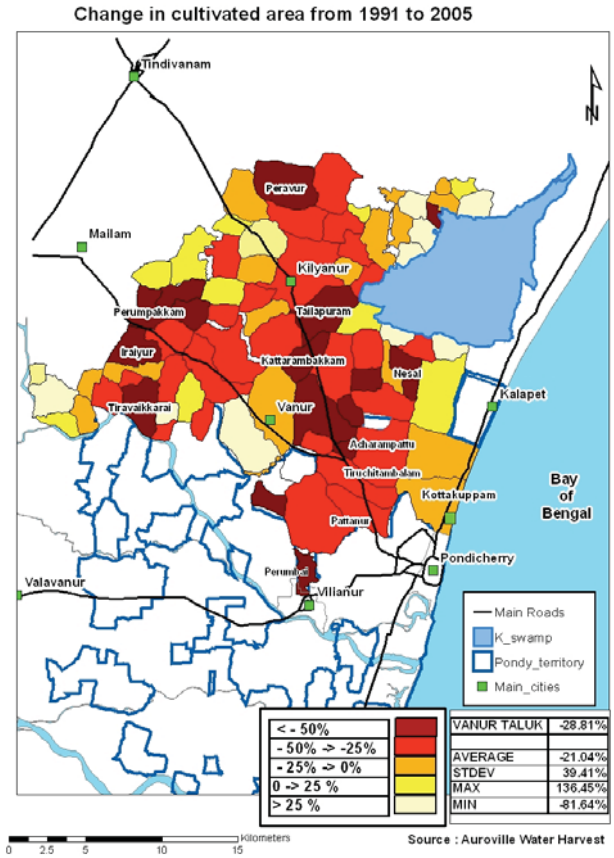





# Change in Primary Sector

- Strong decrease in primary sector
- Influence of developing areas
- Further extension




## Change in cultivated area

- Cultivated land : -28.81%
- Strong reduction : Pondicherry-Tindivanam national highway, Western-Southern part of Vanur taluk, Perambai, Tiruchitramballam
- Kaluvelly swamp: opposite tendency



## Domestic Consumption

- 46 liters per person and per day on the average
- leakage : 34 LCD
- Extraction related to domestic consumption : < 1 % of global extraction.
- Extrapolation: 15 % of population growth and increase in water supply to 110 lcd => 2025: 4.4 MCM : 3 %

**Hence, domestic consumption is not the main issue**

# Basic Recommendation

- To create watershed agencies with appropriate empowerment, accessibility to information, representation from stakeholders, government and population, and a clear mandate of transparency and participation.
- Concepts like urban watershed management, integrated resources management, sustainability approach must be included in the tool panel and the public has to be consulted
- Education, awareness and participation process must be systematized to create a responsible and empowered civil society
- Ongoing networking effort at national and international level, with the support of scientists, must be maintained and developed`



# Specific Strategy

*Development of a Pilot and Reference Watershed for Integrated Water and Land management with Stakeholders Participation*

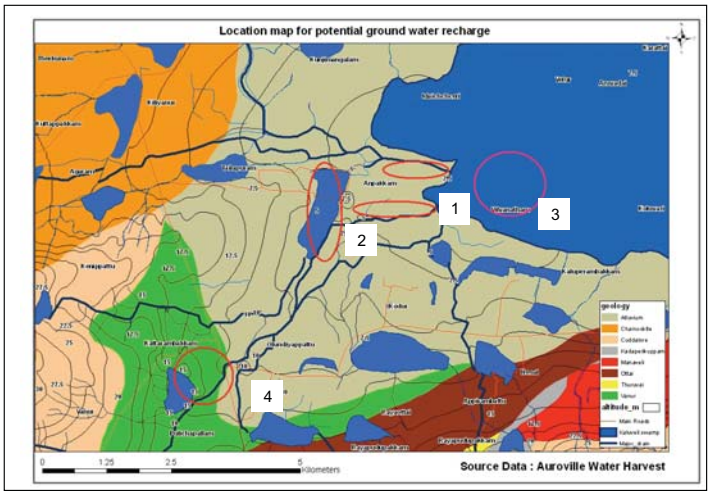
*WHAT*

- Massive Groundwater Recharge
- Drainage system Rehabilitation
- Afforestation along the water ways
- Systematic promotion of Appropriate Irrigation Practices and Organic Farming at Watershed level with full scale stakeholders participation
- Market accessibility
- Integrated Urban Water Managemer

BY

- Involvement of State and Central Government agencies
- Involvement of Research Organizations
- Involvement of local NGOs
- Involvement of the population through awareness, capacity building, trainings, empowerment, policy making

# Potential recharge zones



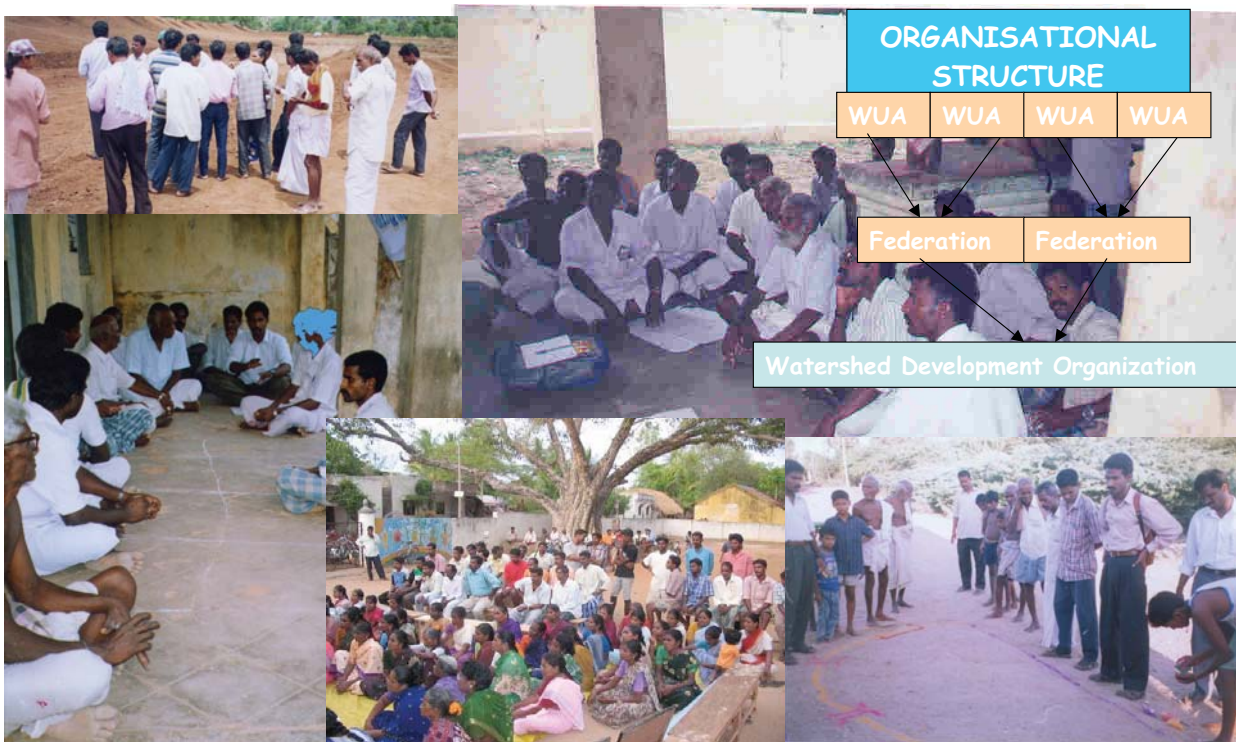

1. Along the channels
2. The tanks
3. Western part of the Kalluveli
4. Outcropping of the Vanur aquifer

| Recharge localisation \ Criterias | Distance of the water flows from the recharge area | Porosity of the surface soil | Porosity of the sub layers | Availability and occupation of the land | Output |
|---|---|---|---|---|---|
| Along the channels | + | + | + | - | ++ |
| The Tanks | ++ | -- | + | + | ++ |
| Western part of the Kalluveli swamp | +++ | -- | - | +++ | +++ |
| On the outcropping of the Vanur aquifer | - | + | ++ | -- | 0 |

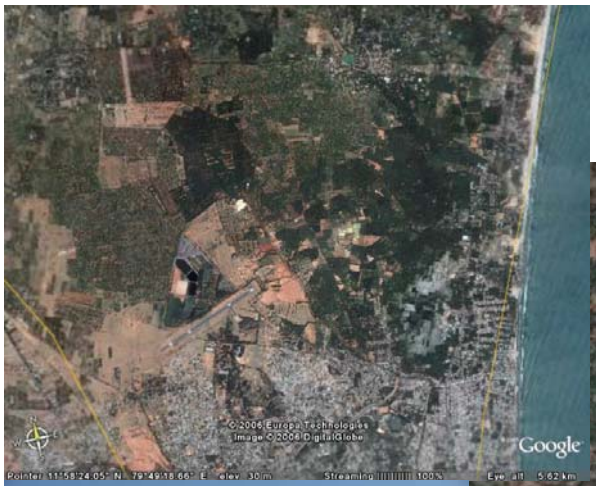
Recharge localization labeled by their criteria suitability



# Involving important stakeholders on Water Resources Management through active participation



# Puducherry Sewage Farm: 13 000cum/d !







# Wastewater management and recycling for 10 000 people

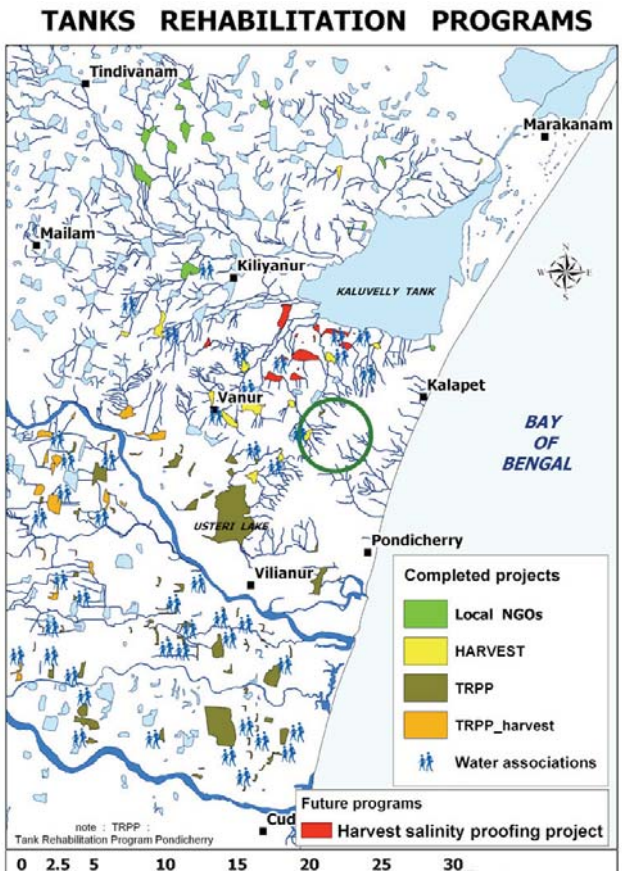
# 2007-2012 a Crossroad for the Future

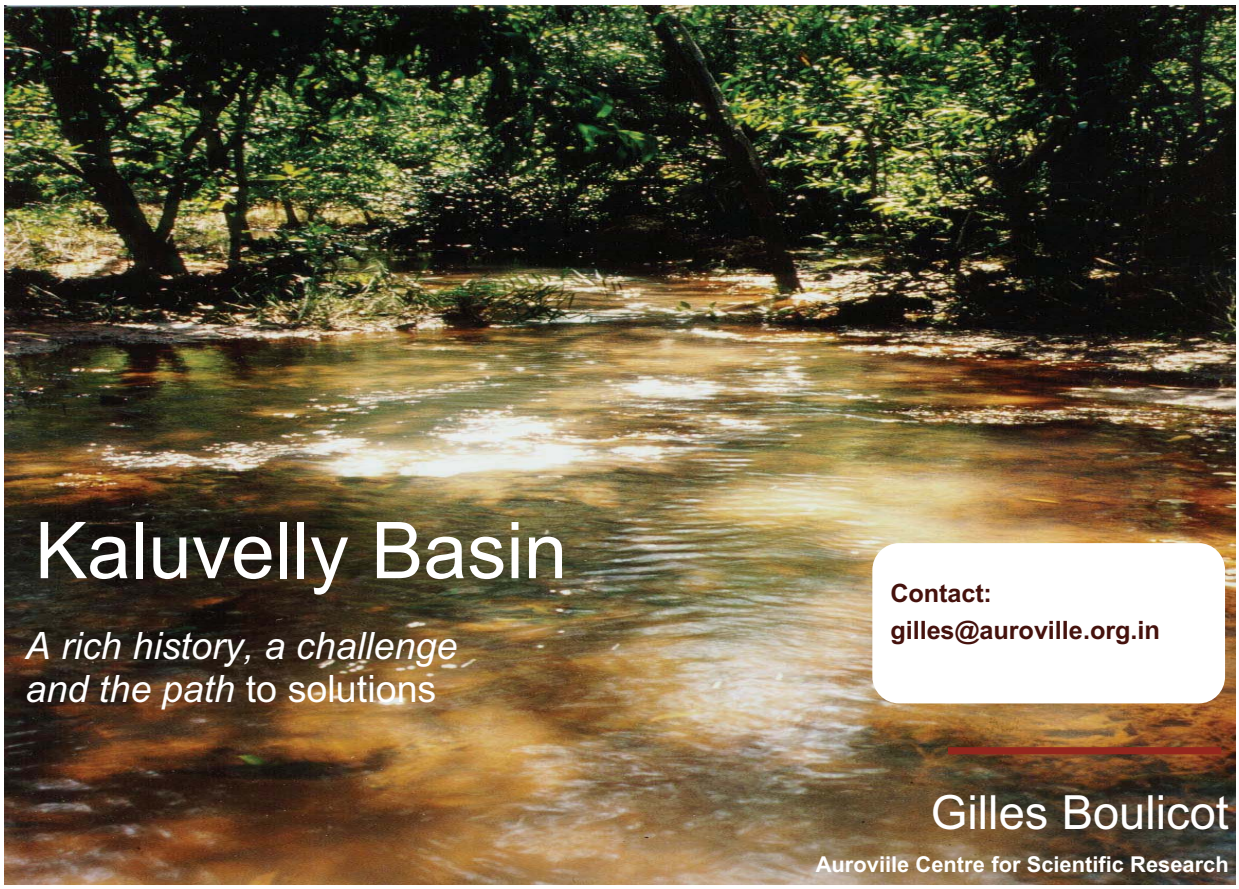
- Optimal reaction: Installation of large and systematic programs on management of water resources, repairing of the structures of drainage and storage; massive groundwater recharge, reafforestation, systematic conversion to perennial agriculture less water demanding and managed locally, with access to market adapted to modern India => stabilized situation and economical growth
- Mitigated reaction: sea water intrusion delayed, endangered zones extending very quickly, loss of soil fertility, impoverishment of the population, migration of population, development of another type of economic activities with a very fuzzy visibility on the future of the area at greater scale
- No proper reaction : salinisation of the principal aquifers, mineralisation of the soil, no access to fresh water, massive populations migration by stages, collapse of the rural life, high-tech development poles around desalinisation process, quasi impracticable remediation in a conceivable scale of time



# Presence on the Ground

- Irrigation Tank and Channel Rehabilitation Program (> 140)
- Network of Water User Associations (>200)
- Integrated approach on water, sanitation, awareness etc
- Regular monitoring of resources
- Networking with NGOs and Government Partners
- Networking with International Organizations and Research Institutes





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