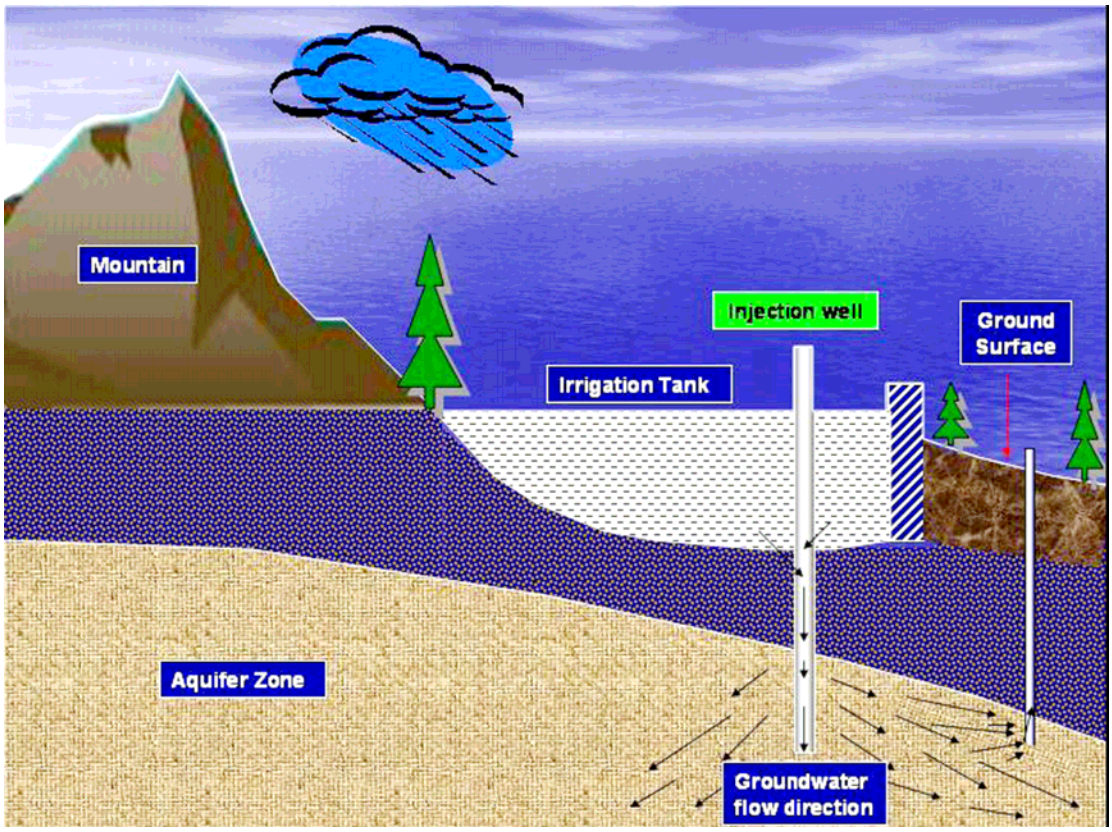
SUCCESS STORIES OF ARTIFICIAL RECHARGE TO GROUND WATER: ANDHRA PRADESH

With increasing demand of water by various sectors, pressure on ground water resources has increased tremendously in the state. Being majority of the area comprising hard rocks, replenishment to ground water is limited through fracture/ joints and in upper weathered layers. Recharging of aquifer at sites indicated feasibility and positive impact on ground water scenario.

Artificial recharge to the ground water in the state of Andhra Pradesh, have been carried out at following location by agencies and proved successful:

1. Pulakuntlapalle Artificial Recharge Scheme.
2. Report on Recharge of Abandoned dug wells in Chennareddy palle Village, Pendlimarri Mandal, Kadapa District of Andhra Pradesh

1. Impact Study on Groundwater recharge From AGR Structures Pulakuntlapalle Micro Hydrological Unit



Evaluation of Recharge from Artificial Groundwater Recharge Structures

Pulakuntlapalle micro hydrological unit is located in primary catchment area of Dhiguvetigadda Hydrological Unit in Ramasamudram Mandal, Chittoor dist. The study area (322 Ha) lies between 130 27' 32" N to 130 26' 12" N latitude and 780 23' 18" E to 780 24' 10" E longitude.
Three kinds of structures are executed in this hydrological unit, they are:

1. Desilting of Utlavani cheruvu and Madhaiah Kunta:

De-siltation is proposed in the tanks up to the fullest extent of depth where the fracture system/ weathered granite system is traversing. This silt will be used for both tank bund strengthening and application in catchment area fields. The water is stored in the pit after rains and infiltrates into the aquifer zone. The stored water spreads into the aquifer zone to all directions and recharging the groundwater. The depth of the silt varies from 5 to 9 feet. Desilting in the two tanks for storage water, they are one in Utlavani cheruvu and another one is at Madhaiah kunta.

2. Drilling of Injection wells:

Three injection wells, one at in Utlavani cheruvu, one at in Bayya reddy cheruvu and another at Kothakunta to a depth of 400 feet, were drilled in the pre-defined location based on the Geophysical Investigations. Construction a recharge shaft to ensure the higher rate of good quality recharge to the deeper aquifer created filter media.

3. Check dam:

One check dam was constructed to conserve the soil moisture and to maintain the ecological balance to some extent in the vicinity. Usually it is constructed where there is a stream flow which helps for recharging of the surrounding Bore wells and Open wells in influence zone. Also it is constructed in the stream which will act as an obstruction from which the water will divert either through conduits or channels which reaches to the nearest Bore well/ Open well through filter media. This method is used for recharging of Bore wells/ Open wells.

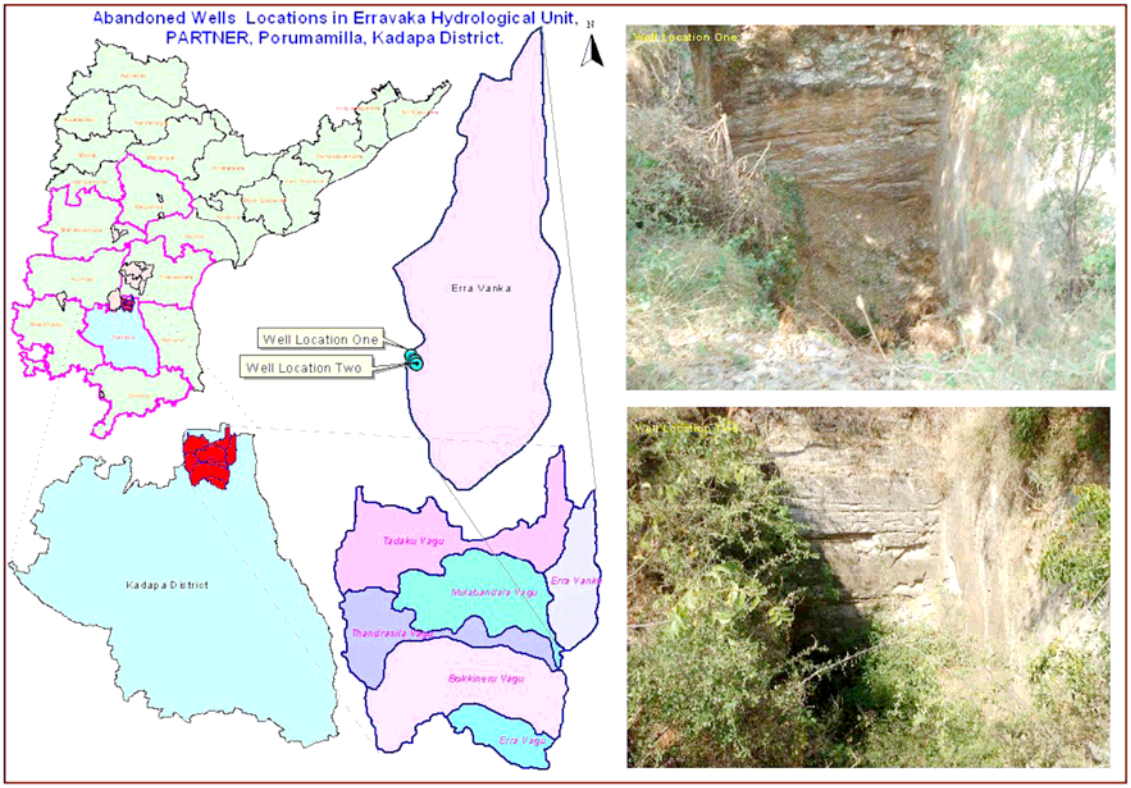
Impact of Artificial Groundwater Recharge structures on local ground water system (June 2005 to May 2006)

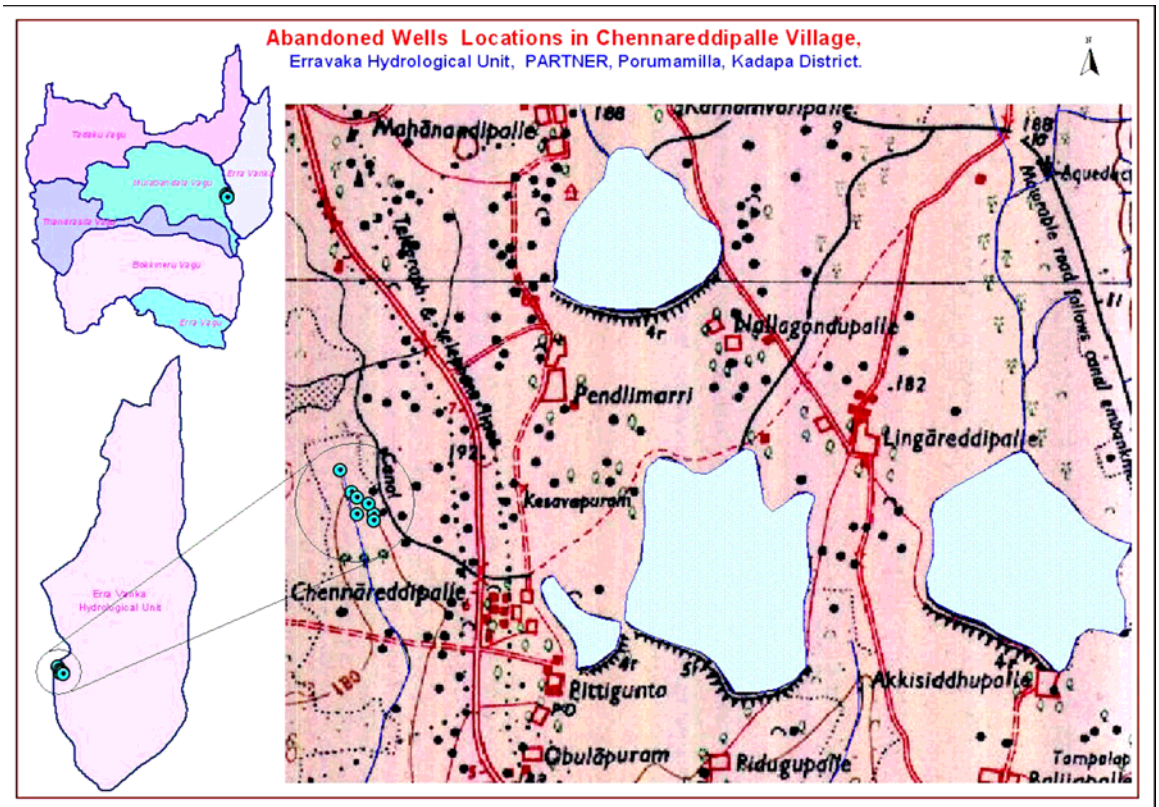
- The AGR structures and the local groundwater system around the AGR structures area are intrinsically associated.
- Artificial ground water recharge structures are impacting the local ground water system.
- In the AGR structures the sources are of three types, they are injection wells, desilting tanks and check dams. All these recharge structures work as good recharge sources.
- All the recharge structures are located with in the area of 100 – 200m apart.
- Before AGR impact, the groundwater flow direction is from North to SE part of the HU. But after AGR impact the flow direction spreads to all surrounding areas in the HU.
- The comparative study is made between AGR executed area and non-AGR executed area to know the difference of average water level fluctuations.
- The average water level rise is 3 m higher in the AGR executed area when compared with the average water level rise in non-AGR executed area.
- In AGR executed area the rise variation in average groundwater level is calculating the additional groundwater amount than the non-AGR executed area. The additional groundwater

amount is 2,36,241m3. This additional recharge amount is may be attributed to AGR structures.

- By using this additional recharge amount the local farmers are benefited.
- They can irrigate additionally 79 acres by the using of additional groundwater recharge.
- Three injection wells were drilling in three irrigation tanks in AGR executed area. The injection wells are functioning to control the more overflowing of rainwater from the tanks
- From Desiltation too, farmers get benefited from the fertility of soil excavated.
- Desiltation tanks are also used to store water which infiltrates into aquifer system.
- Some bore wells that were dry up to September 2005, are functioning for the irrigation uses. In Pulakuntlapalle HU there were 35 functioning wells as well as 7 defunct wells. After the influence of AGR structure, all the defunct wells are functioning.
- Some parameters like fluoride are diluted due to AGR impact.
- Part of the seepage from recharge structures reaches the local groundwater system as artificial recharge.
- Beneficial zones of recharge are the shallow aquifers in the weathered granites and fractured granites.
- Distribution of recharge is controlled largely by the regional groundwater gradient.
- There is no ground water quality deterioration after AGR structures influence. The fluoride content was more than the preferable limits before AGR impact (1.8 mg/l), later it reduced to 1.0 mg/l. The total hardness also diluted after the AGR impact.
- Two tanks are located in non-AGR executed area (8 Ha. and 3.5 Ha), and three tanks are in AGR executed area (3 Ha. 3 Ha and 2.5 Ha).
- In the period of heavy rainy season, two tanks over flowed 4 months in non-AGR executed area, but in AGR executed area two tanks over flowed for 3 months only. The area of tanks is also small than the non-AGR executed area.
- The remaining tank located in AGR executed area with injection well, never overflowed during this heavy rainy season indicating that the rainwater immediately percolated into the aquifer system through the injection well.
- As the silt was removed to its fullest extent (i.e. ranging from 4 ft to 8ft bgl) accelerated the rate of ground water recharge – as per the observation of the farmers dated 8th April 2005. The silt was collected and tested in the laboratory for fertility. The richness of the soil fertility was explained to the community in the capacity building training. The mode and method of execution of each structure and its role in AGR was discussed with the community in detailed.

2. Report on Recharge of Abandoned dug wells in Chennareddy palle Village, Pendlimarri Mandal, Kadapa District of Andhra Pradesh





Introduction

APFAMGS has been involved with DSMG in Yerravanka HU since 2004. Crop water balance estimation has shown that there is deficit water balance in the HU. In addition to improving the groundwater situation through reduced pumping, improving crop water efficiency and crop diversification supply side management through recharge of abandoned wells was taken up.

Where suitable sites were available, artificial groundwater recharge of open wells was taken up by the communities with technical guidance from the project.

Purpose of the RECHARGE OF ABANDONED OPEN WELLS structure:

As a part of expanding the APFAMGS project vision to favorably alter the groundwater balance, Artificial Groundwater Recharge (RECHARGE OF ABANDONED OPEN WELLS) is contemplated as an appropriate intervention in drainage units subjected to over exploitation. As part of RECHARGE OF ABANDONED OPEN WELLS intervention, the experience of working with the community will be effectively used to persuade the farmers to take up appropriate measures that can trap the peak flows and convey them into abandoned open wells/bore wells to recharge the aquifers.

The project has another major goal of using the RECHARGE OF ABANNDONED OPEN WELLS techniques to unlock the non productive investments on wells and bore wells.

Average rainfall of the HU is 750mm. 75 - 80% of the rainfall received through influence of South West monsoons spread over from July to October with average 35 rainy days per year. Highest rainfall of 1572.5mm was recorded during the year of 1996-97. Six out of 14 years reported less than average rain fall and the least rain fall reported is 285.6 mm during the monsoon year 1999 – 2000.

Depletion water levels are seen in Pendlimarri, Lingareddi Palli and Chennareddi Palli habitations. No. of Bore wells went dry during summer 2006. Presence of silt in the surface water bodies is also hampering recharges process and the rain water reported during the high intensive rain day is loosed through rapid surface run off.

Towards meeting the objective, Ground water Management Committees (GMC) have been established in all the habitations comprising of men and women members. GMC's play watch dog role, preventing over exploitation of ground water resources.

Objectives:

- Favorably alter the natural conditions to enhance the groundwater recharge at a micro basin level.
- To improve the groundwater levels in micro basin.
- Initiate artificial injection of runoff generated from peak storms at favorable locations.
- Facilitate the technology, skills and knowledge for better understanding the ground water system in the area to the community enabling longer sustainability.

People's Participation in RECHARGE OF ABANDONED OPEN WELLS

Structures Execution:

The area proposed for Artificial Groundwater Recharge belongs to the people of, Chennareddypalli villages and Part of Yerravaka habitations. APWELL Project's intervention has left the clear impressions on the community in groundwater related aspects.

The bore wells that are the principal source of water are unable to cope up the demand of the community. Lots of money being invested to get the required water in the form of drilling new bore wells but the result was multifold loss.

At this juncture APFAMGS project personnel entered in these habitations and slowly incorporated the idea of comprehensive groundwater management through people's participation. As the projects concept is in line with the need of the farmers the response and involvement of the community is never less than the expected.

During this process the farmers were made to analyze the situation and able to develop the action plan of their own to improve the groundwater situation in their micro HU. The various stages of people's participation in activity are:

- Demand from the people for recharge measures during informal as well as in GMC meetings.
- Expressed their willingness to extend participation in the activities. Requested the project to extend the support and explore the avenues for groundwater recharge.
- Involved in evolving the situation of groundwater resources.
- During feasibility studies by the Consultant all the GMC members actively shared their opinions and extended their cooperation.
- After getting the technical feasibility Combined GMC'S meeting was organized and discussed their role in RECHARGE OF ABANNDONED OPEN WELLS execution.
- Social feasibility was assed by them selves.
- Permission from the Panchayatraj institution (GP) was obtained by GMC's/HUN