

# Ground Water Collectivization



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## Context

*The Tragedy of the Commons: "People often take advantage of resources that are freely available to them. Often, they don't consider the fact that if everyone over-uses the resource, this will lead to negative effects for everyone, including themselves." - Garrett Hardin*

Variability in rainfall distribution results in frequent crop losses in low rainfall and drought prone areas. The impending Climate Change further accentuates these disturbances and crop failures. Due to this Groundwater exploitation is further increased due to mechanisms of excessive drilling, digging of bore wells. It is commonly experienced that the life of borewells is limited and it is only a matter of time by when the extraction of groundwater from these aquifers proliferates making the borewells dry. It leads to losses in terms of:

- Excessive groundwater exploitation due to multiple borewells in vicinity
- Crop failures
- Investment losses on infrastructure when borewells fail

Groundwater Collectivization provides a way forward to resolve all the above problems

## What is Ground Water Collectivization

Ground water collectivization is an alternative for conservation, efficient use, and equitable distribution of ground water as resource. Common sharing, social regulations, technical support and scientific understanding are the key principles which lead to the groundwater collectivization.

The basic idea is pooling of up the groundwater from bore well farmers and share it with all other farmers who don't have access to water, thereby providing critical irrigation to the rainfed crops. The farmers who agree to

participate enter into an agreement wherein borewell/dugwell owners provide critical irrigation to non-borewell owners and non-borewell owners agree that they won't drill a bore well for a specified number of years.

## Objectives

- To establish community based groundwater management systems with a clear focus on access; efficiency and sustainability of groundwater and surface water resources
- To improve water security for rain-fed agriculture
- To improve the productivity of and incomes from rain-fed agriculture
- To enhance the contribution from rain-fed regions towards GSDP

## Benefits of Ground Water Collectivization

- Pooling the bore wells and sharing water would avoid competitive borewell drilling and further eliminate the unnecessary investments and loss of capital.
- The borewells owner is assured for earlier cropped area but with cultivation of low water intensive crops.
- Water thus saved will provide critical irrigation to the rainfed area, which includes lands of both borewell owners and others.
- In case there is bore well failure, back-up arrangement is assured as the bore wells are pooled.
- Community is motivated to use micro irrigation systems (sprinklers and drips).

## Investments

- a) Pooling all the existing borewells into a common grid of pipe lines so that irrigation can be provided for all lands through outlets.
- b) Micro-irrigation systems (mostly sprinklers) are used at the each outlet for irrigation.
- c) Civil Works
- d) Each block will have a compost pit with biomass trees around to produce quality compost required for that block.
- e) The farmers will be organised into a collective (smaller outlet groups and the groups federated at the system level) – for maintenance of the system, irrigation scheduling, collection of member fees, user charges etc. for maintenance of the system.

## Ground Water Sharing Conditions

Agreements have to be made between the members of the group (bore well farmers and non-bore well farmers with the following conditions laid down:

- a. The irrigated area under bore wells should not be increased from the current status, whereas the critically irrigated area can be increased
- b. In the critically irrigated areas water should be given during four phases of cultivation of crops and it is a must to provide critical irrigation for a minimum of 3 phases. The four phases of are:
  - i. First phase is when the seed is sown
  - ii. Second phase is when the flowers bloom
  - iii. Third is when the pod is developed
  - iv. Fourth phase is the harvesting of crop.
- c. Crop water budgeting exercise should be conducted before sowing of seeds

- d. If paddy is to be cultivated, the System of Rice Intensification (SRI) should be practiced.
- e. Micro Irrigation system such as drips and sprinklers should be used in order to conserve water.
- f. No new bore wells should be dug for 10 years without the permission of committee.
- g. During the period of critical irrigation (June to November), in case of any problem with the working condition of the bores, the expenses for its maintenance will borne by the common fund of the committee, with collective permission from the committee. During the rest of the year the expenses for its maintenance will be borne by the respective farmers.

## The Proposal

The project proposes to work intensively in all APDMP clusters. The cluster wise separate proposal would be submitted and accorded approval from SPMU. The approx. district wise project targets for Ha collectivized are below. Each cluster approx 300 acres shall be brought under ground water collectivization.

Anantapur: 4320 Ha

Chittor: 2880 Ha

Kurnool: 2520 Ha

Kadapa: 1080 Ha

Prakasam: 1800 Ha

By 31<sup>st</sup> March 2019 at least per site per cluster should be collectivised.

## Expected Outputs from Program

The program results into the following outputs:

1. All the clusters taken up under this program will be completed in 3 years' time.
2. Intensively trained human resources in the form of Community Based Resource Persons on groundwater collectivisation shall be available for further scaling up.
3. Each patch will have :
  - a. Farmers organised into groups (based on irrigation outlets) should become member of FPO.
  - b. Maintenance systems of the borewell network are in place with clearly demarcated responsibilities among the consumers.
  - c. The groups will work learn crop planning and work out mechanisms of irrigation schedulingAll the plots in the area shall have:
  - d. All the outlets shall have micro irrigation systems for irrigation.
  - e. All the sub-plots under the out lets shall have manure preparation pits with biomass and constant addition of organic matter to improve soils productive capacity.
  - f. Field level practice within all the blocks on comprehensive and integrated water management: from soil moisture, water harvesting to using groundwater.
4. The patches will be reasonably secure against short and medium term drought spells and other aberrations of rainfall.
5. The income of the participating farmers in the blocks shall enhance by about 20%
6. All the necessary modalities for scaling up shall be established with preparation of required human resources.



## Groundwater CollectivizationComponents

**Phase-1: Site identification & Community mobilization:** - It involves site identification for ground water sharing, creating awareness through conducting series of meetings and exposure visits on ground water sharing its importance; mobilising them take up ground water sharing. Use of CRP and Experience farmers and Resource persons for mobilisation apart from existing HR like FA and LFA staff

### **Phase -2: Planning & Implementation**

**Bore well networking proposed area in acre:** Installation of pipe line network for ground water sharing in selected patches of rainfed area (Patch consists of minimum of 3 bore wells pooling and 30 acre of area) Work items are earth work for pipe line trench an average of 100m per acre and cost of pipe line installation as per design (maximum pipe pressure shall be 6kg/cm<sup>2</sup> for main pipe line for fittings 6 to 10 kg/cm<sup>2</sup> pressure material shall be adopted)

**Soil fertility improvement through biomass and cropping system:** Providing on in-situ composting facility with using biomass available on field. Compost pit (4x3x.5 meter size compost pit per acre) and 100 biomass plants plantation around compost pit and on field bunds are need one time invest.

**Crop diversification (converge with CMSS and Navadhanya) :** Promoting crop diversification through making the seed available for inter crop / mixed crops ( good suitable variety/traditional seed and minor crop seed) to 50% area of total of each farmer; **maximum of 5 acre per farmer.**

## Roles and Responsibilities

### 1. CRP

One village level trained CRP (activist) will be appointed by FPO on task basis to facilitate group meetings and to update book keeping related implementation of program. S/he will collect the water level data monthly once and anchor seasonal crop water budget planning and impact monitoring support exercise.

### 2. FPO Role

It will facilitate farmer mobilization and execute the program along with FA support. It will receive project implementation fund from farmers group and APDMP and shall make the expenditure.

### 3. FA roles

Project implementation & coordination, monitoring .FA is responsible for getting out puts of all program tasks and set up the institutional arrangement at village level for implementation of program.

### 4. LFA Roles

LFA will have overall delivery responsibility and they will provide technical back stopping in the Preparation of plan, technical estimation and assessing of ground water and coordination with DPMU and SPMU for submission of proposal.

### 5. LTA Roles

Designing the program and extending the support to LFAs in planning the capacity building, monitoring and evaluation and reporting

### 6. DPMU Roles

Technical assessment of proposal and recommendation to SPMU. Executing convergence support to LFA for procurement of drip systems

### 7. SPMU Roles

Timely review of proposals and works updates. Procurement via vendors selected within schedule of rates. Time budget release.

## Budget Components

S.No.	Component	Source of funds in Rs.			
		Total	APDMP Share	Through convergence	Farmer Share
1	Civil work				
2.1	Pipe line work- PVC pipes				
2.2	Pipe line work- Pipe line installation and fittings				
3	Micro Irrigation (Drip Systems , sprinkler system)				
4	Soil fertility improvement through biomass based composting				
5	CRP Costs				

## Process Steps for Ground Water Sharing

### Preparatory Phase

Step 1: Identifying the potential water sharing patches through PRA exercise

- 1.1. Identify most favourable micro watershed, where community is harmonious and had limited conflicts in implementation of watershed projects.
- 1.2. Demarcating the area and detailed mapping (supplementing Land Use Maps); the area must have about 1:4 or above ratio of borewell irrigated area to rainfed area.
- 1.3. Divide the micro watershed area into smaller nano watersheds of 100 ha each. Identify the bore wells, water harvesting structures, water table and cropping pattern in each nano watershed.
- 1.4. Conduct meetings with the farmers of these blocks and explain about the prospects of this project.
- 1.5. If the farmers are willing to be part of this process, they should be able to demonstrate their commitment by collectively sharing groundwater resources.

Step 2: Explanation of the exercise to farmers and getting their agreement and contribution amount decided. The agreement is signed by all parties involving the Mandal Revenue Officer (as witness) and Chair of the NRM sub-committee of the GP

Step 3: Committee constituted from group for maintenance of systems with roles and responsibilities fixed.

#### *Planning phase*

Step 4: Plot wise resources map/Mapping each plot and ownership on Google maps

Figure 1: Plot wise mapping on Google earth

**Lakshman M**

GroupA:JoinID	p-442995064767-2
GroupA:primeploti	98
GroupA:aadhamumb	442995064767
GroupA:spouse	Narayana
GroupA:age	45
GroupA:sex	Male
GroupA:caste	BC
GroupA:category	Marginal
GroupA:contactnum	9642301785
GroupA:fa	Dinakar
GroupA:state	Andhra Pradesh
GroupA:district	Kurnool
GroupA:mandal	Krishnagiri
GroupA:grampancha	CH Yerragudi
GroupA:village	CH Yerragudi
GroupA:patch_name	A
GroupA:survey_num	657b
GroupA:plot_exten	03   62
GroupA:plot_exte2	Acre-Cents
GroupA:ownership_	Private Patta
GroupA:landuse_ty	Irrigated
GroupA:kharif_cro	Others
GroupA:rabi_crops	Others
GroupA:orchard_cr	None
GroupA:water_reso	Bore well

© 2018 Google  
Image © 2018 CNES / Airbus

Imagery Date: 1/7/2017 15°31'34.28" N 77°45'38.36" E elev 398 m eye alt 2.98 km

Step 5: Mapping plot wise land use and cropping Pattern

Step 6: Bore well wise water discharge and groundwater levels measurement. With each farmer with borewell discharge measurement exercise is conducted. This would give capacity of the system to provide critical irrigation within the patch.

Step 6: Conducting Hydro marker survey for calculation head of pipeline & class

Step 7: Estimation of crop water demand for the period of 15-20 days to provide irrigation/ critical irrigation capacity of available water source.

Step 8: Proposing the Cropping Pattern based on the system critical irrigation capacity

Step 9: Designing the main and sub lines of pipeline network with participation of water sharing farmers on ground.











Step 10: Preparation of estimate for pipelines, sprinklers, civil works using the norms and submission for approval and Budget Release

### *Implementation*

Step 11: Installation of pipeline, setting of outlets and pump connections fitting.

Step 12: Maintenance of Records

- Group meetings and resolution of each transaction.
- Stock book, Receipts & issues balances.
- Trench excavation details in field
- MB recording on completion of each stage by group with the help of PFA staff
- Pipe line installation layout
- Material procurement bills and transaction details
- Maintain the cash book and ledger book of accounts

## Annexure 1: Approved Rates for Works and Equipment's

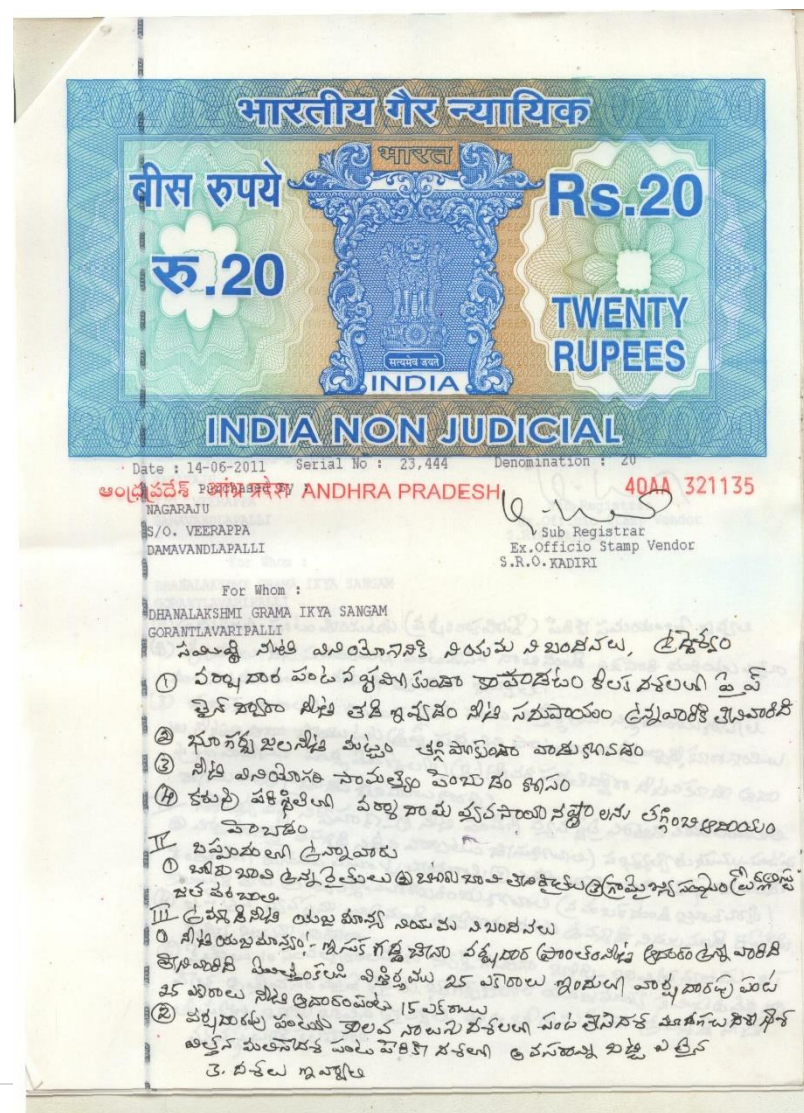


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## Annexure 2: Proposal Submission Format

To be Shared

## Annexure 3: Sample Agreement Template amongst farmers





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