

Marvels of Ground Water Sharing - A Case Study of Farmers of Kummaravandlapally Village in Anathapur District of Andhra Pradesh

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Abstract

Groundwater is the preferred source of irrigation for many smallholder farmers on its involves its low capital cost. The depletion and contamination of groundwater require the development of a robust framework for utilization of groundwater and management practices for sharing ground water by communities. The present case study explains the success story of kummaravandlapally- a drought prone village in Anathapur district of Andhra Pradesh in a project initiated by Watershed Support Services and Activities Network (WASSAN) which aimed to increase productivity crops by providing protective irrigation and promote sharing of ground water by farmers. This study shows that the farmers increased their profit managining by sharing ground water, shifted to less water intensive crops and became model for other farmers in the area.

Keywords: Water management, Groundwater, Irrigation, Drought areas, Water conservation, Andhra Pradesh.

Introduction

Groundwater is the water found underground in the cracks and spaces in soil, sand and rock. It is stored in and moves slowly through geologic formations of soil, sand and rocks called aquifers. India is more dependent on water pumped from aquifers than any other nation.

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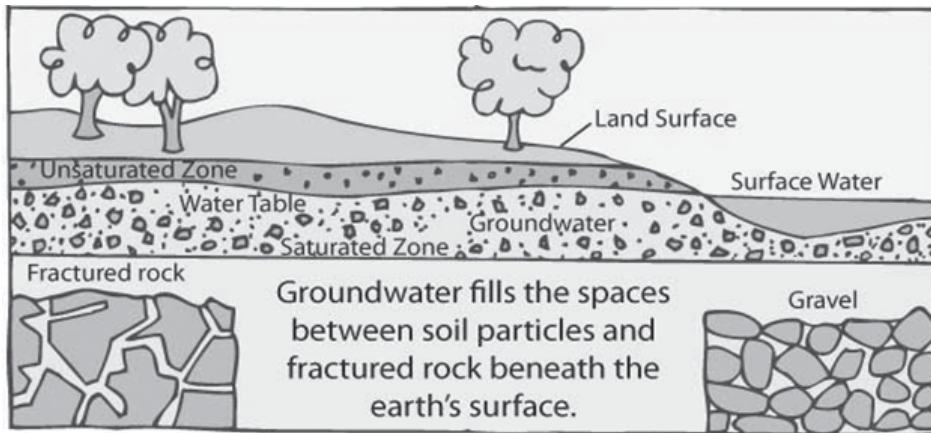


Fig 1: Image of Ground water

Groundwater has emerged as the primary democratic water source and poverty reduction tool in India's rural areas. Its importance as a precious natural resource in the Indian context can be gauged from the fact that more than 85 percent of India's rural domestic water requirements, 50 percent of its urban water requirements and more than 50 percent of its irrigation requirements are being met from ground water resources. The aquifers that host groundwater are the primary buffers against drought for both human requirements, and crop production.

Why ground water sharing

General Scenario

More than half of India's total area suffers from high baseline water stress and very low water storage (including reservoirs and groundwater) per capita. India uses some 230 km³ of groundwater per year, making it the world's largest user of groundwater (World Bank, 2012). In India, about 90% of the groundwater extracted is used for irrigation-a much higher proportion than the global average of 40%.

Groundwater is a common resource pool that ensures economic security by ensuring livelihood security across the globe. It is also considered as the buffer source of irrigation which is indiscriminately exploited, leading to its depletion over the years. India is the major consumer of groundwater. This is indicated by the rising numbers of tube well structures from 1% in 1960's to 40% in 2006 - 07, in irrigated areas and the net draft of

ground water was either close to or excess to the net availability of ground water, thereby indicating an alarmingly overexploitation of the available ground water resources. The state of Andhra Pradesh is given the tag of a water scarce state due to its deteriorated situation. As per the UN standards the permissible levels for drawing ground water is 40%, but the state draws about 58% indicating that most of the policies have contributed to exploitation rather than addressing ground water depletion. To decrease the ground water depletion and to protect farmers from crop loss the "protective irrigation" systems have been developed.

Scenario at Anantapur

Variability in rainfall distribution results in frequent crop losses in low rainfall areas like Anantapur. The impending Climate Change further accentuates these disturbances and crop failures. Depending on the span of drought spell, the crop losses may range from moderate to total failure. These failures result into loss of investment making farmer indebted, leading to a substantial decline in productivity. Failures in early stages might also increase the investments as farmers have to re-sow the crop. This often results into acute fodder scarcity affecting the livestock sector also.

Karuvu Kavacham - The Initiative

Karuvu Kavacham, a program insulating crops and farmers against climate variability. It was designed to achieve drought proofing, using a strategic approach in a given area. Some experiences have been generated in this strategic framework as a part of the World Bank and Government of AP supported program called AP Drought Adaption Initiative (APDAI) implemented in Anantapur and Mahabubnagar districts and under National Agriculture Innovation Project (NAIP), anchored by CRIDA and WASSAN as a lead agency.

This system involved voluntary compliance of farmers in pooling and sharing of groundwater even with farmers who do not own a bore well, for Kharif crop stabilization. Access was created to large number of farmers who do not own bore wells, for protection of their Kharif crops. Necessary facilitation processes, program structure, incentives and investment requirements were assessed in partnership with communities. The overall objective of the program was to secure rainfed crops and farmers livelihoods irrespective of the variations

in rainfall by developing a mechanism of sharing and conserving the groundwater and economical usage of the same.

Kummaravandla Pally

Kummaravandla pally is a village in Gandlapenta Mandal of Anantapur district in Andhra Pradesh. This village houses about 53 families and 41 farmers. In case of farmers who do not own bore wells, the produce from the crops and the economic state of their families was at the mercy of rains. While this was the scenario with this group of farmers, farmers who owned bore wells began to realize that the increasing number of individual bore wells would cause depletion of ground water levels very soon in the near future. This thought process paved way for the resolution "Let us share ground water to sustain our crops", thus leading to the concept of networking of bore wells for ground water sharing.

Kolagunti Ummadi Neeti Yejamani Sangam

The concept of ground water sharing swung into action when the farmers in the village identified the following problems.

- * Cultivation of crops that requires excess of water;
- * Poor awareness regarding usage of bore wells and sprinklers for rainfed crops;
- * Poor awareness regarding expansion of cultivation if ground water is made available
- * Poor awareness regarding the requirement of livestock for agriculture and concept of sharing bore wells for agriculture.

A group of 25 farmers; 15 farmers who own 8 bore wells and 10 who do not own bore wells formed a committee called "Kolagunti Ummadi Neeti Yejamani Sangam". The committee laid down certain conditions for its functioning and practicing networking.

The conditions for Functioning of the Committee Included:

- * The representative of the committee would be a non-bore well (change this) farmer and a bore well farmer

- * A joint account should be opened in the names of the representative bore well and non-bore well farmer
- * The contribution towards share capital should be equal from the bore well as well as the non-bore well farmers.
- * Annual contribution towards the committee fund will be decided by the committee. It will be based on acres. If a farmer with 1 acre of land contributes Rs 100, farmer with 2 acres of land contributes Rs 200.
- * One farmer from the group will be elected for monitoring the schedule for water distribution.

The Conditions for Practicing Networking Included

- * The irrigated area under bore wells should not be increased from the current status, whereas the critically irrigated area can be increased
- * 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 are :
 - * First phase when the seed is sown
 - * Second phase when the flowers bloom
 - * Third phase when the pod is developed
 - * Fourth phase the harvesting of crop.
- * Crop water budgeting exercise should be conducted before sowing of seeds
- * If paddy is to be cultivated, the System of Rice Incentive (SRI) should be practiced.
- * Micro Irrigation system such as drips and sprinklers should be used in order to conserve water

- * No new bore wells should be dug for 10 years without the permission of committee.
- * 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 Impact

General Profile

The group of 25 farmers comprises of 40% (10) of farmers who do not own bore wells and 60% (15) of farmers who own bore well. About 56% of farmers own 1 acre of land, 36% own 2 acres, 4% own 2.5 acres and 4% own about 4.75 acres of land.

Scenario in the Past

In the era prior to ground water sharing, the average investment on crops per acre of land was about Rs. 11,600. The average value of the produce per acre of land was about Rs. 18,900 and the average profit per acre of land was about Rs 7,200. The farmers who do not own a bore well have very low profit margin.

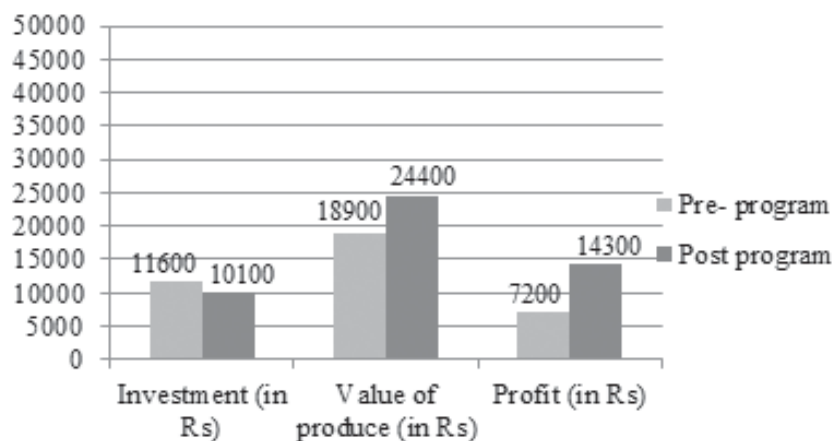


Fig. 2 Pre and Post Scenario of ground water sharing

The produce of the crop sown was better only when the rains were merciful. The farmers who owned bore wells had different sets of woes; they had issues of wastage of water on account of leakages. The leakage was due to lack of proper pipelines. As a result, the area under irrigation was less.

Current Scenario

In the current scenario, the average investment per acre of land is about Rs 10,100. The average value of the produce per acre of land is Rs24,400 and the average profit per acre of land is about Rs14,300. The average profit percentage is about 146% per acre of land. It is to be noted that ground water sharing has enhanced their profit margin by two folds.

Assets

About 84% (21) of farmers in this group of 25 have invested their profits in building up their assets such as house, land, education, health, vehicle, agriculture, television, cattle and cash deposits. The average worth of these assets is about Rs 38,358. The details of average worth of each asset owned by the farmers are given in Table 1. However, when we narrow down our focus to the assets of the non-bore well farmers 6 out of 10 i.e. 60% of the non-bore well farmers have invested their profits in assets predominantly in house, land, television, cattle, agriculture and as cash deposits. This lot of farmers prior to groundwater sharing who barely managed a meager amount as profit, now own assets of an average worth of Rs 50,800.

Table: 1 Details of assets of farmers at Kummaravandla Pally

S.No	Asset	Average Worth (in Rupees)
1	House	51,000
2	Land	1,27,000
3	Education	40,000
4	Health	53,000
5	Agricultural Equipment	31,000
6	Cattle	65,000
7	Cash Deposit	28,300
8	Television	15,000
9	Vehicle	25,000

Crop Pattern

The crop pattern consists of 9 varieties of crops practiced in various combinations. These included groundnut, red gram, jowar, chrysanthemum, mulberry, castor, paddy, mango plantations and tomato. About 52% farmers sow the combination of groundnut, red gram and jowar with red gram and jowar being the border crops. Prior to ground water sharing, farmers who do not own a bore well prefers groundnut. In the current scenario, they look beyond groundnut by choosing other crops such as red gram, jowar (as intercrop), tomato and mango plantation along with groundnut. When we look at the choice of crop of the farmer who owns a bore well, the choice of crops includes mulberry, paddy, groundnut, red gram, jowar, castor, mango plantations and chrysanthemum. The details of the amount invested, value of produce and profit for the crops for per acre of land are given in Table 2.

Table: 2 Details of the average investment, value of produce and profits of crops for per acre of land

S.No	Crops	Investment (in Rs)	Value of Produce (in Rs)	Profit (in Rs)
1	Red gram	5,080	13,600	8,520
2	Mulberry	19,400	38,400	19,000
3	Groundnut, Red gram, Jowar	9,540	23,550	14,010
4	Groundnut, Jowar, Tomato	9,720	64,100	54,380
5	Paddy, Groundnut, Chrysanthemum	12,820	18,840	6,020
6	Groundnut, Red gram, Jowar, Castor, Mango plantation	10,230	22,800	12,570
7	Mulberry, Groundnut, Red gram, Jowar	15,280	38,900	23,620
8	Paddy, Mango plantations	10,900	25,500	14,600
9	Groundnut, Red gram, Jowar, Mango Plantations	5,770	11780	6,010
10	Groundnut, Red gram, Jowar, Castor	12,290	26,000	13,710

Ground Water Levels

According to a study conducted by Department of Rural Development and Social Work, Sri Krishna Devaraya University, Anantapur it was noted that there was an increase in water use efficiency which was due to the change from field channels to pipeline system. The pipeline system has facilitated linking of different bits of the farmers. A decline in cultivation of paddy and shift towards less water intensive crops was observed. Critical irrigation has not only helped in preventing loss of crop, but has also resulted in increased productivity of groundnut. Ground water levels were noted to be stable and have shown certain level of improvement from 32.04 ft in Apr 2011 to 29.25 ft in Apr 2012 and from 27.44 ft in Jan 2012 to 25.27 ft in Jan 2013. The factors cited for sustainability were:

- * No construction of new wells causing failure of existing wells;
- * Assured water in times of failure/repair of any one bore well;
- * Water is being saved due to pipelines that were given for critical irrigation

Convergence

Through sharing of groundwater farmers realized the power of synergy and available benefits under different projects and schemes which facilitated convergence of government efforts at the grassroots level.

The happy farmers....

Mr. K Sivaramappa

K Sivaramappa, a farmer who does not own a bore well is a happy man now. He owns 1 acre of land. In 0.5 acres he cultivates groundnut along with jowar as inter crops and tomato in the remaining 0.5 acres. He had invested Rs. 9,720. The value of the produce for this investment was Rs. 64,100, giving him a profit of a wholesome Rs. 54,380. Groundnut was worth Rs. 17,500 (5 bags at Rs 3500/bag) with a profit of Rs. 12,300; jowar was worth Rs. 100 with a profit Rs. 80 and tomato was worth Rs. 46500 (3 yields of 600 kgs at Rs. 35/kg; 450 kgs at Rs. 30/kg and 600 kgs at Rs. 20/kg) with a profit of Rs. 42000. Prior to ground water sharing, Sivaramappa

opted for only groundnut in 1 acre of his land with an investment of Rs. 8,800 his yield was Rs. 12,000 with a profit of Rs 3,200, this is the scenario only when the rains showered considerably. Sharing of ground water and thoughtful crop selection manifested in the form of surging profits for him. His assets currently are a house worth Rs. 50,000, cattle worth Rs. 35,000 and he has also invested about Rs. 50,000 on agricultural equipment. Sivaramappa who used to earn a meager profit is now the happy owner of assets of average worth Rs. 45,000

C Mallikarjuna

C Mallikarjuna owns a bore well and about 1 acre of land. He cultivates groundnut along with red gram and jowar as inter crops in this 1 acre of land. He had invested Rs. 9,540. The value of produce for this investment was Rs. 23,550 giving him a profit of Rs. 14,010. Groundnut was worth Rs. 19,250 (550kgs at Rs 35/kg) with a profit of Rs. 10,450; Red gram was worth Rs. 4,200 (120kgs at Rs 35/kg); Jowar was worth Rs. 100 with a profit of Rs. 80. Prior to Ground water sharing, Mallikarjuna in his 1 acre of land used to cultivate paddy and vegetables. His total investment then was Rs.18,400. His produce for this investment was Rs. 27,000 with a profit of Rs. 8,600. Paddy was worth Rs. 12,000 with a profit of Rs. 2,100 and vegetables were worth Rs. 15,000 with a profit of Rs. 6,500. Thus, by sharing ground water sharing his profits has risen up by more than 1.5 folds. His asset possession presently includes a House worth Rs. 70,000 and a Television worth Rs. 10,000.

These are the happy tales of two farmers of Kummaravandlapally. They are not alone, along with them ground water sharing has enhanced the socio economic status of 23 other farmers in Kummaravandlapally.

Conclusion

The success of 25 farmers from Kummaravandlapally village has been a great motivator for other farmer groups in the neighboring villages and they stand out as a wonderful example for sustaining groundwater to sustain crops. It was found that Karuvu Kavacham and Kolagunti Ummadi Neeti Yejamani Sangam enabled farmers to cope up the crop failure by providing irrigation at most critical stage. Farmers received 5 micro irrigation sets from Andhra Pradesh Micro Irrigation Project (APMIP) for a contribution of 10% from farmers. The National Food Security Mission (NFSM) provided redgram and groundnut seeds to farmers. Similarly, water storage and conservation structures under MGNREGS and NADEP compost pits helped farmers to enhance their farming activities and get more profits. Sharing of groundwater by farmers in Kummaravandlapally village has also promoted a shift from high water usage crops to low water usage crops.

In the study area, about 56 per cent of farmers own one acre of land and the average profit is about 146% per acre of land. It is to be noted that ground water sharing has enhanced their profit margin by two folds. Increase in water use efficiency due to usage of drip system of irrigation and shifted towards less water intensive crops. Finally those 25 farmers became ideal example for other village farmers to initiate these methods to improve their livelihood.

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