Hilden Project

**ARTIFICIAL RECHARGE PROJECT &
AUGMENTATION OF SURFACE IRRIGATION
IN THE COASTAL AREA OF VANUR TALUK,
VILLUPURAM DISTRICT, TAMIL NADU, INDIA**

Phases of Hilden

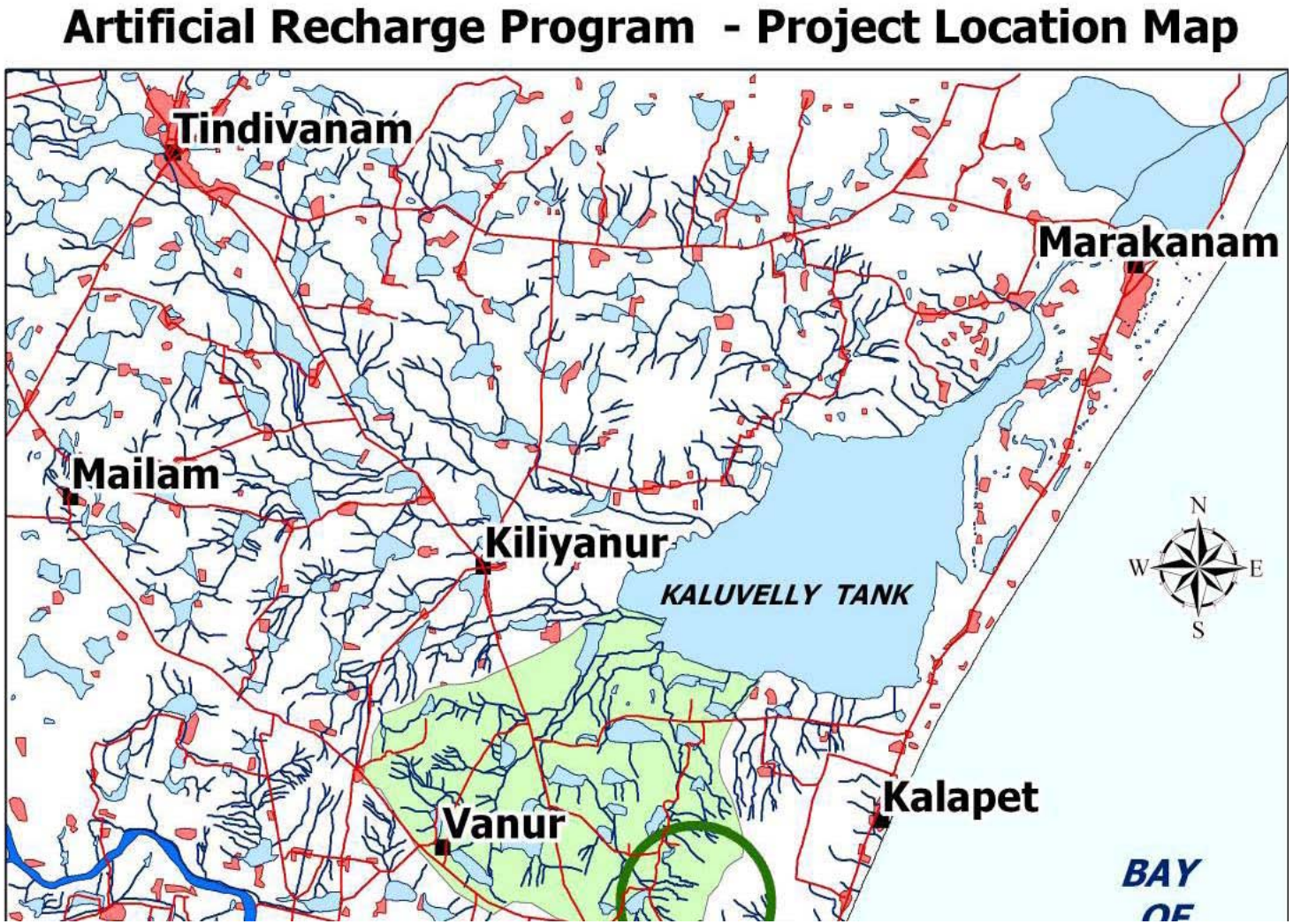
- First Phase 2006-2007
- Second Phase 2007-2008

Project Area

The natural recharge zone of the main aquifer of the region, Vanur sandstone aquifer

1. **Vanur**
2. **Annpakkam**
3. **Pulichapallam**

Location Map



Aim of Project

- To promote people culture and their sustainable use of rainwater harvesting technology
- To improve groundwater recharge
- To protect the quality of the water for the large population living on the coastal area
- To capture more of the run off of rainwater
- To try and protect the coastal area from salt water intrusion of our aquifer

Objectives

- To assess the present status of the harvesting structures and to improve it on the basis of people's expectations.
- To sensitize the village community towards rehabilitant the ponds as a community asset and to make the landless women of the village as partakers in the process of tank development.
- To improve the irrigation capacity of dry land farmers by constructing series of check dams
- To recharge the ground water by storage in the ponds and minimize the ground water depletion
- Assessment of hydrological aspects of the tank and to estimate the probable benefits to the rural through increased capacity of the ponds and check dams
- To conduct revenue survey on the implemented area of ponds and check dams and to demarcate the tank boundaries, so as to find out the extent of the encroachment
- To understand the technical feasibility of the tank to initiate the project interventions, thereby developing the overall environmental scenario of the area.
- To monitor the reality of the state of the surface and ground water, Recharge wells and observations wells are important dynamic of the project

Rationale of the Project

- The extraction rate is more than the annual average rainfall of the region
- The ground water level of the project villages are existing belowm sea level
- The saline aquifers of the neighboring villages are threatening the fresh water aquifer
- Vanur sandstone one of the main aquifer of the area, and is an ideal location for artificial recharge
- Highly silted water holding area of the existing pond and cause poor water storage.
- Deforestation activities and inadequate water conservation practices induce heavy runoff in the catchments area which leads to poor water retention on the surface resulting in poor infiltration of rain water

Phase of work

The project work will be carried out in single phase in one year. Starting from Community mobilization, pond desilting , Construction of series of check dams, Recharge wells and Observatory wells.

i) Social Mobilization

ii) Implementation

iii) Monitoring

Social Mobilization

- This component is the Key activity
- This Activity is done by co funding.
- To take the major role for increased capacity of stallholders in O&M of Activites
- To form the new user group or adopt the existing group
- Trained regarding in Operation and maintenance of Rain water harvesting structures

Physical implementation

- 2 Check dams
- One Pond and one outlet weir
- Clearing channel of the catchment of Check dams
- Sand Filters -2
- 2 Recharge wells
- 2 observation Villages

Checkdams

Purpose of the Checkdams

- The purpose of the construction of the check dams are mainly for arresting the runoff water for storage, which would percolates back into the aquifer as well as be used for irrigating fields.
- This valuable resource (rain water) can be allowed to recharge the aquifer and not be wasted by draining into the sea.

Methodology for Checkdams

- Design Catchments Area
- Selected the appropriate constructed area at the Odai
- Design structures considering runoff, Depth of Storage and Type of Soil
- Clearing the channel for free flow
- Monitoring

Specification of Checkdams

Description	Pulichapallam	Annpakkam
Length of Body wall	6.0 M	9.0 M
Type of Surplus	Weir	Weir
Material Used	Random Rubble	Random Rubble
Height of Body wall	1.50 M	1.20 M
Width of Bodywall	0.45M	0.45M
Protection wall	Wing wall	Wing wall

Impact of Checkdams

- Change in agriculture output around the check dam
- Change in green grass cover over the effected area
- Change in salinity in affected soil area
- Change in water level in surrounding open wells (depends on the fillings. Last year both check dams had 10 fillings)
- A lot of earlier water is protected by arresting and storage the water
- Increasing the recharge rate. (During runoff recharge is minimum. When controlling runoff by keeping storage recharge is maximum on storage periods
- Soil erosion was controlled by strengthening the side bunds of the odai
- A proper balance between soft water and sea water will be maintained, thus preventing the risk of a fast salinization of the area

Outcomes (Check dams)

- 1.540 cubic meter earthwork was taken at pulichapallam. 0.05mcft water storage increased(14.15 Lakhs liters)
- 4.225 cubic meter earthwork was taken thus by increasing additional storage 0.15 mcft increased (42.46 lakhs liters)
- 300 meter bund was strengthened both at Pulichapallam and Anpakkam
- 500 meter Odai was cleaned for free flow at both Pulichapallam and Anpakkam

Recharge Pond -Innovative

- Two Different storage level in One Tank
- Water from the catchments enters into the first pond which was built to be lower than the second pond. So most of the silt and sediment are deposited into the first pond.
- The water reaches a certain height before it starts to fill the second pond. The second pond due to its ingenious design doesn’t fill up with sand and silt.
- The water from both tanks discharge into the aquifer
- During the heavy rains most of the water will be captured in all the series of tanks and dams. A part of the water will overflow from the tank and via channels end up in the Kaliveli.

Specification of Recharge Pond

- Length of bund: 330 m
- Deepest bed level: + 20.60 m (Above MSL)
- Full tank level + 21.30 m (Above MSL)
- Maxi. Water level: + 21.90 m
- Catchments: 1,95 sqkm.
- Nature of catchments: Average
- Total annual rainfall 1.250mm.
- Yield from the catchments: 0.131m3

Impact of Recharge Pond

- A Recharge pond is an artificially created structure that captures water. The subsurface is highly permeable so most water captured percolates and recharges the ground water (aquifer);
- Sufficient number of wells and cultivable land will benefit from the augment of ground water

Recharge Calculation

Area of the Catchments = 0.12sq.km

Rainfall infiltration factor = 0.16

Total recharge in one filling = 0.12*0.16;

= 0.00192 mcum,

= 1920 cum,

= 1920000 liters. Total no. of fillings in monsoon = 8 fillings

Possible recharge amount = 8*1920000

= 15.360m3.

Outcomes of Recharge Pond

- 250 meters of bund was strengthened;
- Recharge is ensured;
- Monitoring recharge observation well on the upstream side was provided;
- Increase of 22.400 cubic meter capacity;
- 8 to 10 surrounding wells are benefited from the extended capacity of the Vanur outlet pond

Monitoring

Monitoring Components for RECHARGE

1) Recharge well at Aanpakkam
2) Recharge well at Pulichaplaam
3) Observation well at Vanur recharge pond (Upstream)
4) Observation Well at Vanur recharge pond (Down stream)
5) Two Sand Filters for Two Recharge wells

Specification of Wells

Sl. No	Description	Depth of Well	Earth Dia	Pipe casing Dia
1	Annpakkam Recaharege well	150feet	16 inch	12 inch
2.	Pulichapallam Recharge Well	150feet	16 inch	12 inch
3.	Vanur Observation well (Upstream)	70 meter	8 inch	4 inch
4	Vanur Observation well (Down stream)	70 meter	8 inch	4 inch

Monitoring water level

- At Vanur Recharge pond,
  - Before water level
  - After water level

Constraints

- Artificial Recharging of Ground water is the latest technology, which has been developed, in the recent past to try to recharge the depleted aquifers. Till recently, the need of recharging the ground water was less felt and ground water was still considered an endless resource.

Where we are

Without rational water management both at the surface and in the ground , Our future is isolated. Selection of techniques and adaptation of that technique by local farmers or rural remains always a challenging task for any development agency.

Conclusion

- Harvest confident that this project could achieve its true and its goal through Hilden, Which is the recharge of the ground water of the excess water from the surface and the education of people to manage their own sources.