

A tale of two farmers...

Sivaramappa is able to make significant profits from his one acre of land. Mallikarjuna is also making profits from his one acre of land from 2010 onwards. (See box).

Sivaramappa cultivated groundnut along with jowar as inter crop in half an acre and tomato in the rest of the land, in 2010. He invested Rs 9,720 for inputs and others. The value of groundnut harvested was 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 46,500 (3 harvests - 600 kgs at Rs 35/kg; 450 kgs at 30 Rs/kg and 600 kgs at 20 Rs/kg) with a profit of Rs 42000. Jowar is used for household consumption.

FARMERS – CROPS, INCOME AND PROFITS		
	Sivaramappa	Mallikarjuna
Land	1 Acre	1 Acre
Borewell	No	Yes
Crops Before 2009	Groundnut	Paddy and Vegetables
Investment Rs	8800	18400
Income Rs	12000	27000
Profit Rs	3200	8600
Crops After 2009	Groundnut and Jowar; Tomato	Groundnut and Jowar; Red Gram
Investment Rs	9720	9540
Income Rs	64100	23550
Profit Rs	54380	14010

Mallikarjuna cultivated groundnut along with red gram and jowar as inter crops. He invested Rs 9,540 during the year 2010. The value of groundnut harvested was Rs 19,250 (550 kgs at 35 Rs/kg) with a profit of Rs 10,450; red gram was worth Rs 4,200 (120 kgs at 35 Rs/kg); jowar was worth Rs 100 with a profit of Rs 80. He also used jowar for household consumption.

Interestingly, Sivaramappa does not own a bore well, which is considered to be most important asset in a drought prone district like Anantapuram, Andhra Pradesh. However, Mallikarjuna owns a bore well. The incomes and profits from agriculture of these two farmers started improving since 2010 and they never looked back....

This is a tale of two farmers in Kummaravandla pally, a small hamlet in Anantapuram district, Andhra Pradesh. These farmers have a good company of other 23 farmers in the same village, who are part of Koluganti Ummadi Neeti Yajamanya Sangham – a collective of farmers. Since 2010, all these farmers are enjoying the benefits of using groundwater a collective and common resource, irrespective of bore well ownership. Farmers like Mallikarjuna are magnanimous and gracious to share water from his bore well with other farmers like Sivaramappa, who do not have borewell...

What happened in 2010?

Water is a contentious resource and wars could erupt on water issues in regions like Anantapuram. Farmers in this region (and in many other drought prone areas of India) tend to give high priority to access groundwater and rarely agree to share “their” water with others. There are also examples where bore well (water) became the centre of controversy between joint families and several criminal cases were also registered, as a result of such feuds. With this background, the experiences of Kummarivandlapally sound like fiction.

Let us visit this real fiction....

Kummaravandla pally is a village in Gandlapenta Mandal of Anantapuram district, Andhra Pradesh. This village has 53 families and 41 farmers. Rain-fed agriculture is the main occupation of the villages and there are 19 bore wells in the village. These farmers are dependent on groundwater resources for irrigating their crops. However, as all farmers extract groundwater from the same aquifer, any new bore well dug by any farmer would introduce a new user of the same aquifer and groundwater. As this process of accessing groundwater (digging bore wells and pumping water) is not regulated, there is always some kind of uncertainty about the availability of groundwater, even if they have a bore well. It is very common to see that a new bore well makes existing bore wells dysfunctional (as the new bore well may be deeper than the existing ones and would extract water from deeper strata). A bore well owner is always worried about the life expectancy and availability/ dependability of his own bore well, given the competitive digging of bore wells. On the other hand, farmers who do not own bore wells, are completely at the mercy of rainfall. Delayed monsoons, long dry spells in between two rains and complete failure of monsoon – are very common in Anantapuram. Farming in such situations is a gamble. WASSAN team facilitated discussions and reflections among farmers on the above points in Kummaravandla Pally village.

Importance of Groundwater...

Groundwater is increasingly becoming a means of attaining economic security in several parts of the world. It is also the main source of irrigation in several drought prone areas in India. As the technology for accessing groundwater improved (mainly in the form of bore wells), the number of bore wells increased drastically and this led to indiscriminate exploitation of groundwater resources in the country. 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 groundwater was either close to or excess to the net availability of ground water, thereby indicating an alarmingly overexploitation of the available ground water resources.^[1]

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.

Before this, WASSAN team interacted with all farmers and conducted a situation analysis of the village. Like many other villages, Kummari Vandla pally also faces groundwater related problems (shortage, inequitable access to groundwater; inappropriate cropping pattern that demands more water, large areas are left fallow and a limited area is cultivated with intense irrigation with the bore well water). There are no previous experiences of collective use of groundwater resources.

Based on series of meetings, awareness camps, exposure visits and personal interactions between villagers and WASSAN team, 25 farmers in the village came forward to form a collective – Kolagunti Ummadi Neeti Yajamanya Sangham. During this process, they resolved to “share groundwater with each other to sustain our crops”, thus leading to the concept of networking of bore wells for ground water sharing. There are 15 farmers who own 8 bore wells and 10 who do not own bore wells, in this group. About 56% of farmers in this group own 1 acre of land, 36% own 2 acres, 4% own 2.5 acres and 4% own about 4.75 acres of land. This collective evolved a system that addresses the problems of farmers having bore wells and farmers who do not have borewells. The overall objective of this initiative was to secure rainfed crops of all farmers, irrespective of bore well ownership.

This system involved voluntary compliance of farmers in pooling and sharing of groundwater among 25 farmers, i.e. farmers with bore wells have to share groundwater with those farmers who do not own a bore well. By linking all bore wells with a networking of pipelines and outlets, all farmers (bore well owners and farmers without bore wells) could access groundwater. WASSAN supported them in facilitating discussions among themselves to evolve norms of water sharing, design of physical infrastructure and investment requirements. During this process, the group agreed for the following points.

- The committee would have farmers with bore wells and farmers without bore well.
- A joint account should be opened in the names of these members.
- The contribution towards share capital should be equal from all farmers, irrespective of bore well ownership.
- Members have to mobilize annual contribution towards the committee fund (maintenance fund). This amount will be decided by the committee and will be acre based. i.e. 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/ allocation and also the contribution from each member.

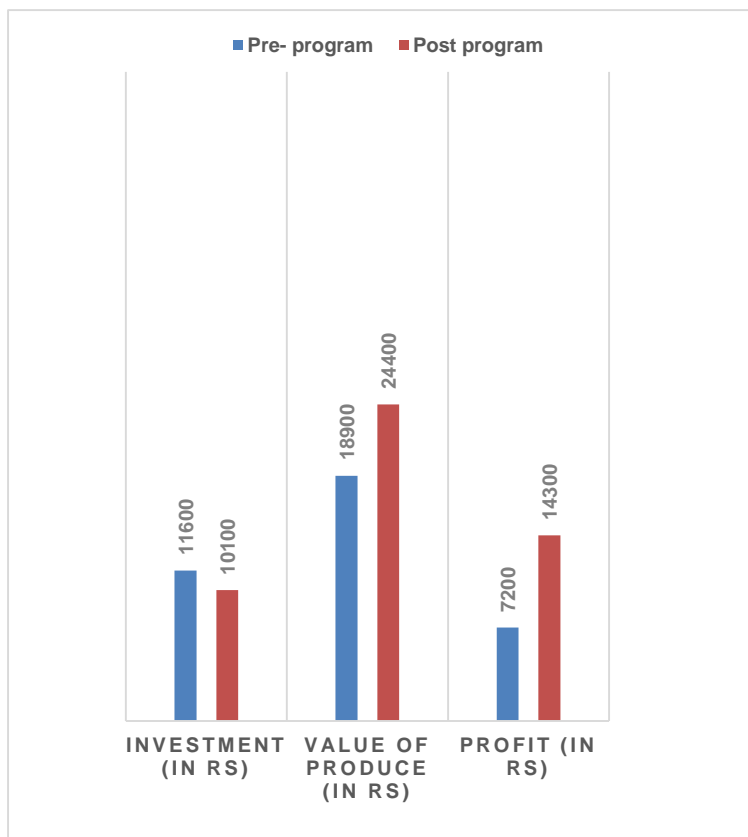
Apart from the institutional norms, the group also decided the norms for sharing groundwater.

- The irrigated area under bore wells should not be increased from the current status (2009 situation), 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 of are
 - First phase is when the seed is sown
 - Second phase is when the flowers bloom
 - Third is when the pod is developed
 - Fourth phase is 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 damages/repairs of the bore wells, the expenses for its maintenance will borne by the committee fund (maintenance fund) of the group. During the rest of the year the expenses for its maintenance will be borne by the respective farmers, who own the bore well.

After these norms are evolved, the group developed an action plan for sharing water, with the support from WASSAN. This plan was implemented as part of AP Drought Adaptation Initiative (APDAI), which was a collaborative project between Government of Andhra Pradesh and World Bank. Mandal Mahila Samakhya (an apex body women self-help groups) functioned as an implementing agency of this project for this village, while WASSAN provided necessary technical and project management support to the villages. APDAI aims at insulating crops and farmers against climate variability. Sharing groundwater from existing private bore wells among all the farmers in a group ensures protecting crops during dry spells and helps them to withstand the vagaries of climate. As this approach fits into the overall mandate of APDAI, farmers of this village could get financial support for necessary infrastructure for sharing the groundwater. This includes – pipeline network and regulators for connecting existing bore wells and enabling of water sharing. Funds from Andhra Pradesh Micro Irrigation Project (APMIP) were accessed to get 7 sets of sprinklers and drips systems

for micro irrigation. The total worth of sprinkler were rs.140000/-Each sprinkler set @ Rs.18000/- including of farmer contribution. Each sprinkler group farmers contributed Rs.2000/each to acquire the sprinkler sets. For promoting diversity in agriculture, red gram and groundnut seeds were provided for free of cost from National Food Security Mission (NFSM), Agriculture department, GoAP. Different government schemes were accessed as per the needs of these farmers – such as horticulture plantation in five acres of land; water and soil conservation works through Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS); Nadep compost pits from Non Pesticidal Management (NPM) and so on.

Before 2009, these farmers were largely taking up paddy (bore well owners) and groundnut (other farmers). Only small patch of land was irrigated and rest of the land is either rain-fed or left fallow. The farmers who do not own a bore well had very small profit margin. This was also possible in a good year, where monsoon is normal. The agreements/ norms among



farmers and water sharing pipeline network introduced a new way of agriculture in this patch of 72 acres, for these 25 farmers, since 2010. The cropping pattern changed and there is a diversity of crops in this patch. There is also considerable reduction in costs of cultivation (investment); improvement in value of produce and also net profit. The average profit percentage is about 146% per acre of land. It is to be noted that groundwater sharing has enhanced their profit margin by two folds. (See box).

Since 2010, the crop pattern is a diversified system. During 2011, the group grew 9 varieties of crops in various combinations; groundnut, red gram, jowar, chrysanthemum, mulberry, castor, paddy, mango plantations and tomato (and other vegetables). Fodder plots also became part of the cropping pattern now. The choice of crops by farmers who owns a bore well 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 tables.

Details of the average investment, value of produce and profits of crops for per acre of land in 2011

S.no	Crops	Investment (in Rs)	Value of Produce (in Rs)	Profit (in Rs)
1	Red gram	5080	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

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

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. WASSAN collected the groundwater levels of these bore wells each year since

2009 and this indicates that the groundwater levels are sustained, while the area under agriculture and critical irrigation improved. The factors cited for sustainability were

- No new bore well was dug. So existing bore wells survived, without failure.
- Assured water supply to fields. Even when one of the bore well fails, water could be supplied from other bore wells, through networking of bore wells.
- Repairs and maintenance is taken care of, by the group during kharif season.
- Water losses during transmission are prevented due to pipelines that supplied water to each field.
- Similarly drip and sprinkler systems helped in improving the water use efficiency
- Area under intense irrigation drastically reduced and crop diversity helped to improve net profits from agriculture.

This study and recent surveys conducted by WASSAN indicate that all farmers in the group including Sivaramappa and Mallikarjuna have also accumulated moderate assets – a house, TV, agricultural equipment's, a bank balance, since 2010. They are also able to take care of medical emergencies of the family and send their children for higher education.

This group of 25 from Kummaravandla Pally is now a role model village for several other farmer groups in the state and they stand out as a wonderful example for sharing groundwater and withstanding the vagaries and variability in rainfall distribution in the village. They could reduce crop losses, by providing water to crops at critical stages. Diversity in agriculture is another principles they followed to ensure that they are prosper, irrespective of rainfall distribution in the village.