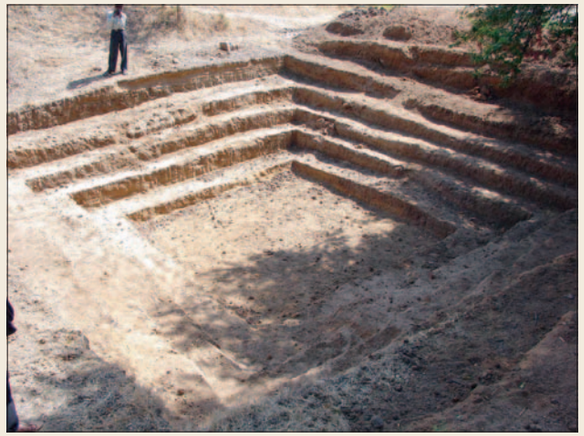
- Environmental benefit = Improvement of micro climate
- Cost of the unit = Rs. 5000/-
- Contribution = Rs. 500/- (labour)
- Location of the pond is decided in a participatory mode considering its utility to the villagers.



Farm pond in Chowderpalli

Check dam

Check dam is a structures across the gully / waterway with packed stones or stone masonry structure. This is constructured in the middle reaches of the gully or stream. The upstream stored water is useful for recharge as well as supplemental / life-saving irrigation.

The location & dimensions are decided as follows:

- Locate the structure in the stream based on the gradient.
- Fix the height based on the depth of waterway.
- Calculate the dimensions based on the expected peak flow.

The following steps are followed during execution:

- Clear the site where the structure is proposed
- Give the bank sides a slope of 1:1
- Excavate the bed of the stream to a uniform depth of about 0.3 metres and pack dry stones / stone masonry wall from the excavated level.
- Allow sufficient waterway in the centre of the dam portion to discharge the maximum runoff from the catchment. Make the upstream and downstream control section as straight as possible.
- Provide apron with sufficient width & length in the rear to prevent scour.
- Protect the gully sides above the apron with stone pitching to a height of atleast 0.3 m above the anticipated maximum water level to prevent side scours.

Check dam in Chowderpalli

Details:

- Catchment area = 50 ha
- Peak flow = 13.3 m^3/sec.
- Crest length = 10.0 m
- Volume of impoundment = 2600 m^3
- Cost = Rs. 91200/-
- Contribution = Rs. 9000/- (labour)
- Benefits : Benefit to village community as a whole and water for livestock.
- Environmental benefit: Improvement of micro climate

Participatory Ground Water Monitoring

The construction of recharge structures has created awareness among the farming community to observe the status of ground water in their respective wells on real time basis. This has triggered the process of participatory ground water monitoring. The villagers are thinking of adopting some process for regulating ground water use through community participation. The participatory monitoring will help the people:

- to understand their ground water system and water level fluctuations in annual and seasonal basis.
- to regulate the ground water use,
- to initiate social regulation and
- to change in cropping pattern; maize or groundnut in place of paddy during *rabi*.

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DFID-NRSP-R8192

GROUND WATER RECHARGING TECHNIQUES

NRSP

DFID Natural Resource System Programme

भाकृअनुप ICAR

Central Research Institute for Dryland Agriculture

Santoshnagar, Hyderabad

Karnataka and Andhra Pradesh (A.P.) stand second and third respectively in the ranking of drought prone states in India. The cluster of villages considered in DFID Project fall under Tumkur district of Karnataka and Anantapur and Mahabubnagar districts of Andhra Pradesh. All these districts are drought prone. Soil and water conservation programme is taken up on priority in these areas as prelude to natural resource management (NRM). The groundwater basin encompassing Mahabubnagar mandal of Mahabubnagar district of Andhra Pradesh (A.P.) falls under semi-critical exploitation category indicating the present stage of ground water developments between 70% to 90%, and the water level shows falling trend. The villagers of Chowderpalli are also complaining about the depletion of ground water. Also, Mahabubnagar mandal is vulnerable to drought. Hence, caution should be exercised for further development of ground water and more emphasis should be given on ground water recharge. In this context, a campaign was made in a participatory mode involving the villagers of the cluster to understand the ground water problem in their area. This was also highlighted during the PRA exercise and was reflected while making the action plan. Because of extensive adoption of borewell technology, most of the open wells and village tanks have become defunct and also the water level in borewells is declining. Past survey showed that the net area irrigated by tube wells in A.P. has increased by 0.52 million hectare between 1990-91 to 1998-99 whereas the increase was only 0.1 million hectare from 1980-81 to 1990-91. Most of the farmers have resorted to rice cultivation rather than ID crops, thus resulting in decline of ground water. Andhra Pradesh water vision also suggests increasing water harvesting through desilting of tanks, conversion of tanks to percolation tanks and revitalizing dried up wells in Mahabubnagar district.

The ground water can be recharged by different ways like

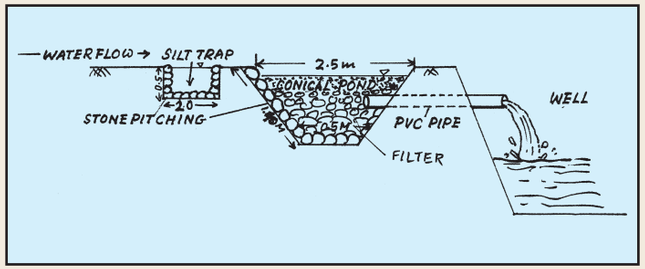
- diversion of runoff to dried-up / defunct wells
- making a series of farm ponds from ridge to valley
- construction of check dams etc.

Recharging through dried-up wells

As most of the open wells are dried up, it was decided by the villagers to divert upstream runoff to such wells wherever possible for recharging ground water. The examples of other

Over-exploitation of ground water for paddy cultivation in drought prone area is responsible for lowering of ground water.

places in Andhra Pradesh and Gujarat were brought before the farmers. Care was taken to divert clean water by passing the runoff through silt trap as shown below and depicted in cover page photo (Vill: Chowderpalli).



Diversion of runoff to dried-up well

The technology of diverting runoff to dried up wells is

- cost effective (less than one paisa per litre per filling),
- eco-friendly and socially acceptable,
- easy to construct and replicate,
- useful in harvesting maximum runoff (about 80%),
- effective utilization of defunct wells for recharge ,
- provide scope for life-saving irrigation during dry spells and
- helpful in creating awareness on water resource management issues and participatory hydrological monitoring.

Farm pond

This is a small water harvesting structures dug in the gullies/ waterways where the flow of water exists for considerable period of time. The purpose is:

- to collect and store water in a cost effective way,
- to recharge the ground water depending on geology,
- to address drinking water needs of the cattle and
- to use for supplemental irrigation when stored water is available for longer period.

Details of recharging through dried up wells

Materials required	• PVC Pipe – 20ft length, 4 inches diameter. • Local stone for filling filter pit and pitching silt trap.	
Estimated cost	• Earthwork for silt trap, pond and diversion channel	Rs. 150-00
	• Stone pitching for silt trap and conical pond	Rs. 150-00
	• Cost of PVC Pipe	Rs. 300-00
	• **Total cost**	**Rs. 600-00**
Contribution by Material the farmer		Rs. 150/- + Filter
Capacity of the well		250 – 750 m^3
Catchment area		3 - 4 ha (approx.)
Technical details	• Silt trap	2.0 X 1.0 X 0.5 m
	• Conical pond / filter pit	Top area : 2.5 m dia or 2.5 m X 2.5 m Bottom area: 0.5m dia or 0.5 m X 0.5 m Depth: 1 m
	• Length of pipe	Length of pipe is decided depending on the site condition
When to do	Diversion channels should be completed before rainy season for effective utilisation of rainwater.	
Operation in cluster villages	In the entire cluster villages the farmers have taken up this activity.	
Maintenance	The silt trap to be cleaned at regular intervals by the farmers.	

Farm ponds can be constructed in

- gullies / waterways wherein seepage flows occur over a longer period of time,
- the upper reaches of the stream and
- a series from top to bottom to have better effect on ground water recharge and sub surface flow.

The other specifications are

- Pond will generally be of square shape.
- Proper surplusing arrangement is provided
- Collect the spoils and deposit across the gully and around pond as embankment.
- Decide the dimensions of the embankment (trapezoidal shape) based on spoils.
- Provide a berm between pond and embankment so that the spoils will not fall into the pond. Deposit the soil in thin layers and ram it properly for better stability.
- Limit the depth to 3 m depending on the exposure of hard stratum.

Details of a typical pond of Chowderpalli

- Catchment area = 2 ha
- Pond capacity = 250 m^3
- Depth of the pond = 2.5 m
- Benefit to landless = Drinking water to livestock