



Like rest of Southern India, tanks in Tamil Nadu also suffered massive deterioration as irrigation moved towards being more atomistic and less community-managed. Tank institutions declined and what remained of these irrigation tanks evolved into percolation tanks. In 2017, Tamil Nadu government announced Kudimaramathu scheme to revive the age old practice of community participation in tank repair and management. The program has tried to bring farmers together to form WUAs to take up activities for tank rehabilitation but like many other programs in the country, do these institutions exist only on paper? Has the scheme managed to make groundwater irrigation sustainable for farmers? This ITP Highlight brings observations from the field, notes some best practices, and outlines areas where the program could do better.



## Water Policy Research **HIGHLIGHT**

### ■ **Will Kudimaramathu Make Communities *Think Tanks Again?***

*A study of tanks in transit, coping  
mechanism of communities and  
government action*

■  
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# WILL KUDIMARAMATHU MAKE COMMUNITIES THINK TANKS AGAIN?<sup>#\*†</sup>

*A study of tanks in transit, coping mechanism of communities and government action*

Research highlight based on Sakthivadivel and Shah (2018).

## 1. TANK IRRIGATION IN TAMIL NADU

Tanks are part of an ancient tradition of harvesting and preserving local rainfall and water from streams and rivers for later use, primarily for agriculture and domestic purposes, and for sacred rituals and festivals. Tank irrigation is one of the oldest and significant sources of irrigation in India, particularly in Southern India. Irrigation tanks accounted for more than one-third of the area irrigated in the south Indian states on Tamil Nadu, Karnataka and (undivided) Andhra Pradesh (Palanisami 2000). While at the all-India level, the area under tank irrigation declined from 4.6 million ha to 3.3 million ha, the total area under tank irrigation in Tamil Nadu, (undivided) Andhra Pradesh and Karnataka together declined from 2.4 million ha in 1960-61 to 1.7 million ha in 1996-97, a reduction of about 30 per cent [Narayanamoorthi 2002 and 2004; Janakarajan 1996]. Tamil Nadu alone saw flow-irrigated area from tanks fall by a third, from 0.94 million ha to 0.60 million ha in the same period (Palanisami and Ranganathan 2004) and further down to 0.5 million ha in 2013-14, reducing irrigation tanks to percolation tanks.

In Tamil Nadu, historically the tanks were constructed and maintained by mirasi system of land tenure, instead of being maintained by a few people. There were well defined rules regarding repairs and water allocation and mirasidars (peasant proprietors who owned village land collectively but formed an exclusive body for management) had the authority and responsibility to ensure maintenance of tanks. The pre-eminence of tanks as a source of water storage and supply for multiple use was lost after independence due to a variety of factors: chiefly, the development of large-scale gravity irrigation systems, rapid spread of tube well technology, and decline in traditions of community management (Sakthivadivel et. al 2004). Currently, for the administrative purpose tanks are classified into Panchayat Union (PU) Tanks and Public Works Department (PWD) Tanks. PU tanks have a command area less than 40 ha, and are controlled by the village communities. All the system tanks are PWD tanks and have a command area of more than 40 ha.

Tanks not only supported irrigation but also other sources of livelihoods (such as fishing) and helped recharge groundwater

in the region. In the last five years, water tables in the state have receded steadily owing to over extraction of groundwater coupled with inadequate recharge (The Hindu 2017a). Agriculture has been adversely affected in many parts of the state, because of the recurrent floods and droughts the last few years. Tanks, which store floodwater, recharge groundwater and provide water during dry spells, have been rendered defunct owing to encroachment of beds, construction blocking feeder channels, and invasion by *P. Juliflora* (Sakthivadivel 2016).

ITP had conducted a study of 25 tanks in 3 districts (Dindigul, Kancheepuram and Thiruvallur) of Tamil Nadu in 2016-17 and interviewed tank command area farmers and agencies operating tank systems. The study found that farmers want tank capacity to be increased for two main reasons. First, due to climate change, there are periods of very high rainfall (once or twice in ten years) when a large quantity of flood water is collected but in other years, no appreciable quantity of water reaches the tank. Increasing the storage capacity of their tanks by digging below the ground level to collect this extra water was the requirement of all the farmers interviewed in this study. Secondly, farmers wanted tanks to store water for longer durations to keep recharging wells in its command area. In the study area, it was observed that of late, tube well irrigation has completely taken over dug wells in groundwater irrigation.

## 2. KUDIMARAMATHU: AN ATTEMPT AT REVIVING COMMUNITY TANK MANAGEMENT

Realizing the importance of storage of rain water to overcome floods and droughts, the Tamil Nadu government set the stage to rejuvenate defunct small water bodies by reviving the age-old practice of Kudimaramathu (or self-maintenance of tanks by community). The Kudimaramathu Scheme is based on the centuries-old concept of participatory water management at its core, and was launched with the aim of rejuvenating the state's crumbling water bodies. The scheme was launched by Chief Minister Edappadi K. Palaniswami at Manimangalam village in Kanchipuram District on March 13, 2017. At an estimated ₹100 crores, Kudimaramathu envisages the rejuvenation of 1,519 tanks out of 16,098

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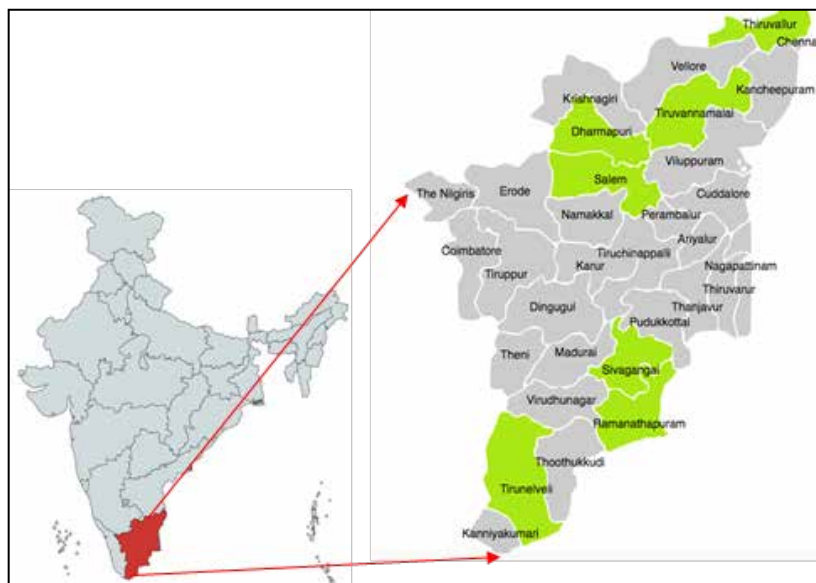
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PWD tanks in 30 districts of Tamil Nadu in the first phase. In the second phase, 2,065 tanks will be taken up in 2018-19, with an estimated outlay of ₹332 crores.

The scheme is designed such that the beneficiaries have to contribute 10 per cent of the cost either in cash or labour and excavate the tanks using heavy machineries, wherever required. Every tank should be represented by a group of villagers. The program outlines water users' association (WUA) as the executing authority but many of them have become defunct. In its absence, any group can go ahead and register for the scheme by depositing 10 per cent of the sanctioned cost of the work. They are also free to engage contractors. PWD officials are required to supervise the work on a daily basis, besides providing technical guidance. The main objective of the scheme is to restore full storage level in tanks and strengthen bunds. Selection of tanks for repair was done by PWD. Many of the tanks were selected based on petitions submitted by farmers at the monthly meetings organised by District Collectors. (The Hindu 2017b).

The farmers have been allowed to carry silt to their fields for the duration of the program without paying a royalty, for which Tamil Nadu Minor Minerals concession rules, 1959 was modified suitably in April 2017. The amended rule states that "Persons in the same village or in the adjoining villages of the tanks, channels and reservoirs (except Chennai, Kancheepuram and Tiruvallur districts) in the state are permitted to take the clay, silt, savudu and gravel from the bed of tanks, channels and reservoirs for free of cost after due notification by the District Collector in the District gazette and after obtaining permission from Tahsildar of the concerned taluk. The quantity of silt and clay proposed to be removed for agricultural purposes shall not exceed 185 m<sup>3</sup>/ha for wet lands and 222 m<sup>3</sup>/ha for dry lands, once in two years. The quantity of earth, savudu and gravel for domestic purposes shall not exceed 30 m<sup>3</sup>/family. The quantity of clay proposed to be removed for pottery shall not exceed 60 m<sup>3</sup>/village."

Figure 1: Map of Tamil Nadu (right) showing study districts in green



### 3. METHODOLOGY AND STUDY AREA

For this study, 30 tanks from Phase I and II of the scheme were selected from the districts of Thiruvallur, Tiruvannamalai, Salem, Dharmapuri, Ramanathapuram, Sivagangai, Dindugul and Thirunelveli. Figure 1 highlights the study area in green. Interviews, focus group discussions and survey were conducted and data collected was analysed to understand the working of Kudimaramathu scheme.

### 4. TANKS IN TRANSITION

It was hypothesized at the beginning that tank irrigation under gravity flow is slowly moving towards complete bore well irrigation replacing tank and dug well irrigation resulting in groundwater over-exploitation. The field data supports this hypothesis. What was once the command area dependent solely on tank and rainwater, had moved gradually to tank water supplemented by dug wells, followed by a phase of irrigation with dug wells supplemented by tank water and is now completely irrigated using bore wells. Tanks visited during the study also indicate that none of them get sufficient water in eight out of ten years. Tanks are heavily silted and encroached. Many tanks have been converted into cultivation fields with bore well water. Data collected from 17 tanks for 2018 and compared with the scenario 20 years ago shows that:

- Total number of wells (both dug and bore) has increased from 115 to 254, an increase of 121 per cent over a period of 20 years.
- Functioning dug wells have decreased from 102 to 47, a decrease of 54 per cent.
- Bore wells over a period of 20 years have increased from 12 to 208, an increase of 1,633 per cent.
- Average depth of a bore well has increased from 88 feet to 370 feet, an increase of 320 per cent.
- 24 per cent of farmers distribute water by pipes only from source to field, 21 per cent by pipes and open channel, and 65 per cent farmers by open channel only.

Farmers expressed that increasing the storage of tanks and using them as recharge structure is the only way to arrest the declining ground water levels. Farmers felt the only way to increase the storage capacity of the tank is by desilting and deepening them. Removing tank encroachment should be adopted for long term sustainability of any work done in a tank but is a long drawn process and takes a long time due to legal entanglement.

Farmers' response and field observations indicate that tank gravity flow irrigation will give way to pumped storage system in the near future. But for this to happen, each tank has to be investigated as an individual entity for its hydrological endowment and only those tanks where the farmers want this type of conversion should be taken first.

Figure 2: Existing status of tanks in Tamil Nadu

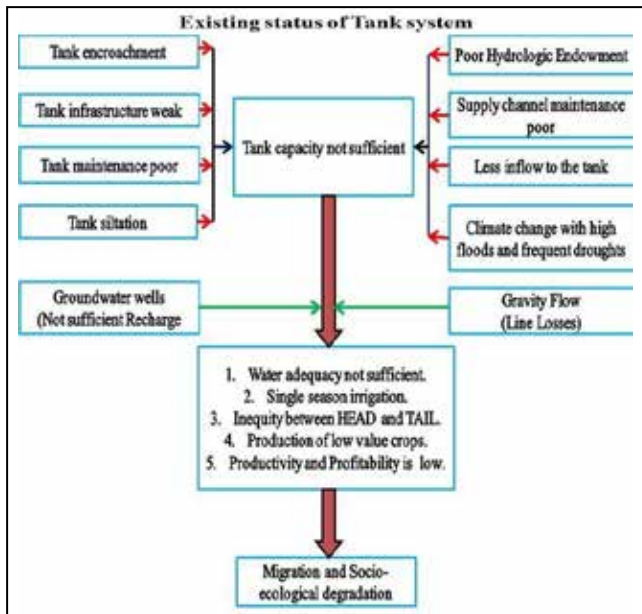
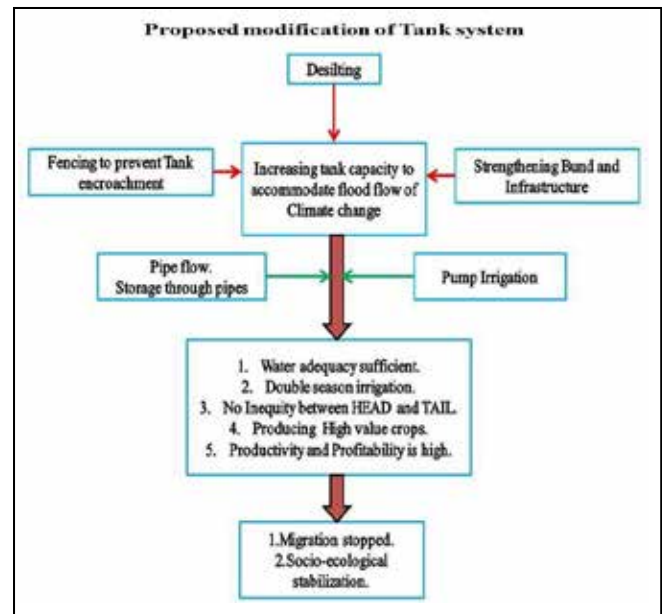


Figure 3: Proposed modification of tank systems



Hydrological entity and farmers' willingness to adopt the change are the two most important criteria for selecting a tank for rehabilitation. Figure 2 shows the existing status of tank system in Tamil Nadu, prepared based on field insights and Figure 3 shows the proposed methodology for modification of tank systems.

**5. OBSERVATIONS FROM THE FIELD FOR SUCCESSFUL TANK REHABILITATION**

- If rejuvenation of tank under Kudimaramathu scheme is implemented in a village where the components of the scheme truly address the existing crisis and the need of the village, then there is a very good chance that the scheme will be successful. In other words, the scheme should be a demand-driven one and not pushed for the sake of completion. Example of such a successful demand-driven implementation: Kombaipallam Tank in Dharmapuri District, where farmers took up the planning of tank rehabilitation themselves and ensured best utilization of government funds.
- Where there are non-farm activities heavily dependent on water and tank silt such as brick making and livestock rearing, the Kudimaramathu scheme was a successful one as seen in Kottur Avarampatti Tank in Dindugal District – another example of importance of making the program demand driven.
- Strengthening and widening the tank bund was liked by one and all as it makes transport of materials to and from the fields using machinery and vehicles easier.
- Providing boundary stone has helped the villages identify the encroachers and using social pressure to evict them. Farmers also feel that demarcation of government lands by boundary stone will prevent future encroachment
- Farming community gives more importance to water acquisition than to water distribution . The

Kudimaramathu scheme is all about water acquisition, water storage and extending the water availability through ground water recharge. Therefore, it is being readily accepted by the community.

- Leadership and faith of farmers in the integrity and fairness of the leader taking up the rejuvenation exercise is an important attribute for the success of the scheme as seen in Radhanur and Madhavanur Tanks in Ramanathapuram District where local leaders not only led the committees but motivated contribution for all farmers in the tank commands.
- The transparency in activities of WUAs, collective decision making, forming clear rules and strict enforcement are important attributes for sound implementation and well-functioning of the system as observed in Periyamma Patti Tank in Dindugal District.
- Systems performed better where the president of the WUA were powerful enough to as seen in the case of Muthanampatti Tank in Dindugal District.
- A strong financial foundation of a WUA and its ability to mobilize resources are important attributes for the success of Kudimaramathu scheme as observed in Sakkur Tank in Sivagangai District.
- Handholding role played by an NGO or an individual with commitment to contribute towards the success of Kudimaramathu scheme was found to be vital. For example: Mookan Eri in Salem District, rejuvenated by an NGO, Salem Citizen's Forum headed by Piyush Manush.
- Where there was regular monitoring and technical inputs from the PWD officials, Kudimaramathu work was done in a satisfactory manner. Example: Panjamthangi Tank in Palani Taluk, Dinugal District.
- Three types of contractors were found being employed amongst the study tanks. The first type is a prominent person in the village taking the contract, second is a

group of farmers forming a WUA together to take the contract and third is a contractor from outside the village who has done similar work in some other tank. Based on comparison of Radhanur Tank (Prominent Person), Madhavanur Tank (Group of Farmers) and Poothondi Tank (Outside Contractor) in Ramanathapuram District, amongst others, it can be observed easily that the work done by farmer group as a WUA stands first in terms of quality and quantity followed by cases when a prominent person acts as the contractor and the last by the contractor from outside the village.

## 6. OLD WINE IN NEW BOTTLE

While all the villages where Kudimaramathu work were undertaken, the farmers liked the scheme; but the way in which the scheme was planned and implemented and the adopted processes were not liked by most of the farmers because of the following reasons:

- The Kudimaramathu scheme for their village had not been properly explained to them with regards to components of work included and the item-wise cost of each component. Their input in the planning stage was minimal and they had no say in deciding which structures shall be rejuvenated.
- The PWD did not investigate hydrological endowment of the tanks, type and depth of silt within the tank bed and their demarcation so that farmers can decide and take the type of silt they want. It has also resulted in inferior quality of work. Because of this, funds allocated for different components by PWD do not match the stipulated work, often resulting in incomplete work for some components.
- The release of funds for the work already completed takes a long time resulting in delays due to inadequate cash flow with the contractor.
- Inadequate monitoring during implementation by PWD officials has led to haphazard desilting and use of sub-standard materials for bund forming.
- Almost all the farmers feel that deepening of the tank is inadequate to store water of their needs. They are also not aware of the way budget is allocated to different tanks under this program.

So, in many cases the implementation of the scheme is like any other top down scheme with little role of community where WUAs exist only on paper and community-participation is limited to program documents.

## 7. WATER USER ASSOCIATIONS: REVIVED OR WATERED DOWN?

Farmers everywhere in the study areas felt that each tank has its rejuvenation requirements which needs to be attended for it to work satisfactorily. Therefore, fund allocation and the type of rehabilitation components to be undertaken must be discussed with WUA before finalizing the budget. Formation of WUAs, their capacity building

and helping them frame their institutional arrangement for proper planning and implementation form the cornerstone for successful planning and implementation of rejuvenation of tanks under Kudimaramathu scheme. But unfortunately, this component was given the last preference. Even the WUAs formed at the time of sanctioning the project were not active after one year (when data was collected) and in many cases they have become defunct.

The local section officers (Assistant Engineers, AEs) of PWD have a fair idea about the tank status with problems faced, idea about the contractors in and around, and possible farmer and farmer groups capable of taking contract and implementing it successfully. They informally discuss with prospective candidates and arrive at a decision on who should the contract be given to. Using the contractor, the AE then convenes farmer's meeting, forms WUA, selects office bearers of the WUA and confirms the selection of contractor through WUA. Once the tank is selected by the higher ups, then the section officer plays a central role in implementing the scheme through the contractor. Based on conversations with farmers, it was observed that the WUA is just used as a dummy to satisfy the scheme requirements in most cases. There was no real participation of WUAs in most decision making in implementing the rejuvenation scheme.

## 8. KUDIMARAMATHU: HIT OR MISS?

Kudimaramathu scheme has brought unity amongst the villagers even in a multi-community setup, in one of the villages (Pudhu Eri in Salem District) where after 20 years, the whole community assembled together and celebrated a temple festival of the God located on the tank bund. Increased storage capacity of rejuvenated tanks has been used to aid and alleviate different kinds of problems. Some of the uses the water was used for were: to increase the agricultural production, to improve the drinking water availability during summer, to improve the livelihood of marginal and poor farmers and to improve the off-farm activities such as grazing, fishing and to take up small scale enterprises such as growing flowers and marketing. Wherever the focus is on the felt need of the community, the rejuvenation program was considered a success.



Picture 1: Using the scarce tube well water through collection and distribution at intervals (Picture credits: R. Sakthivadivel)



Picture 2: Farmers participation in tank repair and maintenance through MGNREA (Picture credits: R. Sakthivadivel)

To have a regular maintenance, there was a suggestion from farmers that each village has a 100-day working group under MGREGS scheme which has to be integrated with Kudimaramathu Scheme to carry out regular maintenance. In some of the tanks where water was stored during the recent rain, wastage of water was noticed due to over irrigation. Agricultural extension must also form part of the scheme to ensure effective and efficient use of groundwater. Each tank has its own strengths and weaknesses. Thus,

Due to increased storage and anticipated higher availability of water, farmers did not change their crops that they grew because of fairly clayey soils, and due to seepage and leakage entering from the adjacent fields. In some areas, farmers used lined ponds filled with pumped groundwater to safeguard protective irrigation (see Picture 1). However, they did change from short duration varieties to long duration and in some cases, they extended the area of paddy cultivation marginal and switched over to finer varieties of paddy from coarser varieties. Example: Pudhu Eri in Salem District and Kombai Pallam Tank in Dharmapuri District.

The villagers felt that this is due to rejuvenation of tank under the scheme and is a good omen for the tradition to continue in the coming years. Although the scheme has been conceptualized well, the process adopted in implementation needs a radical change giving importance to institutional building and strengthening the capacity through the programme to have sustainability of the work undertaken. Many farmers are of the opinion that the scheme was hurriedly prepared without proper investigation, the farmers institution was not strengthened to take up the management activities and the responsibility was not given to the villagers. Instead, it has been given to a contractor who implemented the project as per PWD direction. In essence, farmers do not have the feeling of ownership of the rejuvenated tank.

The farmers feel that the sustainability of the implemented work is questionable if proper maintenance is not done to keep the tank clean and prevent invasion of *Prosopis Juliflora*.

each tank should be treated individually and no blue print approach shall be used. Hence, instead of being standalone program with limited objective, Kudimaramathu should be integrated with other programs such as MGNREGS (see Picture 2) and Agricultural extension services so that water harvested through the scheme can be put to maximum use and make the program sustainable. Since the fund required for rejuvenation of tanks is in lakhs, many WUA formed like to take up the work but since the capital investment is high, only the resource-rich people come forward to take up the contracting work. The rejuvenation programme should consider this aspect to relieve the constraint for real participation by the village community. There is a demand from land owners of tank ayacut and livestock grazers for removing *Prosopis Juliflora* (used as fuel; see Picture 3) from the tank bed and bund to increase water storage, reduce evaporation losses and recharge ground water. Only landless people, especially

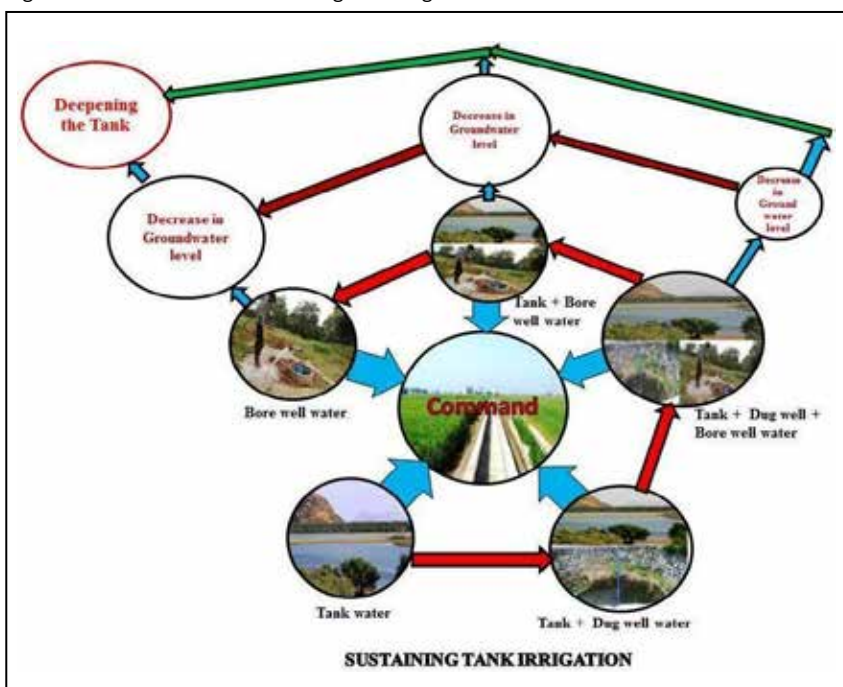


Picture 3: Coal making from the woods of *Prosopis Juliflora* removed from the tank beds (Picture credits: R. Sakthivadivel)

women, felt that they have been deprived of fuel collection in the days when they do not get any other work. They also felt that they have to travel long distances to collect fuel wood now. This is another aspect of conflicting nature of tank users' interests and rules have to be set in place to ensure equity in benefits. This rejuvenation programme has definitely cut down the time delay that takes place due to tendering procedure but has not covered the loopholes in the process of contractor selection and hasn't involved community as a part of the program using their WUAs as a vehicle for planning.

Based on the discussion above about the program and the changing trends in irrigation in the state, Figure 4 depicts a framework for sustaining tank irrigation in Tamil Nadu and highlights the importance of tank rehabilitation in the current context.

Figure 4: A framework for sustaining tank irrigation in Tamil Nadu



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## About the IWMI-Tata Program and Water Policy Highlights

The IWMI-Tata Water Policy Program (ITP) was launched in 2000 as a co-equal partnership between the International Water Management Institute (IWMI), Colombo and Sir Ratan Tata Trust (SRTT), Mumbai. The program presents new perspectives and practical solutions derived from the wealth of research done in India on water resource management. Its objective is to help policy makers at the central, state and local levels address their water challenges – in areas such as sustainable groundwater management, water scarcity, and rural poverty – by translating research findings into practical policy recommendations. Through this program, IWMI collaborates with a range of partners across India to identify, analyze and document relevant water management approaches and current practices. These practices are assessed and synthesized for maximum policy impact in the series on Water Policy Highlights and IWMI-Tata Comments.

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