

Restoration of traditional water Resources (Lakes) with local participation for coping up with Climate Change

Bitra Sada Siva

*Team Leader, DHAN Foundation, Hyderabad, India
sadasiva@ghan.org*

A. Gurunathan

Chief, Executive, DHAN Vayalagam (Tank) Foundation, Madurai, India

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ABSTRACT:

Irrigation tanks (Traditional water harvesting structures called Lakes) are our heritage handed over to us by our ancestors and are the lifelines of villages. Tanks (Lakes) are small irrigation structures predominantly serve small and marginal farming communities to sustain the agriculture production by supplementing the monsoon rains. There will be festivities in the villages if its irrigation tanks get filled. A proper maintenance of the tanks will prevent famine, starvation and unemployment and bring in prosperity. During the British rule, the tank as a common property has become the 'state' property. The tanks belong to the 'state' and they are 'vested' with government departments for their maintenance and management. In most of the Southern states in India, the major threats to tanks are mainly from the encroachers, inefficiency in the functioning of tank system and improper use by the government itself.

Tank (lake) irrigation in Andhra Pradesh, India has played a vital role in the development of its agricultural economy. There are around 79,000 small and minor irrigation tanks providing water for irrigation and domestic use, supporting grazing land, fuel wood growth and ground water recharge. Many of these tanks are hydrologically linked in chains (called tank cascades) that cut across administrative boundaries. With deteriorating tank systems, marginal and small farmers are increasingly at the mercy of monsoon and are forced into a cycle of deprivation and debt.

The share of the tank irrigated area in India has declined from 16.51% in 1952-53 to 5.18% in 1999-2000, whereas the share of ground water irrigation has increased from 30.17% to 55.36% during this period. In the last 25 years, about 1.7 million hectares of net area under tank irrigation has been lost, amounting to a capital loss of about Rs.51,000 million.

DHAN Foundation, a not-for-profit Non Governmental Development organisation since 1992 demonstrated successfully at grass roots in rehabilitation of over 1800 traditional irrigation tanks with community empowered nested institution approach. Due to this effort, 163,000 families got incremental benefits in addition to assured water supply for crops for irrigation. But, the Govt. support for the rehabilitation of tanks is lacking. So, there is a strong felt need for reviving the traditional tank irrigation systems to their original standards with strong political will so that the surface water storage capacity could be enhanced substantially with lesser costs than looking for new infrastructures for water resources development in India. Traditional tanks are considered as flood mitigators due to their equitable water distribution among hydrologically linked tank cascades. They are also seen as drought mitigators.

This paper analyses the revival of tank cascades in Nalgonda district of Andhra Pradesh, India with participation of all stakeholders. The paper also brings out the role of community participation in bringing all stakeholders to manage and maintain the tanks and the various aspects of the holistic approach to reviving these tank cascades offering insights to the readers, particularly to policy makers and NGOs, in the cascade approach to tank modernisation.

INTRODUCTION ABOUT THE TANKS AND CASCADES

India, with its scattered and at times intense monsoons followed by protracted droughts, has a tradition of rainwater harvesting to meet the local needs of water, especially for agriculture. Irrigation tanks, which are the rainwater harvesting structures, were ingeniously conceived by our erstwhile rulers and chieftains together with the local communities and craftsmen. These locally managed, earthen-bunded reservoirs were built across slopes using the depressions and mounds. The

undulating topography of the Deccan Plateau was suitable for these simple, innovative tanks in the semi-arid regions of Peninsular India.

Today these tanks are in disuse and need to be restored to revive the rural economy. As most of the areas have existing structures there is no need for huge capital investments. Though ancient in terms of structure and management, tank irrigation in India has declined from about 4.45 million ha in 1960-70 to 3.81 million ha in 1970-80 and then to 2.90 million ha in 1989-90.

RATIONALE FOR INTERVENTION

DHAN Foundation, having long experience in renovating tanks, especially tanks in chains was invited by the Nalgonda district administration in June 2000 to study the status of the tanks, and to list the steps needed to restore their original capacity and performance. A team of professionals from DHAN Foundation, India had talks with the District Collector, Drought Prone Area Programme (now District Water Management Agency) officials, District Rural Development Agency, Irrigation Branch, Panchayat Raj and Agriculture departments. The team made field visits in the District and presented an assessment of the tank systems status and the feasibility of restoring their original performance with State Government support through the DWMA. Finally, a joint decision was taken to revive the Gundrampally and Aipur tank cascades in Chityal mandal.

The present paper aims at describing the experiences of DHAN Foundation for restoration of tank cascades and its impact on livelihoods with community participation and ownership in Nalgonda district, Andhra Pradesh State, India.

PROFILE OF NALGONDA DISTRICT

The 14.24 lakh ha Nalgonda district has 59 mandals. The district's average annual rainfall is about 740 mm, received mostly during May-October. The monsoons are erratic and dry spells are long. There are 4,434 small tanks each with less than 100 acres of command area. Many of them are in chains with the terminal tanks draining into small river systems. As per 1992-93 data, tanks irrigate a gross area of 17,697 hectares but this has reduced substantially in this decade.

The district's topography makes irrigation from canals, tanks, wells and streams feasible. As most tanks are heavily silted, the main irrigation source is ground water, which is being tapped mindlessly through bore wells. The Season and Crop report of 1992-93 shows that 1,29,411 ha is irrigated with ground water out of a total irrigated area of 2,82,566 ha. Unfortunately, many farmers suffer as they depend on rain-fed agriculture to grow castor, redgram, jawar, bajra, cotton and chilli for their livelihoods.

GUNDRAMPALLY AND AIPUR TANK CASCADES:



The rehabilitation of the tank cascades were to be based on the following criteria:

- The extent of tank cascade degradation and the scope for restoring its original standards
- Scope for recharging ground water
- The number of small and marginal farmers, including those from the Scheduled Castes, who would be benefited
- Willingness of farmers to contribute cash or labour for the rehabilitation work.

The team mapped out twenty tanks including two Irrigation Branch tanks in these two Cascades.

GUNDRAMPALLY TANK CASCADE

There are 11 tanks in this cascade in Chityal mandal, 9 are Panchayat Raj tanks with a command area of less than 100 acres and one Irrigation Branch tank with a command area of more than 100 acres. The cascade covering Gundrampally, Sunkenapally, Tumbavi, Peddabavi and Saidabad villages can irrigate 287.36 acres, benefiting 280 farm families directly.

The team during its survey and participatory tank appraisals found that:

- In most of the tanks the water spread area was encroached upon and three tanks were completely encroached.
- Sluices were either closed permanently or dismantled.
- In four tanks social forestry trees (*Acacia nilotika*) were planted on the foreshore.
- The surplus weirs were either broken or silted up to crest level.
- All the tanks were heavily silted.
- About 80 per cent of the supply channels were encroached.

AIPUR TANK CASCADE

Aipur cascade has nine tanks. This cascade covers Aipur, Katrev, and Aregudem villages, and can irrigate 191.20 acres, benefiting 191 farm families directly. In most tanks, water could last only for a brief period after monsoons. So the farmers cultivate only a part of their lands, and often leave their lands fallow for a year.

Table-1: Status of Tanks in Gundrampalli Cascade before renovation

Sl. No.	Name of the tank	Total ayacut area (ac.)	No. of farmers
1	Tette kunta	6.35	4
2	Pottigutta kunta	1.30	7
3	Ura kunta	2.32	12
4	Peddabavi cheruvu	9.24	14
5	Mastini cheruvu	62.12	66
6	Rameswaram cheruvu (IB)	117.11	66
7	Lakkasani kunta	40.00	25
8	Devi cheruvu	33.31	44
	Total	271.75	238

Table-2: Status of Tanks in Aipoor Cascade before renovation

Sl. No.	Name of the tank	Total ayacut area (ac.)	No. of farmers
1	Vithalai Cheruvu	60.00	85
2	Yerra kunta	8.00	4
3	Oora kunta	14.30	9
4	Toorpubai kunta	32.20	8
5	Kammara-vani kunta	27.10	55
6	Aipoor-Halia	NA	NA
7	Lingareddy kunta	12.00	10
8	Edamma	18.00	15
9	Sunkaravani kunta	20.00	5
	Total	191.20	191

Proposal for Rehabilitation

The proposal submitted by the DHAN team to the district administration in June 2000 had the following components:

- **Defining Tank Cascade Boundaries:**

All the tanks and small water bodies would be defined with trenches and trees along their feeder channel, water spread and command area boundaries. The departments of Revenue, Survey and Land Records would identify the boundaries of government lands and encroachments thereon.

- **Promoting Farmers' Organisations to do the work:** The farmers would form Tank Associations (TA) and Tank Cascade Associations (TCA) to do the work.
- **Initiating Savings and Credit with Tank Association:** Savings, credit and insurance cover would be started to sustain the TAs and TCAs after the promotional phase.
- **Support for Tank-fed Agriculture:** Agriculture department would stabilize tank-fed farming. Seed production clusters could be promoted. Tank silt would be analyzed as it could increase the productivity of dry lands. Contingency plans would be drawn to tide over drought and late onset of monsoon.
- **Endowment Fund:** Each TA and TCA could create and contribute to a tank endowment fund – from members and other sources – to cover tank management costs.

The people had to contribute 25 percent of the cost in cash or kind or both. For reviving the 16 tanks in two chains, the total proposed amount was Rs.25.50 lakhs, including Rs.9.27 lakhs for two IB tanks. The DWMA sanctioned Rs.17.04 lakhs for 14 tanks, excluding the two IB tanks. A team of professionals was placed at Chityal to implement the project.



A view of a tank complex



The Inception team interacting with farmers

Implementation

DHAN Foundation has played a major role in training the farmers properly and in designing the works. The experts and engineers at DHAN's Tank Programme office helped the field team at Chityal to ensure quality. For the first time the local people could see the glory of their tanks which in the monsoon could store up to maximum capacity.

Tank Rehabilitation work

Tank rehabilitation work includes the following steps:

Preparation of people estimates to assess the needs and prioritizing the works by the members: Together with the TA formation, people estimates were prepared for tank revival

work. The farmers were asked to list out members submitted the estimates to DWMA, Nalgonda for administrative and technical sanction.

Preparation of technical estimates: The technical estimates based on the farmers' needs were prepared by senior professionals and irrigation engineering experts at the DHAN Tank Programme office. The team after discussing with and getting the approval of TA and TCA participation and contribution to the cost, they were taken for an exposure to places where similar work had been done by DHAN. After much dithering they finally agreed to pay 25 per cent of the estimated cost. If they were unable to pay the total contribution they had to decide the priority of works. The first acceptance in tank cascades project came from the farmers of Oora *kunta* in Aipur village.

Getting technical sanction from the DWMA: The DWMA engineer visited the location, checked the estimates and recommended for final approval by the Project Director.

Mobilizing 25 percent contribution from the farmers: This is an indispensable part of the project. Convincing the farmers to contribute in cash, kind or labor was difficult. To emphasise the importance of farmer's tank works by priority such as bund strengthening, desilting the tank bed or supply channels, sluice repair or rebuilding, surplus weir repair or rebuilding with approximate costs.

Table-3: Details of activities undertaken

Name of the tank	Value of work done (Rs.)	People contribution (Rs.)
1. Oora Kunta	1,77,739	45,959
2. Lingareddy Kunta	1,99,880	71,980
3. Turpubavi Kunta	1,54,620	36,600
4. Kammaravani Kunta	79,600	19,521
5. Vithalai Cheruvu	2,05,888	66,614
6. Sunkaravani Kunta	1,03,130	22,700
7. Yerra Kunta	74,760	19,261
8. Edamma Kunta	1,27,123	22,900
9. Devi Cheruvu	35,837	11,050
10. Bussuvani Kunta	34,000	13,350
11. Chouta Kunta	25,272	5,525
12. Peddabavi Kunta	46,758	13,248
13. Guddetivari Kunta	1,07,000	23,010
14. Pottigutta Kunta	0	0
Total	13,71,607	3,71,718

The DWMA, Nalgonda first sanctioned the Chouta *kunta*. But due to delay in contribution mobilisation, the Oora *kunta* supply channel and Vitalaya *Cheruvu* breach closing were taken up from March 2002 to July 2004. The delay was because –

- the work could be done only from February to July and not during the rainy season when water stood in the tanks
- the volume of digging needed was high. But, the Government did not allow use of machinery for this. There were inadequate hands in these villages for this work

- c) encroachment eviction took time.

Encroachment eviction in Peddabavi Kunta

Peddabavi kunta is in Sunkenapalle village, Chityal Mandal. Poor rains for over 10 years and sheer neglect had left the tank dry. The village patwari who measured land and collected land revenues traditionally had given the tank bed and supply channel land to some villagers who farmed it almost up to the bund by encroaching the entire tank bed. This drastically reduced the tank's capacity.

While preparing the people estimate, the Peddabavi kunta TA members realized that the encroachments had to be removed first. After getting the technical sanction from the DWMA, the DHAN team approached the Mandal and State-level officials while urging the farmers to solve the problem on their own. The TA members visited the MRO many times before the officials visited the village, surveyed the tank bed and fixed the boundaries. The encroachments were removed and the farmers completed the work enthusiastically.

Impact on the performance of the tank system

It is well known that the supply channels are the main conduits for water to flow into the tanks. The supply channel reclaiming work done in Oora *kunta*, Kammaravani *kunta*, Turpubavi *kunta*, Yerra *kunta*, Edamma *kunta* of Aipur Cascade, and Peddabavi *kunta*, Guddetivari *kunta* of Gundramapally Cascade had a spectacular impact on the system. Cleaning and deepening the supply channels ensured that the rainwater runoff from the catchment reached the tank. Earlier it was wasted.

Weeds were a serious problem in almost all the tanks where the dense weeds reduced the storage capacity. The tank bed work eliminated the problem considerably.

Table-4: Details of work undertaken

Detail	Aipur Cascade	Gundrampally Cascade	Total
Volume of work done (in Cubic Meter)			
Tank bed	28,738.36	8,940.39	37,678.75
Supply Channel	4,727.84	878.29	5,606.13

Desilting the tank was a major part of the cascade renovation work. The volume of earth removed from the tanks was 37,678.75 cubic meters that increased the storage capacity to the same extent (equal to 37,678,750 litres of water). With reclaimed supply channels the water from subsequent rains got stored in the tank. The earth removed during desilting was used to strengthen the tank bunds.

The year after the renovation works were completed, the bunds withstood heavy rains and floods. Due to the emphasis on strengthening the bunds, they soon met the best design standards. The locally designed and modified Slope Aligning Tool (SAT) made the farmers' work easy. They could meet and maintain the standards of all tanks.

Performance of the sluice decides the tank water use efficiency. Irrigation through open cuts in embankment wastes water weakens the bunds which could then breach during heavy rains. Absence of shutters in sluices also wastes water. Plug and Rod shutters were provided to sluices so that the tank water could be regulated precisely, thereby improving the water use efficiency.

Table-5: Impact assessment of the treatment

Particulars	Before renovation	After renovation
Water availability during South West Monsoon	45 days	100 days
Water availability during North East Monsoon	60 days	150 days
No. of seasons cultivated	Only Kharif	Both Rabi and Kharif

Another major impact of the project was on the ground water table. The farmers could see the water level in the near-by wells. In the ayacut area of Kammaravani *kunta*, the water table increased by up to 1.20 metres. In the bore wells near Oora *kunta* and Lingareddy *kunta*, farmers noticed a steady inflow of water. It provided them water for an assured crop yield for the next two seasons.

Impact on village economy and village development

The crops in this region were often affected for want of water, particularly during the critical stages of crop growth.

In some of the villages the command area would be left uncultivated fully or partially due to lack of water in the tanks. Soon after the rehabilitation the area received good rains. The 273 ayacutdars were able to get good yields during both the seasons in 2004-2005, some of the farmers after several years. It also provided farm labour work in the villages. The rehabilitated tank system had become an asset that raised the productivity of agriculture and improved the village economy.

As a direct impact the project provided jobs when the local job scope was 'NIL'. Nearly 40 percent of the total expense was wages for 3,695 labour-days of work in these cascades.

Livestock rearing is a major additional income-generating activity of the villagers of Aipur and Gundrampalli Cascades. The availability of water in these tanks for a longer period meant the cattle could get drinking water especially in the summer. This was seen in Bathukamma *kunta*, Guddetivari *kunta*, Oora *kunta*, and Bussuvani *kunta*.

Table-6: Details of works undertaken

Detail	Aipoor Cascade	Gundrampalli Cascade	Total
No. of tanks	8	7	15
No. of Ayacutdars	191	82	273
Command area benefited in acres	191.20	82.80	274
Labour days generated			
Men	1,068	491	1,559

Women	1,767	369	2,136
Total labour days	2,835	860	3,695

Microfinance Interventions

Timely, affordable credit was a major constraint of the farmers. The Vayalaga Podupu Sangams or micro finance groups (MFGs) were promoted to meet the savings and credit needs of farmers and the landless poor. So far, 76 MFGs have been started in Aipur, Gundrampally, Sunkenapally and Katrevu villages. The members include the landless labourers as well as village women. They save regularly and take loans for various purposes. They meet once a month and the accounts are kept by the employed staff.



People estimate preparation



Tank Cascade Association meeting

While bank credit facilities for women SHGs were easily available, banks were shy of giving loans to farmers' groups. On seeing the performance of these MFGs, Nagarjuna Grameena Bank, Gundrampally extended credit facilities to them. Today the farmers can get loans easily from the banks.

So far, 34 groups have been linked with the bank and Rs. 2.30 million has been obtained as credit. Nearly 45 percent of the loans has been used for farming.

Table-7: Details of savings by SHGs

Details	Aipoor Cascade	Gundrampalli Cascade	Total
Rs. in Lakhs			
No. of Vayalaga Podupu Sangams	16	18	34
No. of members	234	213	447
Savings by members	5.76	6.47	12.23
Credit mobilized from banks	47.85	36.25	84.10

Social Impact

Several socio-economic and political factors weakened the village unity and cohesiveness, and affected the performance of common assets like tanks. The rehabilitation initiatives in these two cascades have provided a space to solve many problems of the tank system in particular and village development in general.

The TAs now are thriving entities. With the collective strength and solidarity because of the TCA, they have begun collective purchase and supply of inputs, creating endowments for the TAs to sustain their works.

	We did work for Rs.2,70,000. The DHAN Foundation staff would not touch even a single rupee. We had to go to the bank, withdraw money, pay the workers, the JCB wala, the stone supplier, material supplier... Even when we asked them to count they would not touch the money. They would only oversee work and write the accounts.		After seeing them, we said we didn't have money to contribute. We are 50 members, both Scheduled Castes and backward community, using the tank. Instead of money we will contribute labour. They asked, "What work can you do?" We said we could clear the bushes, remove the stubble, do earth work, and rebuild the sluice. We rebuilt the surplus weir and sluice. Our contribution was equated with this work.
Kadaganchi Ramulu President, Lingareddy Kunta TFA, Aipur cascade		Arasani Edaiah Vayalagam Movement Leader, Aipur village	
		DHAN Foundation staff met us for one year. Meanwhile the Oora kunta people completed the work.	

The TA members volunteered to spend their time during the planning and implementation of the project. The TA office bearers were deeply involved in supervising the work, writing accounts, and dealing with government officials, problem solving, etc.

- Each village showed its unique character and strength during the project.
- The success story has served as a demonstration effect on nearby villages.
- Visitors from government departments and nearby villagers have come and learnt from the work.
- Performance of the TAs' unique character is discussed and praised in various forums.

The work done was recognized at different levels. One of the TCA representatives, has been nominated as a member, State-level Conservation Council for Small Scale Water Resources promoted by DHAN and other institutions working on water issues. The TCA leaders have visited Tamil Nadu to learn the cascade renovation project done there.

Endowment for sustainability

In order to sustain the tank after renovation, the concept of creating an endowment was introduced by DHAN Foundation with the support of Sir Ratan Tata Trust, Mumbai.

In these two cascades, an endowment fund has been created for nine TAs. The TAs have contributed Rs.73,000 and an equal sum was given by DHAN Foundation with support from the Sir Ratan Tata Trust, Mumbai to be kept in fixed deposits for at least five years. After maturity of the fixed deposit, the TCA could only withdraw the interest for tank maintenance.

Input supply through collective action

The Aipur TCA members wanted quality seeds for their farms. With the help of the TCA staff, they bought seeds from a private firm. Next season they got foundation paddy seeds and raised a seed farm on Mr. Malla Reddy's field in the same village and distributed the seeds to all the Aipur farmers.

In the same season the TCA members needed 75 bags of DAP, 93 bags of urea and 46 bags of other complex fertilizers. In June 2005, the TCA decided to use the revolving fund to buy 100 bags of DAP and 100 bags of urea.



Capacity Building event for the farmers



Farmers attending Vermi compost training

Table-8: Impact of interventions in the tanks

Sl. No.	Name of the tank	Status before rehabilitation	Status after rehabilitation
Aipoor Cascade			
1	Oora Kunta	Weak bund, tank bed and supply channels silted heavily and surplus weir was broken. Sluice without shutters.	Bund strengthened as per the technical design, surplus weir repaired, supply Channels and tank bed were desilted and sluice provided with plug and rod shutter.
2	Lingareddy Kunta	Bund breached up to 15 meters and tank has no structured surplus weir. Sluice has no shutters.	Breach was closed with core wall and bund strengthened. Surplus weir constructed and new sluice was provided with plug and rod shutter.
3	Kammaravani Kunta	Bund was very weak with thick Prosopis jungle.	Bund strengthened as per the technical design, two sluices

		Surplus weir completely dismantled and sluices without shutters. No defined supply channel and surplus course.	repaired and provided with plug and rod shutters, surplus weir rebuilt, supply channel and surplus courses deepened.
4	Vithalai Cheruvu	Bund was very weak and dense jungle on the bund and tank bed was silted heavily.	Jungle cleared, bund strengthened and provided with revetment. Both sluices provided with pug and rod shutters and tank bed was desilted.
5	Turpubavi Kunta	Weak bunds with thick prosopis jungle, surplus weir was broken and two sluices were there but without shutters, supply channel & surplus channel heavily silted.	Bund improved, surplus weir repaired, both the sluices provided with plug and rod shutters and supply channel and surplus courses desilted.
6	Edamma Kunta	Bund was completely dilapidated. There was no surplus weir and supply channel was silted up.	One diversion weir was built along the supply channel and bund was newly formed. Surplus weir was newly built.
7	Yerra Kunta	Bund was weak, surplus weir was damaged and supply channel was heavily silted.	Bund was strengthened, surplus weir repaired and supply channel was desilted.
8	Sunkaravani Kunta	Weak bunds, sluice was leaking, surplus weir was completely damaged and surplus course non-existent.	Bund strengthened, surplus weir and sluices were repaired, plug and rod shutters were provided.
Gundramapilly Cascade			
9	Guddetivari Kunta	Weak bund, no surplus weir and no supply channels and there was no surplus course.	Bund strengthened as per technical design; two supply channels and one linking channel (surplus course) were excavated. New surplus weirs were built.
10	Peddabavi Kunta	Weak bund and tank bed was encroached up to 40 per cent and two supply channels were encroached completely. Surplus weir was completely broken.	Bunds strengthened, encroachment evicted and boundary trench was dug along the periphery of the water spread area of the tank. Surplus weir repaired and one supply channel desilted out of two channels.
11	Bussuvani Kunta	75 per cent of the tank bed was encroached. Weak bund and sluice was without shutters.	Bund strengthened up to 60 per cent of the estimate and sluice was provided with plug and rod shutter.
12	Devi Cheruvu	Tank was heavily silted up,	Bund strengthened, revetment

		weak bund with dense jungle. Supply encroached.	provided for the bund.
13	Bathukamma Kunta	Tank was heavily silted and partially encroached.	Tank bed was desilted.

Two TCA executive committee members along with the Block Integrator of DHAN Foundation met the fertilizer dealers in Chityal. Since the kharif season was at its peak, fertilizer prices were high. The dealers suggested to the farmers to use one type of fertilizer to make it a single load. But the TCA members refused. They bargained with the dealers and got 100 bags of urea at Rs.255 a bag and 100 bags of DAP at Rs.585 a bag, *including* the cost of loading, unloading and transporting up to the TCA office in Aipur village. In the retail market the farmers would have had to spend Rs.260 for a bag of urea and Rs. 590 for a bag of DAP, *excluding* loading, unloading and transporting costs.

Even though the difference between the retail and wholesale prices was narrow, the TCA member-farmers were happy as they got the fertilizers at their doorstep. The group effort had saved them money and, more important, their time.

Impact on a Farmer: The Case of Muduppu Chandra Reddy

Mudupu Chandra Reddy (48) is a farmer living in Aipur village.. He settled in this village after his marriage to Manamma from the same village. They have two daughters and a son. The daughters are married while his son (13) is in the eighth standard at a school in Choutappal.

Chandra Reddy owns half an acre in the ayacut of Oora *kunta*, the village tank. He also owns 6.3 acres of dry land in the outskirts of the village. The *kunta* that his forefathers had built was small. Over the years the tank was enlarged which increased the ayacut. The government used to do some renovation work earlier but after some time the maintenance stopped and no one cared about the tank.

The tank used to be dry most of the year. During southwest monsoon, the water would be available for 15 days up to sluice level. There would be some water in the pit of the tank for another month. During northeast monsoon, water would be available for 30 days up to sluice level and for another 30 days in the pit.

Chandra Reddy recalls, "In the well the water would be available only for a few days. With that we could farm only one-fourth the ayacut land and on the remaining land we grew castor and red gram. We kept three bags of rice and three kgs of red gram for our own use and sold three bags of castor for Rs.1500. It was bad time for us. Many times we left our land fallow because there was no water."

The DHAN team then came to rehabilitate the tank. They discussed these issues with the farmers and insisted on them to form a TA. "We did not believe them first, but they visited us regularly for a year, and finally we agreed to form the *sangam*," said Chandra Reddy. He was one of the first to understand and accept the idea and played an active role in setting up the TA. "People hesitated to contribute for the work. But Purushotham Reddy and I collected rupee by rupee from the members," he said.

Chandra Reddy played a lead role in the renovation work. "It was a pleasant moment when we finished the tank work ourselves. We spoke to JCB owners, cement merchants and

quarry owners for materials. We supervised the work and disbursed the money for it. In my house we cooked food for the JCB operators and construction workers. We have realized the fruit of our efforts during the last rain and heavy flood,” he said.

After a long period of drought and crop failures, Chandra Reddy saw the impact of the tank renovation on the lives of all farmers. He says, “there was no water in the well earlier. Now water is there in the tank, wells and bore wells. We are happy now. This is good work at the right time. For the past two years, we get enough water to take up both Kharif and Rabi crops. Because we had strengthened the tank bund we were able to save our tank, ayacut and the water when heavy rains and floods lashed us last year.”

On seeing the changes in the tank’s water level Chandra Reddy got the confidence to invest more money and energy on farming. Last year he sank a bore well in his land. “I was the first. I have also taken three adjacent acres of wetland on lease. We will be sharing the expenses on and income from that land. After seeing me a few other farmers have also invested in bore wells. I give water to other farmers and many of them grow paddy now.

During summer the water pressure is low in the bore wells but when the tank has water the pressure is high. We get free power for seven hours a day, three at night and four during the day. None of the bore wells failed to yield water. I have cultivated all 3.5 acres of wetland. I kept 11.25 quintals of Hamsa variety of paddy for our use and earned Rs.8,000 selling IR64 and BPT varieties,” he said.

The Aipur villagers formed Sri Rama Sangam (SRS) and Jyoti Vayalaga Poduppu Sangams (JVPS) to provide savings and credit facilities to the farmers. Chandra Reddy’s wife Manamma has become a member of the JVPS, while Chandra Reddy joined the SRS. After seeing his hard work, financial discipline and leadership qualities, the members chose Chandra Reddy as the group’s treasurer. “Credit was a major problem we faced. During farming seasons we need money. Earlier we borrowed from the moneylender at 60-72 per cent interest a year. Now we are able to borrow from the *sangams* at 24 per cent interest a year. So far we have borrowed Rs.35,000 from the Vayalaga Podhuppu Sangam and repaid them on time. We have also repaid our debt with the moneylender. Now we have a savings of Rs.2,300 in our *sangams*,” said Chandra Reddy. Manamma says, “We are 15 members in JVPS. Monthly we save Rs. 50. We took a loan of Rs.20,000 from the *sangam* for our daughter’s wedding. We repaid it and got another loan of Rs.10,000 to buy a buffalo. Earlier we had only one buffalo that yielded three litres of milk. Now we get six litres of milk and earn Rs.1000 a month. I take care of them. We get fodder from our field.” Chandra Reddy is the first try out any new idea discussed in the TA. He played a key role in the collective purchase and distribution of seeds and fertilizers last year. “The problem with paddy cultivation is the availability of quality seeds. We discussed this in our association and gave foundation seeds to Malla Reddy who cultivated it and supplied to us. This year also we are asking Sharath Chandra and Shankraiah to arrange for good quality seeds.

Table-9: Impact in Muduppu Chandra Reddy’ Family

Impact in	Before Tank Renovation	After Tank Renovation
Area cropped	• 0.5 acres	• 3.5 acres (3.0 acres took for lease)

Season cultivated	• Kharif only	• Both Kharif and Rabi
Crops cultivated	• Paddy in 0.25 acres, Castor, Red gram in the remaining area	• Paddy on the entire 3.5 acres
Yield	• Paddy -6 bags (4.5 Quintals) • Castor -3 bags (2.7 Quintals) • Red gram – Kgs	• From 0.5 acres -15 bags of Paddy Hamsa variety (11.25 Quintals) • From 3.0 acres – 72 bags of Paddy BPT (54 Quintals)
Income from cultivation	• Kept Paddy & Redgram for consumption. Earned only Rs. 1,500 by selling castor	• Kept Hamsa Variety for consumption worth of Rs. 5,000 • Earned Rs. 8,000 after sharing 50% income with the land owner
Livestock	• One Buffalo • Two Bullocks	• Two Buffalos (Bought one buffalo with the loan from Vayalaga Podupu sangam) • Two Bullocks
Income from livestock	• Rs. 6,000 per annum by selling milk	• Rs. 12,000 per annum by selling milk (Uses fodder from the field)
Benefits from the Vayalaga Podupu Sangam	• No saving • Rs. 10,000 loan borrowed from money lenders at 60 per cent interest per annum	• Saving – Rs. 1,500 • Loans – 10 loans to the tune of Rs. 35,000 from the Podupu Sangam at 24% interest a year for consumption and agricultural purposes • Repaid Rs. 24,000 in the Sangam • Repaid the external debt of Rs. 10,000

The Way Forward

The pilot project of reviving Aipur and Gundrampally cascades has by and large been successful. The programme brought the community together to restore, maintain and manage the tanks. The understanding has come that the Government cannot do everything and the community has to work hard on their own with Government support, so that they can benefit a lot from these *kuntas*. Not only farmers but also shepherds, cattle grazers, washermen will benefit from this work and joined the activities. People from 10-15 villages came and saw what has been done and realised that all the farmers must work together as the tanks have been serving the humanity since time immemorial. Today they have been restored to their original capacity. This should become a movement and the message should spread from one village to another, from one farmer to another farmer. The experience at the Aipur and Gundrampally cascades shows that encroachments are a major hurdle.

Though there are difficulties in convincing the Government to take up works like this, especially in allocating resources, it was not so with the Government of Andhra Pradesh. The

District Administration of Nalgonda, the DWMA and the office of the Commissioner Rural Development have given total support to implement this pilot project. Based on this experience, work has been expanded to another 11 cascades in this mandal and also to the neighboring mandals of Narayanpur and Choutappal. Similar interventions are afoot not only in rest of the district, but also in other parts of the State and the country. Particularly in the rain fed areas where other irrigation sources are not available and tanks are only source.

Also by taking this as an entry point activity an attempt for the total productivity enhancement of land and then the overall improvement in the livelihood of the community dependent on these tanks can be initiated.

The success of this partnership convincingly reinforces the immense potential of this relationship of mutuality, wherein the partners can recognize the contributions and strengths of each other and inspire each other to generate ideas, alternative approaches and solutions to problems.

Ultimately it is the community that is at the centre of all these initiatives. It has to realise how the mutuality and collective action improves their lives. The Aipur and Gundrampally experience has therefore paved the way for a continuing relationship in similar ventures in future.