Concept for Water supply in Auroville City Area

Auroville 2011

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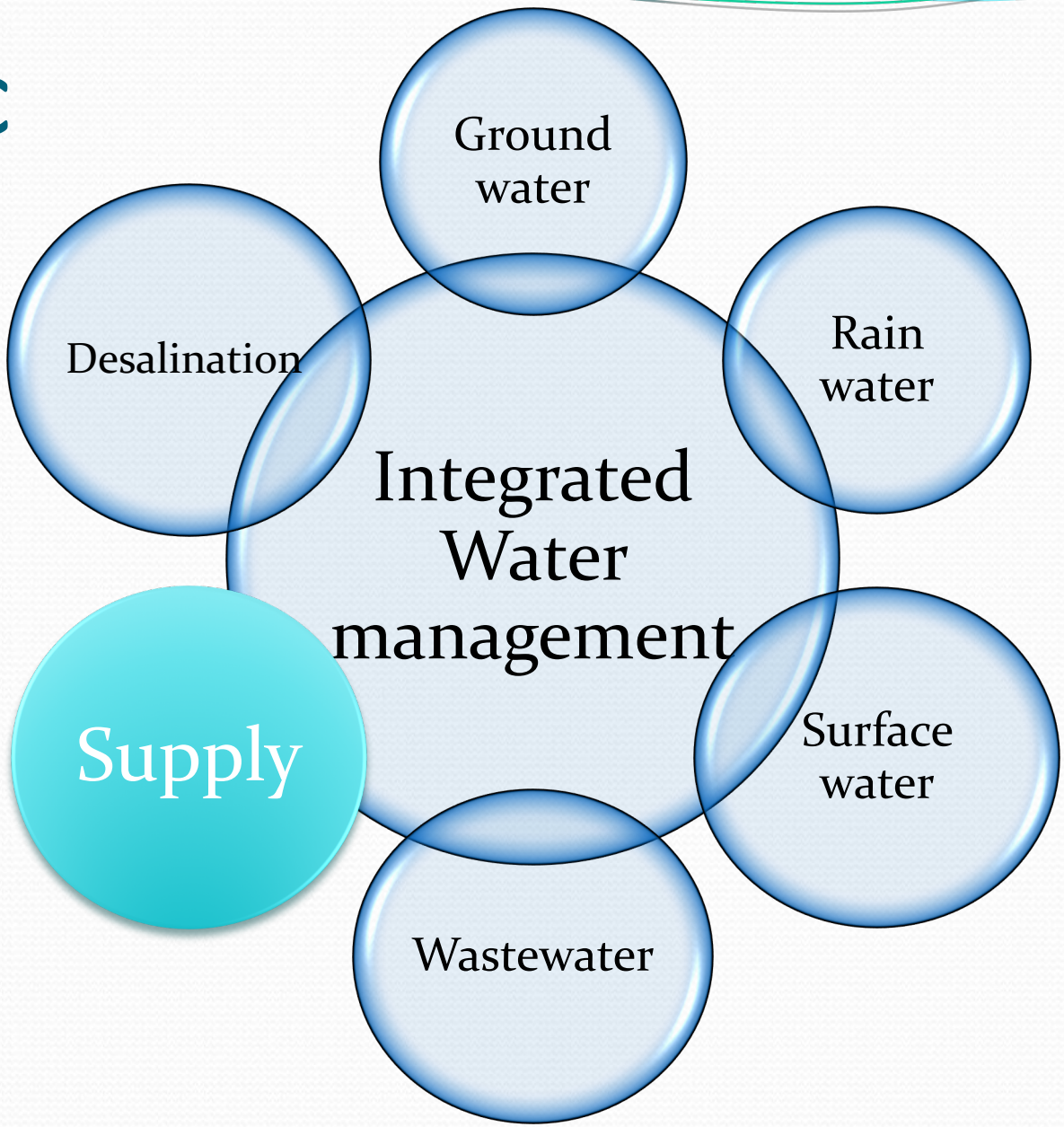
Topic


Ground water
Desalination
Rain water
Integrated Water management
Supply
Surface water
Wastewater

Why have we decided to develop a concept?

- By looking at immediate needs, means, sustainability and scalability, various solutions are possible and must be investigated
- The actual water supply systems is not evolutive and leads to a dead lock :
  - no separation of resource management and supply
  - Very complex network
  - Fragile (well collapsing…)
- The study conducted by Dirk and Toby is not defining a concept but develop a detailed solution
  - Alternative options are not studied
  - Use of existing sources of water is absent and multiple sourcing is not investigated
  - Lack of adaptability to changing and difficult to predict context
  - Fully dependent on new resources, not yet available: existing wells disregarded
  - Fully centralized, monolithic, captured approach
  - It does not offer solutions for immediate needs

Goal

- To allow for immediate development in identified areas
- To develop appropriate, robust, affordable, scalable water supply infrastructure
- To allow for multi sourcing and interconnectivity at later stage
- To avoid interfering with the to-be-defined water policy
- To test a practical oriented solution

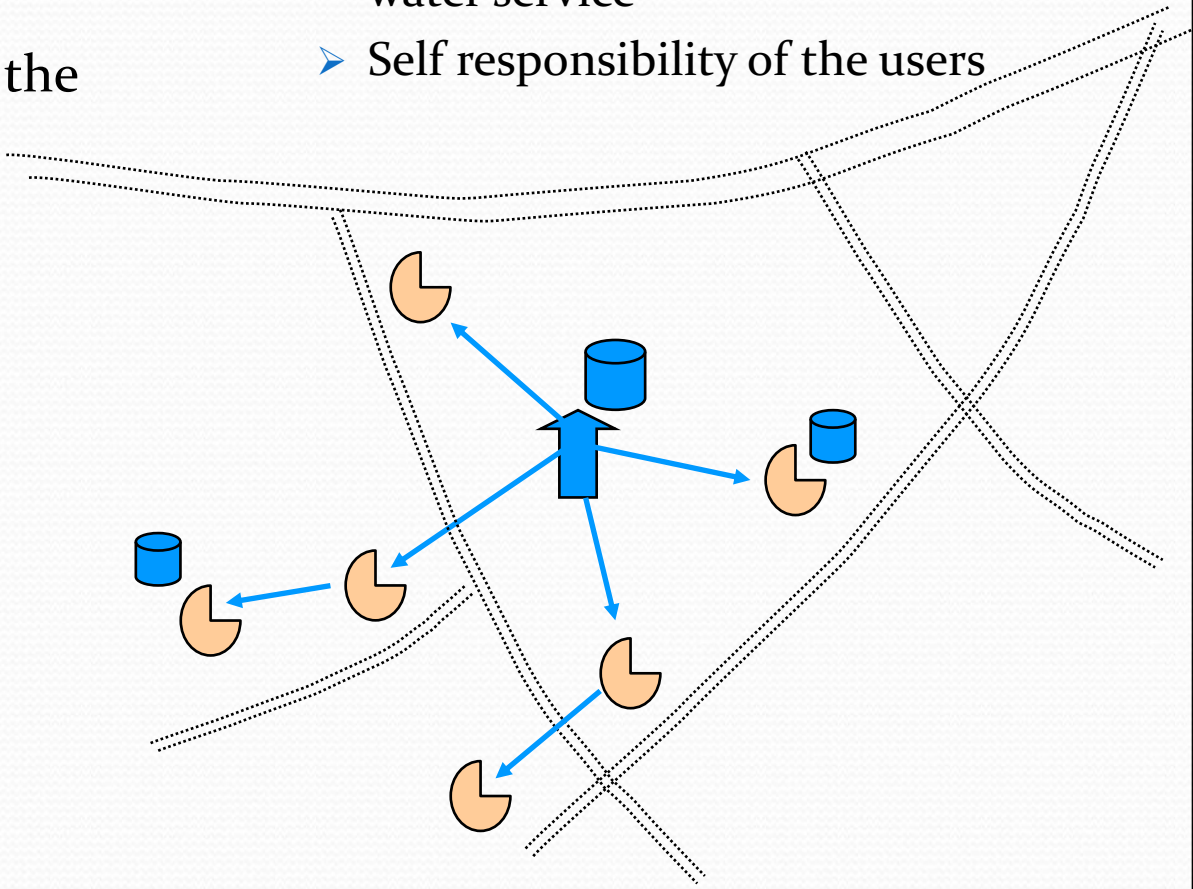
Water Policy - orientation

- Validation and limits of usage of groundwater
- Groundwater recharge and pollution control
- Surface water management
- Scope for usage and limitation for various sources (costs, energy efficiency, fragility, social issue…)
- Wastewater management
- Recycling of rainwater and wastewater
- Consumption control, regulation and equipment
- Quality requirement, hygiene and public health
- Local actions and regional actions

Present situation

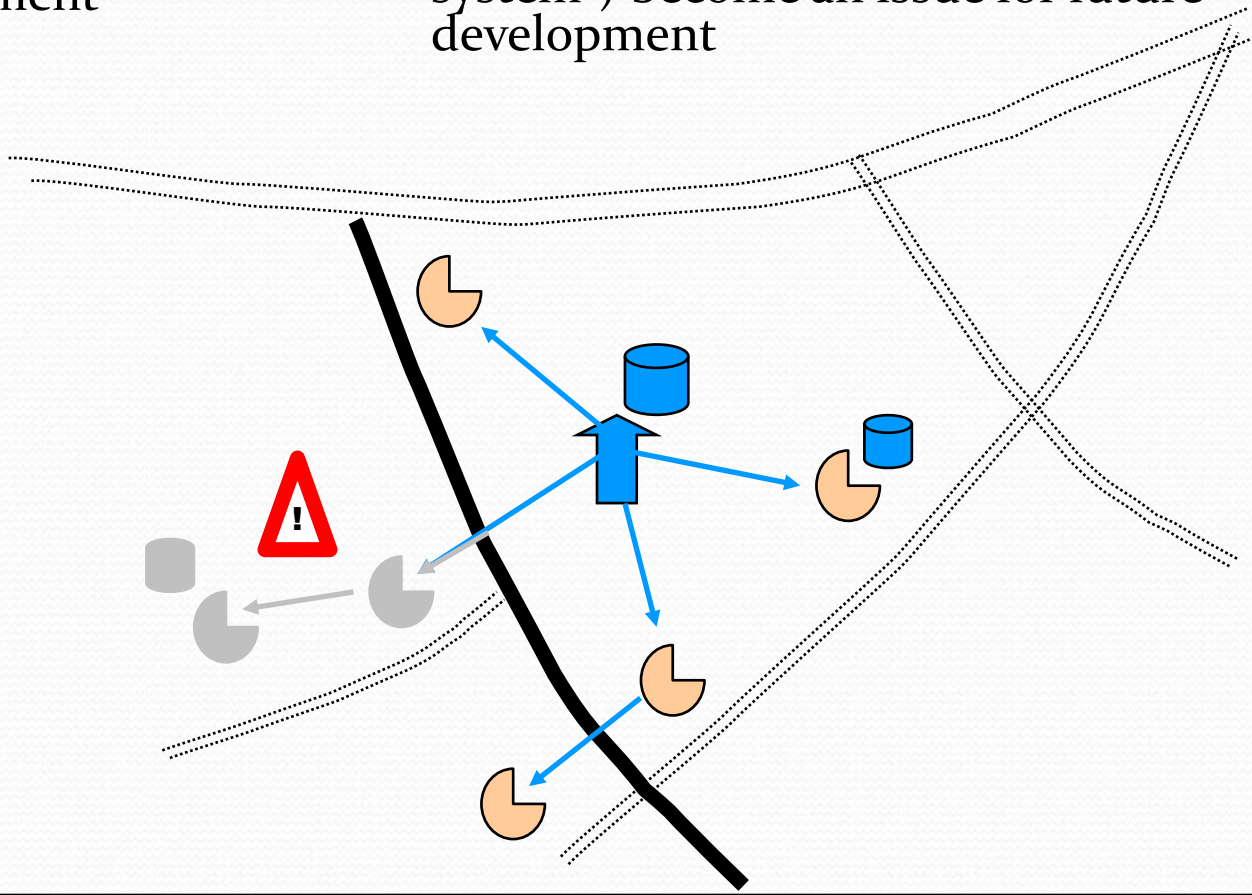
- Water supply in cluster with people/ project connected as they come around a well or several wells
- Network in tree structure
- No usage of public areas but the shortest way

- Advantages :
  - Cheap
  - Autonomous, no need for a public water service
  - Self responsibility of the users



Present situation

- Drawbacks:
  - Dependence on local resources, no or poor back-up
  - Poorly documented: risk of damage during further development
  - Such network can conduct to supply collapse for all users
  - No sharing or resources (“privatized system”) become an issue for future development



Threats and opportunities

- Even without a water policy one can assume that
  - For the time to come ground water will remain our main resource : cheaper, already available
  - The present extraction capacity is largely sufficient to cover our present and near future needs
  - Through time the degradation of groundwater will generate decline of some bore wells (dry or saline)
  - It will force the need for sharing resources
  - Other sources would then need to be used: Multi sourcing will become necessary

Sourcing from a practical point of view

- Immediate: locally and already made-available groundwater
- Medium term: groundwater from larger area (extra wells may become necessary)
- Longer term: rainwater, surface water or desalinated water

Sourcing from sustainable point of view - Groundwater

- Fluctuating through years from a quantitative point of view
  - Leakage through discontinuity in the upper structure
  - Multi layer tapped hence despondency to larger area
- Collapsing at a regional scale
  - Over extraction
  - No regulation
- Deteriorating at regional scale from a qualitative point of view (salinity increase)
  - Direct result of over extraction
  - Affected areas: beaches, Cuddalore formation along the coast
  - Threaded areas: all areas depending on Vanur formation
  - Note: for Auroville, only the few deepest wells are concerned by the threat to Vanur, the Auroville beaches and the area around Auromodel by Cuddalore salinity intrusion.
- Upper strata directly replenished from Auroville plateau

Hence

- Unsecured at a regional scale in the medium to long term
- "Reduced" insecurity possible locally through appropriate measures.

Sourcing from sustainable point of view
Surface water

- Fluctuating quantitatively through years (Large rainfall fluctuation)
- Quantitatively sufficient to feed Auroville's population even in driest years
- Fully controllable locally:
  - One can catch and use what falls on one's head
- A perenial resource: Whatever the volume, it rains !
- But … difficult to harvest because of few, scattered and heavy rains
- Sensitive to pollution
  - Urban development as polluting factor
  - Atmospheric pollution
  - Uncontrolled waste disposal
- Social issue : surface water replenish kolams and erys down the stream from Auroville plateau
- Can be easily collected from a topographic point of view
- Can easily recharge water table on Auroville plateau at many places because of high infiltration rate through proper landscaping and greenwork
- Will increase as the city develops

- <u>Hence</u>
  - A secured resource but sensitive to many factor
  - Must be fully integrated in planning and development at every step
  - Can be positively managed through systematic infiltration and … Matrimandir lake's feeding as water supply resource…

Sourcing from sustainable point of view
Desalinization of seawater

- Very stable resource
- Single point source, easy to connect
- Highly dependant on power supply, heavy machineries , & human resources
- Social issue: Non sharing of resources is risky
- Practical issue: pipes passing through private land, hence difficult to secure
- Financial issue: who pays what and for how long (investment, running)?
- Ownership issue: existing proposal based on privately owned system

- Hence
  - A secured resource but sensitive to many factor
  - Because of its stability should be integrated in planning and development

- Note: Alternative such as desalinization of groundwater, much easier and cheaper, must be kept as an option

Objectives, phasing

- The main objective is to provide Auroville with a water supply system for:
  1. Multi-sourcing for water supply including ground water, surface water and desalinization in order to ensure sustainability and guarantee the reliability of the system
  2. Sharing of resources by proper distribution system at city level
  3. Supply of water of appropriate quality, with scope for drinkability if judged adequate at end user level
  4. Water accessibility at local level to allow for development
  5. Development of accessible infrastructure for operation and maintenance along public space

- BUT…
  - Multi sourcing is complex and will take time to realize
  - We are not enforced to realize it immediately
  - Water supply system must follow the progress in planning, especially space allocation (grid)
  - Water distribution at city level is not required for the time being or in the short term
  - Local distribution following appropriate and evolving design is most appropriate for the time being

Objectives, phasing

- So, we propose to focus on objectives 3 to 5 for the time being by:
  - Developing and upgrading local networks
  - Preparing the ground for
    - Interconnection and sharing at city level
    - Multi-sourcing

Identified areas for development

Residential Zone Sector 1 and 2

- Status :
  - Relatively well defined development plan
  - Existing water supply infrastructure and dedicated well
  - Unconnected wells available
  - Capacity for additional water extraction sufficient for the 5 + years to come
  - Very poor piping and distribution system
  - Extra connection will generate even more difficulties
  - “Privatized” infrastructure (capital transfer?)

“Administrative area”

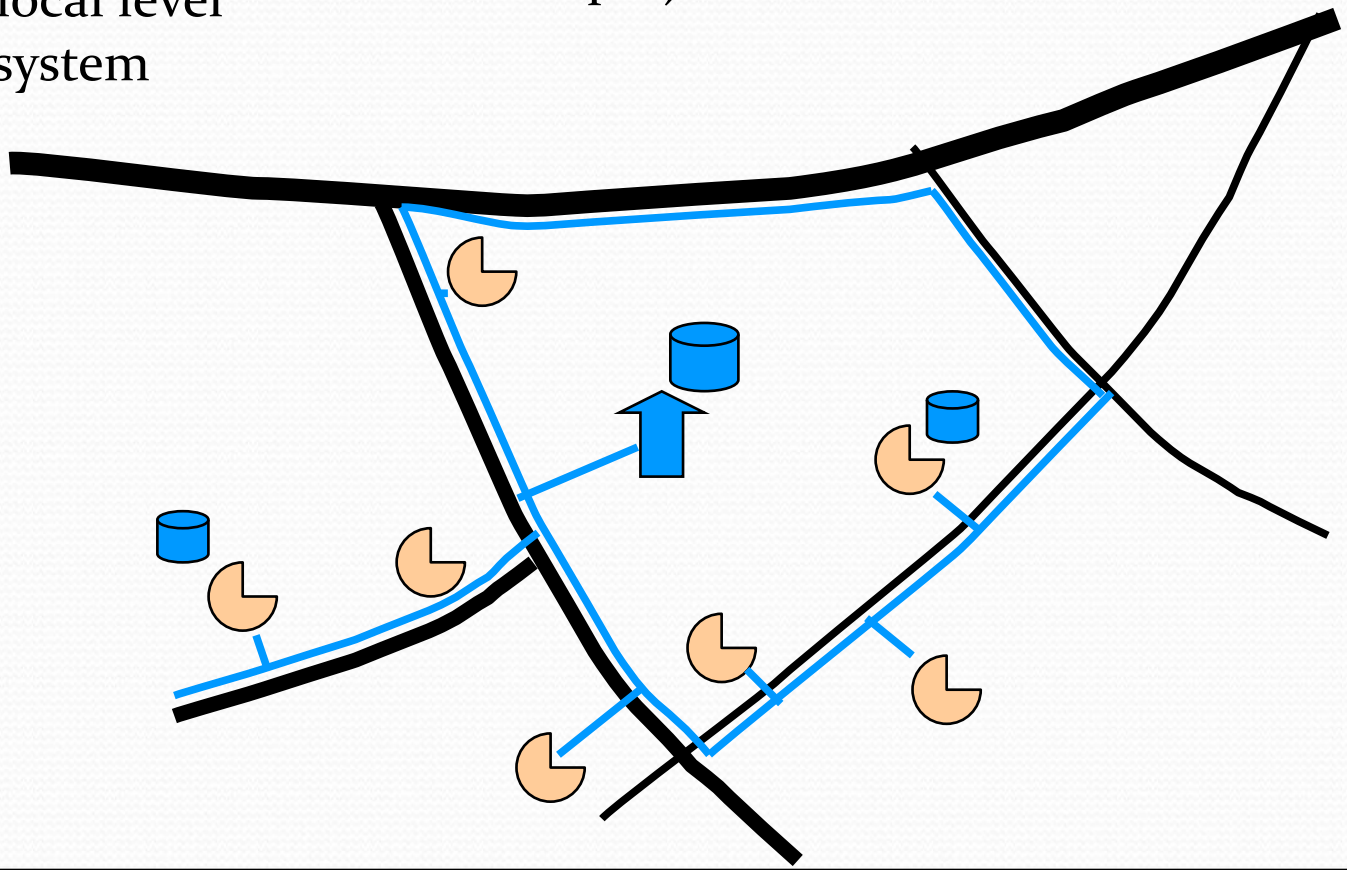
- Status
  - Hardly defined development plan
  - Poor and unsecured water infrastructure
  - Unconnected wells not identified
  - Potential for water supply not clear (source?)

Industrial zone

- Status
  - Unconnected well available
  - Potential for extra water supply limited
  - Hardly defined development plan
  - Poor water infrastructure

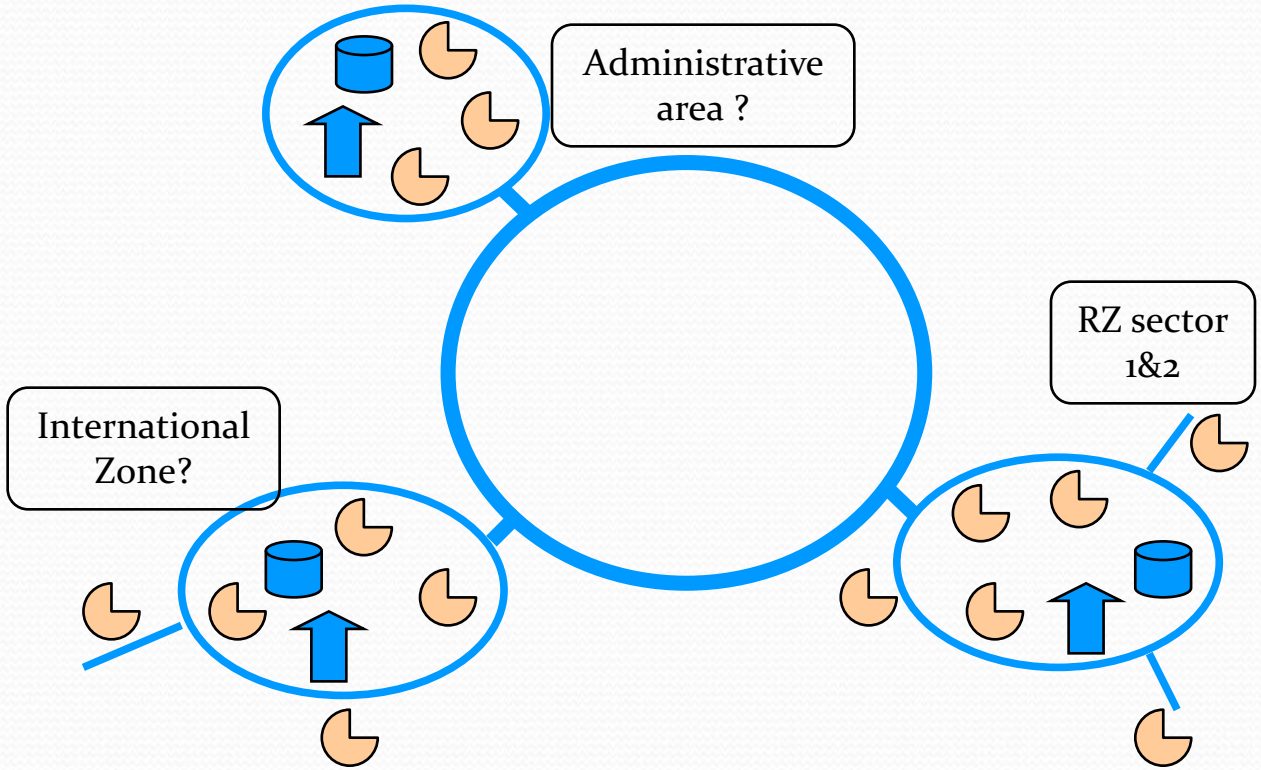
Proposed solution: Step 1 – 2 years

1. Local Loop System
   - Feeding from several bore wells to a common sump at local level
   - Distribution at local level through a loop system
   - Final “”in-plot” water distribution pertain to the project holder



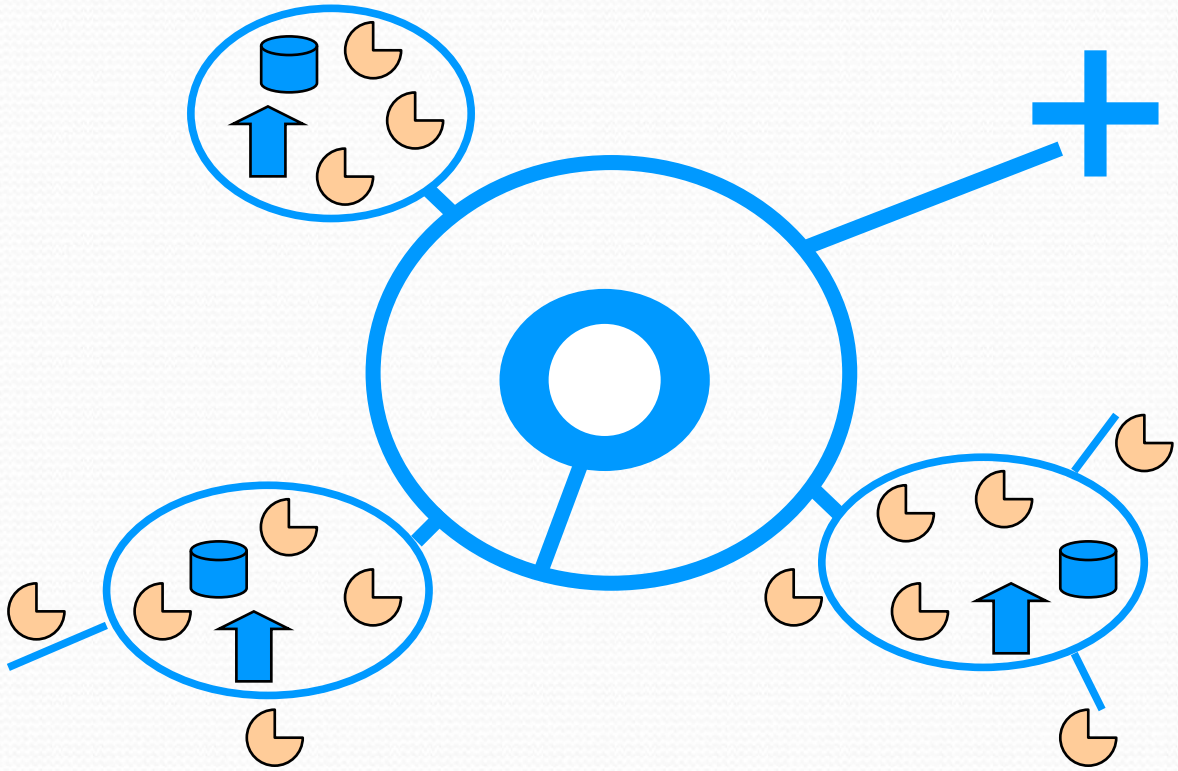
Proposed solution: Step 2 – 2 to 5 years

2. Interconnectivity through a central main feeder :
   - Supply of excess water to other areas => sharing of resources
   - Demand of water from other areas => access to larger resources



Proposed solution: Step 3 – 3 to 20 years

3. Connection to other sources through the central main feeder :
   - Multi sourcing : surface water, Matrimandir lake, desalinization…
   - securing water accessibility



Next steps

1. Definition of areas for infrastructure positioning
   - Planning group
2. Clarification on Administrative area and International Zone
   - Planning group
3. Dimensioning and specification
   - Study group
4. Costing
   - Study group
   - Deadline: end of March