

Case Study for GWP & IWP

1.1 Tank Renovation – An Hope to Build Resilience

1.1.1 About Gundar and Drought

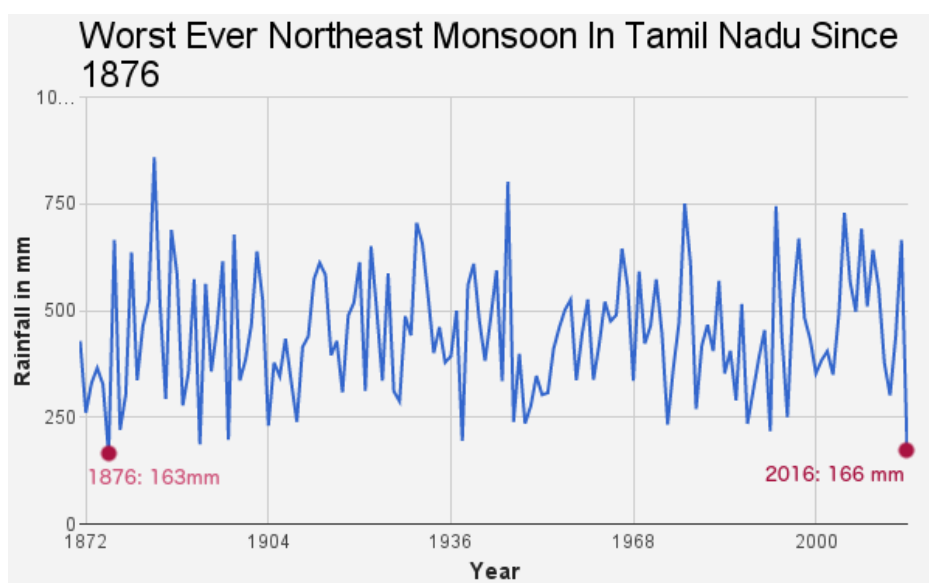
The Gundar is one of the dry basins with acute shortage of water for irrigation and domestic needs. Being part of rain shadow region, the rainfall pattern and farm production is almost uncertain and making the farmers life miserable. The drought in the year 2016 was a worst nightmare for the farmers in the region. After the year 1876, the state of Tamil Nadu received the lowest rainfall in 2016. Many of the tanks did not receive sufficient water. In Gundar Basin, the sluices were kept closed, since many of the tanks did not receive water to level of sluice gate.

Farmers usually cultivate paddy as the first crop, which also fulfills their family needs. This year, many of the farmers have not taken-up paddy crop considering the shortage of water. Those who have cultivated have left it in the halfway considering the shortage of water. Many have incurred loss. One of the farmer said, farming is equivalent to gambling and our income is not guaranteed.

Table 1: 2016 Rainfall comparisons between India and TN

Seasonal	Actual Rainfall		Normal Rainfall		% Departure	
	India	TN	India	TN	India	TN
Unit in mm						
Winter(Jan, Feb)	17.9	3.3	41.4	30.9	-51	-89
Pre Monsoon (Mar to May)	131	111.6	131.5	128.1	0	-13
Monsoon(June to Sep)	862	258.1	887.5	317.2	-3	-19
Post Monsoon (Oct to Dec)	69.7	166	127.2	438.2	-45	-62

Source: CRIS, IMD



Source: Monthly rainfall dataset, Indian Institute of Tropical Meteorology

It is notable that, the state of Tamil Nadu has faced severe flood in the year 2015 and extreme drought in 2016. As per the IMD report the shortfall in rainfall accounted to 62%. Within basin the shortfall was ranging from 46 to 63% during the Northeast Monsoon. In 2017, the southern districts again suffered due to decline in rainfall during the Northeast monsoon. With the basin, the deficit was ranging from 17 to 47%. Drought in two consecutive years crippled the livelihood of farmers, who got from money lenders and trader intermediary with hope to make repayment after the harvest.

S. No.	Districts	NEM 2016			NEM 2017		
		Annual Average Rainfall	Actual Rainfall	Variation in %	Annual Average Rainfall	Actual Rainfall	Variation in %
1	Madurai	419.1	228.2	-46	419.1	286.5	-32
2	Sivagangai	422.7	159.1	-62	422.7	259.2	-39
3	Ramanathapuram	491.7	191.3	-61	491.7	259.1	-47
4	Virudhunagar	419	173.2	-59	419	332.3	-21
5	Thoothukudi	427	158.9	-63	427	353.6	-17

Tank Renovation – An Hope to the Farmers

In the Southern districts of Tamil Nadu, each village has a water body to secure water for agriculture. The hydrological characteristics of the Indian monsoon necessitated the creation of storage facilities to hold the rainwater of the monsoon. With extraordinary engineering, managerial and social skills, an extensive system of rainwater harvesting structures like tanks and ponds had been built and maintained by the people for centuries. Behind these existing indigenous systems of irrigation, there are thousands of years of tradition.

These water bodies are central to livelihood and presence of these water bodies in good condition decides the income of the farming households. The water body supports groundwater recharge, livestock feeding and other needs of rural households.

Impact of Renovated Tank On Ground Water

Prof.R.Sakthivadivel, has done a study on impact of tank renovation on nearest observation wells. The Central Ground Water Board (CGWB) has been monitoring the water levels of the four districts namely Madurai, Sivagangai, Virudhunagar and Ramanathapuram for the last few years of which only two years of data that they have uploaded in their web site. The two years are 2014-15 and 2015-16- For each year , CGWB make four measurements of depth to groundwater level from ground level coinciding with summer (May), pre-monsoon (August), monsoon (November) and post monsoon(January). The data available was used and correlated with renovated and non-renovated tanks.

Methodology adopted:

The purpose of the study is to investigate the behavior of the observed ground water in and near the rehabilitated tank as opposed to the behavior of the observed data in and near the non rehabilitated tank. The hypothesis is that the depth to ground water of wells near the rehabilitated tanks will be smaller than that of depth to ground water of wells near non rehabilitated tanks. The second objective is to investigate as to what distance the rehabilitated tank has an impact on tank water recharge. In order to do this, we have selected a rehabilitated and non rehabilitated tank as shown in figure 5 and marked the area lying within 2 km, 2-6 km and more than 6 km.

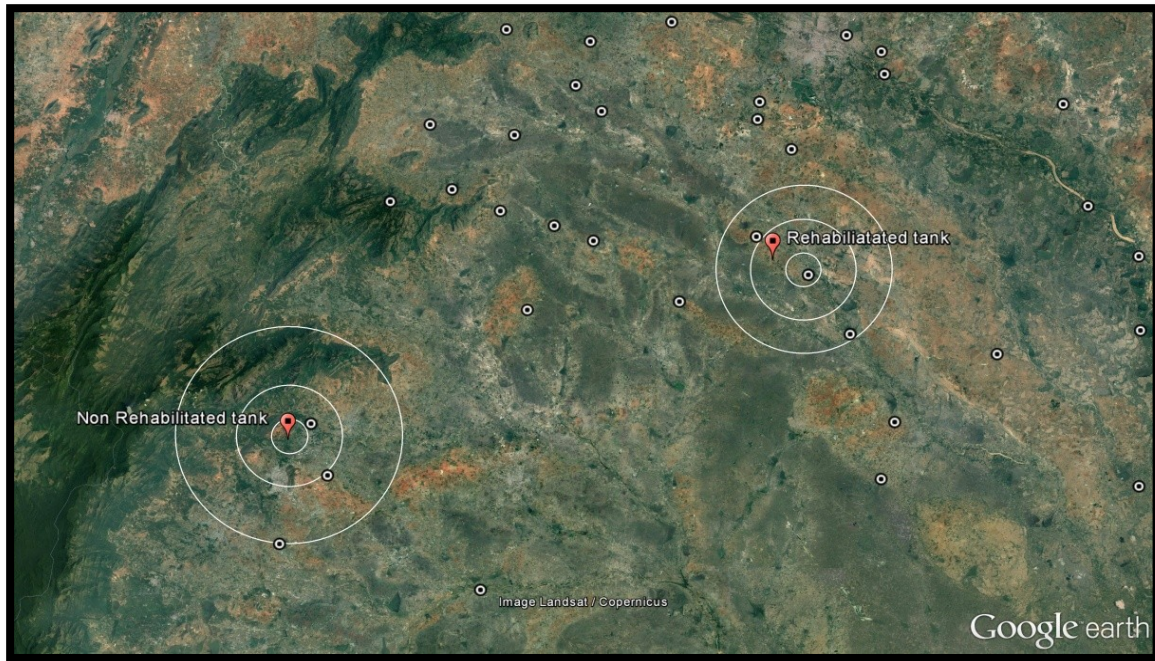
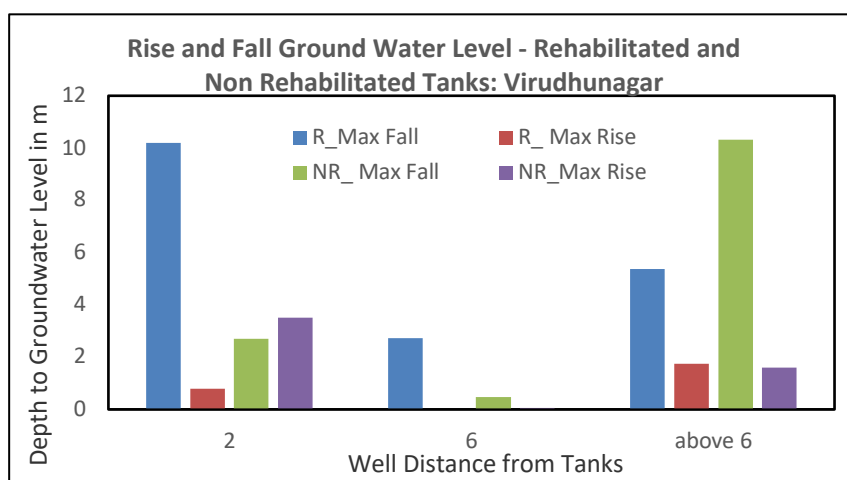
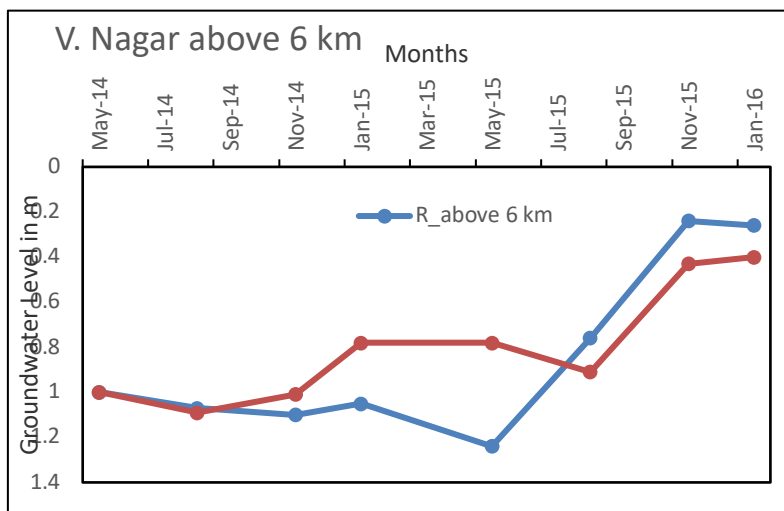
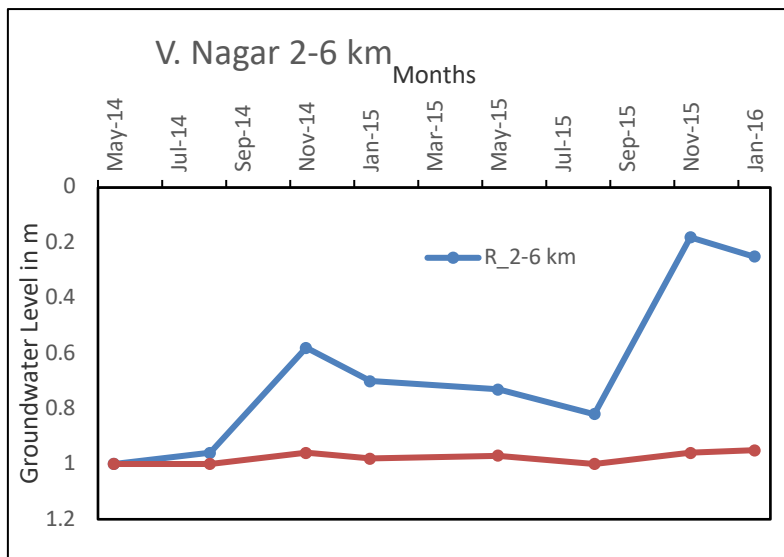
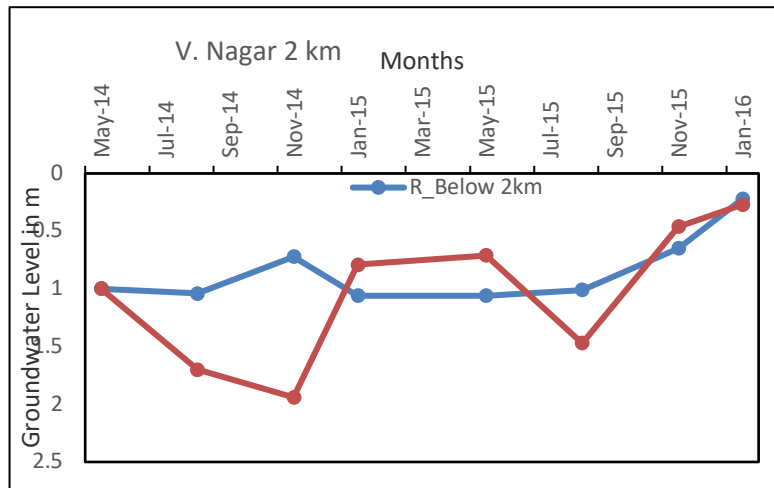


Figure 1 Satellite imagery highlighting the rehabilitated and non rehabilitated tanks

The depth to groundwater as measured by the CGWB varies from tank to tank and since the ground level elevation varies from tank to tank they can not be compared. In order to compare the measured depth, they are normalized with respect to the depth measured in each well during the summer season of 2014. We then have selected a well lying within each of the marked area both for the rehabilitated and non rehabilitated tank. The normalized data obtained for the chosen wells in different districts are given in table 1. The table also gives the max. rise and max fall during the two year periods of record.

Virudhunagar Analysis





The study concluded that the renovated tank has impact on groundwater level within a radius of 2 kilometer. The impact of the such tank renovation is realized by the farmers at village level. The story of Menakshipuram village endorses the study outcome through its experience.

About Meenakshipuram Village

Meenakshipuram is a small village located in Aladipatti panchayat of Thiruchuli block in Virudhunagar district in Tamil Nadu. This village is 12 km away from the block headquarters and 10 km away from the Aruppukottai. As per the villagers there are 220 households and many are settled outside the village. Only adults have settled in the village and people of young age have migrated to Madurai, Chennai, and other areas for survival. People have shared that the rainfall is unreliable and farmers don't want to settle their children in this village.

About the Irrigation Tank

Konkana kurichi tank is the prime source of water for the multiple needs like agriculture, livestock feeding, and recharge of drinking water bore wells, domestic use and fish rearing etc. Farmers in this village cultivate paddy, cotton, and chilies as first during the Rabi season. There are 14 wells of which eight has bore well within a distance on 1000 metres. Farmers are using well water for raising nursery and to provide life-saving irrigation at the critical growth stage of first crop. Farmers use well / bore well water for the cultivation of second crop.

S.No.	Components	Details
1	Registered Command Area in ha	27.270
2	Water Spread Area in ha	38.840
3	Original Capacity of Tank in MCM	0.3358
4	No. of filling	0.856
5	Annual storage in MCM	02909
6	Combined catchment area in sq.km	11.5182
7	No. of sluices	2

The Association

DHAN Foundation facilitated the promotion of Kongana kuruchi kanmoi vayalagam, a farmer's association to conserve and maintain water bodies. The association was

promoted by 66 farmers cultivating on 55 acres of land. They opened a bank account in Tamilnadu Mercantile Bank for the fund management.

Prior to Renovation.....

The Konganakuruchi tank was densely covered with Prosopis. Its presence was noticed on the tank bund, water spread area, and the supply channel. As per the ground assessment, the field team from DHAN identified that about 18900 sq.m of the tank area was covered with prosopis, which was leading to decline in storage capacity of the tank. Its presence in the feeder channel distracted the water flow to the irrigation tank. Further the water spread area of the tank was silted and the tank bund was very weak. The possibility of bund breach due to heavy flow was very high.

Tank Renovation.....

DHAN Foundation facilitated the tank renovation through the association in the financial year 2011-2012. Prosopis on 16643sq.m of area was removed and the water spread area of the tank was deepened. 2349cu.m of earth was removed and deposited on the tank bund. The total estimate of the work was Rs. 1.289 lakhs and community has contributed twelve thousand towards the work implementation. Hindustan Unilever Foundation provided 90% of fund for the renovation. The remaining 10% was contributed by the community.

The Challenge...

During the course of implementation the Panchayat President hindered the work implementation by submitting a petition. The Government officials visited the site and interacted with the community. After visiting the work site and interaction, the officials suggested the community to continue the work implementation.

Tank is a Mother



Mr. Kengamuthu, the President of the Association says, “Tank is a mother and we need to protect it. The success of crop is decided by the rainfall and better maintenance of water body. Before five decades, water from well overflows through the streets and today we couldn’t find water. I have children and all of them are settled in towns. Presently I am taking care of agriculture. Mostly, young people in the village

have migrated to the nearby towns for survival. Since 2011, after the renovation of the irrigation tank, the irrigation tank filled only once in the year 2014. In the rest of the year, the tank was half and quarter filled. Under such conditions, we use our bore well to irrigate our field. The tank renovation supports recharge of bore well. Without which cultivation is almost impossible. Even if this tank is not renovated, it may look like a pond. However the water recharged will not be sufficient to meet the needs of the communities. Post renovation the water level in the bore well has improved.

In spite of acute drought, I was able to cultivate cotton with the support of bore well irrigation on one acre of land and I was able to harvest 10 quintals of cotton in the year 2016. The net income was around Rs. 13000. In 2017, I was able to harvest 23 quintals of cotton and earn Rs. 49240 as net income.

In the initial stage, I worked towards mobilizing contribution. Today I am reaping the benefits of the intervention. We have organized Shramdhan exercise as part of continuous maintenance. Our only expectation is a better rainfall and successful harvest. As a human we did our duties and we pray god for a better rainfall.

Status of Farming in Meenakshipuram Village

In the year 2017-18, the village received very less Rainfall. About one-fourth of the tank was filled. With the available water 14 farmers have cultivated cotton on around 22 acres of command areas. Farmers used both Tank water and open well water for the cultivation of cotton. They got the yield of 25.8 tons. The total income earned by the farmer is Rs. 724930. The crop cultivation generated 705 person days of employment. Besides, 67 livestock in the village access water from the tank.



The Other Side Story of Mr. Thilagar Raj

I am UG degree holder and I live in Muthuramaligapuram village, which is near to Meenakshipuram village. I have 2 acres of command area and own a well and bore well. In 2016, we came across very acute drought. The well and the bore well were completely dry and it did not support irrigation. I was left with no option. I cultivated vegetables in few cents of land, which was only sufficient to meet both the ends. Our tank in the village was not renovated for several years. In 2017, we approached DHAN Foundation. We had discussion in the federation office of ThiruchuliVattaraVayalagam. Based on the

guidance, we made a decision to cultivate maize instead of paddy in their field, which had a better result.

The Data Story

The renovation of irrigation tank has direct impact on groundwater recharge. The study done by Prof. R. Sakthivadivel stating the changes in groundwater level has a very high relevance for the project implemented by DHAN Foundation. As per scholars, the impact of tank renovation is measured in terms of water level in the borewells and

wells. As per community, the impact of tank renovation can be seen in the form of water availability for livestock, and crop in drought condition. In Tamil Nadu there are more than 39000 water bodies. The scope for scaling such interventions in drought prone area is very high to build the resilience. As on March 2018, DHAN Foundation has covered 267 water bodies (work completed tanks) under supply and demand side interventions. Besides under phase I project DHAN has renovated around 255 water bodies. The cumulative coverage of water body is 522.

As on March 2017, the project Impact has secured 4.8 billion liters (Only Assured Data) of water under drought condition in five southern districts of Tamil Nadu. Similarly under phase I, 62.89 billion litres (Assured Data) of water was conserved and reported. Water conservation and efficient application is highly critical in drought context. Every drop matter and farmers should be in a position to cultivate "More crop per drop". The project has done justification in the application of financial resources most efficiently. DHAN Foundation has engaged a team of professional towards the implementation of project works.