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# Contribution of Tank Irrigation in Supporting Rural Livelihood

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**Abstract**

*There is a serious problem in managing both surface water and ground water. Irrigation system in India is categorized as major, medium and minor irrigation works for administrative purpose. Major irrigation works are generally built on perennial rivers and constitute large dams and canals that irrigate areas of many thousand hectares. Medium irrigation works constitute reservoirs of run-off water or large tanks. Minor irrigation works include all surface and ground water sources. Each of these three types of irrigation sources evolved at different times in history to meet changing requirement of human beings. However irrigation from tank is comparatively old technology and it was common in Indian landscape but the recent trend shows a decline in tank irrigation system. There are variety of factors associated with the decline of tank irrigation systems viz., development of large-scale gravity irrigation systems, rapid spread of tube well technology and decline in traditions of community management. As a result, a large majority of the tanks in the southern and eastern parts of India suffer from inadequate management and maintenance, some have become dysfunctional while others are even obliterated.*

Key words: Contribution, community management, tank irrigation, rural

## Introduction

Water is prosperity, water is joy, water is festival, water is ritual and finally to say water is life. Today's life, the looming crisis of water convey, water is **s**truggle, water is politics, water is problem and water can only be the solution too and in this way water flow into human life with the various transformations. Since independence, India has made significant progress in developing its water resources and the post-independence years also have witnessed large-scale investments in water storage structures which have contributed considerably in making India self-sustaining economy.

India constitutes 16 per cent of the world's population but has access to only 4.00 per cent of the total available fresh water and it also has the largest irrigated area in the world, accounting for 22 per cent of global irrigated area but the prevailing uncertainty over access to and the availability of water resource may be reaching crisis level in India. The growing population, diversity of needs, competing demands for this limited resource coming from households, industry, and agriculture have wide-ranging implications for the country's future. The contemporary issues of water crisis alert us to become more vibrant and active in conservation and judicial utilization of water resource for irrigation as well as for household needs. It is not new challenge for Indians to conserve and store the water because, these practices were practiced in India from ancient days. India has many historical evidences on irrigation structures, systems and management, almost from 8th century onwards and they captured India's long history of human interventions in the management of traditional water bodies for agriculture, one of such intervention is an irrigation tank. Tank irrigation systems involve a great deal of collective action and organized community labourers for maintenance and other critical water management tasks (Janakaran, 1993). In this context the present study was conducted to explore the socio psychological characteristics of farmers which influence their attitude and their participation in community based tank irrigation management system.

*Historical perspective of tank irrigation in India*

An irrigation tank is a reservoir constructed across the slope of a valley to harvest rainwater in rainy season and to use it for irrigation and other

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purposes. The tank irrigation is an old established practice in most of the semi-arid tropical parts of India, where the monsoon rains disperse erratically during few months of the year then the irrigation tanks serve to store and regulate the flow of water for agriculture use. In ancient days, tanks were a part of the political process in which rulers extended and maintained domains of control. Right to control the tanks or to control the flow of water were frequently the objects of royal donation and largesse. Many of the tanks in South India are century old and have been historically managed by autonomous local bodies and its importance can be gauged from the fact that even as late as 1990-91 tanks irrigated 8 million hectares of land in semi-arid region of south India (Meenu Singh, 2000). In such a way tanks are having historical features in the cultural landscape of peninsular India.

*Tank irrigation in Tamil Nadu*

Tank irrigation can be traced back two millennia in Tamil Nadu and have been central to socio-ecology and irrigated agriculture in the states of Tamil Nadu (Amarnath and Karthik, 2006). During the 1950s, nearly 40% of the irrigated area in Tamil Nadu was irrigated by tanks and there are more than 39 thousand tanks at present in

Tamil Nadu, many of which were built in the 18th and 19th centuries by kings and *zamindars* and even under British rule (Palanisami and Ester 2009). Tanks are one of the most important and oldest sources of irrigation in South India and it is classified as systems tanks and non-system tanks based on the source of water supply. System tanks receive water mainly from assured source like a canal and may or may not have their own catchments. On the other hand, non-system tanks rely only on the runoff from their own catchment. In Tamil Nadu about 90 per cent of the tanks are non-system types (Palaniswamy and Easter, 1986) and the contribution of tank irrigation declined from 40 per cent in 1955 to less than 25 per cent in 2000 (Balasubramanian and Selvaraj, 2004).

*Importance of community based tank irrigation management system*

Traditionally, in Tamil Nadu the tank irrigation management was done through the informal water user association headed by village elder or President of village Panchayat.

But the recent trend shows that there is marked decline in such a management system which resulted in poor maintenance of tank structure and low productivity in agriculture. In this context, the governmental interventions and its assistance are imperative for the conservation and development of the resources but the government has less practical possibility to have direct involvement in managing all the tank irrigation system and meeting the diverse need of the people who depend on tank irrigation system therefore it is perceived that it is the right time to take massive steps to organise the community groups for the collective management of tank irrigation system for the effective and efficient utilization of water resources since the past experiences of community approach in tank irrigation management discloses the positive note that transfer of irrigation management responsibilities from government agencies to farmers is now an important policy in many countries (Kei Kajisa *et al,* 2006) and the experience of irrigation management transfer programmes around the world shows that farmers' involvement in water management has indeed led to a better and smoother performance of the systems (Kolavalli and Brewer, 1999; Thiruchelvam, 2004). It also reported that self-governing institutions can manage the systems more effectively than the government (Tang, 1992; Ostrom, 2000). The available common water resources are meant 'for the people' therefore it would be better served its purpose if it is managed 'by the people' and if it is so, the feeling of 'our asset' and it is 'our responsibility to protect it' will be felt by the people which ultimately lead to sustainable management of water resources. The objective of this paper, to study the contributions of tank irrigation system in supporting the livelihood of farmers and constraints experienced by farmers in tank irrigation management.

## Materials and Methods

The present study was conducted in Pudukkottai district of Tamil Nadu.

The study was focused on the tank irrigation management undertaken by the community. This district was purposively selected for the study because this is one of the districts in Tamil Nadu having higher number of Irrigation Tanks. Pudukkottai district comprises of 13 Blocks, of which four blocks viz., Ponnamaravathi, Thirumayam, Annavasal, Kunnandarkoil have been selected on the basis of the maximum number of tanks in these blocks. In order to select the villages for the study, the list of revenue villages in each of the four selected blocks were collected. Five revenue villages from each of the selected blocks were identified based on the presence of tanks in these villages. The respondents for the

present study are tank user farmers from the selected villages. Sample of 20 tanks were selected from the 4 blocks. A sample of 10 tank framers were selected from the each of the 20 tanks as the respondents of the study through simple random sampling technique, in that way 200 tank user farmers were selected as respondents of the study through simple random sampling technique. The data were collected using a well structured and pre-tested interview schedule. The data were analyzed by using appropriate statistical tools and the significant findings made and the contributions of tank irrigation system in supporting the livelihood of farmers was studied under two dimensions viz., contribution in terms of agricultural benefits and Non-agricultural benefits.

*Contribution of tank irrigation system in terms of agricultural benefits*

In order to study the contribution of tank irrigation system in livelihood of farmers in terms of agricultural benefits, the total household income (income from tank based farming, non-tank based farming, wage income, and non-farm income) and

farm income from tank were obtained. Agricultural Contribution from Tank (ACT) was derived by using total household income and farm income from tank and the results were categorized.

$$ACT = \frac{FIT}{THI} \times 100$$

Where,

ACT-Agricultural Contribution from Tank

FIT- Farm Income from Tank

THI-Total Household Income

*Contribution of tank irrigation in terms of non-agricultural benefits*

To understand the contribution of tank irrigation system in terms of non-agricultural benefits eleven major non-agricultural contribution of tank irrigation were identified based on the consultation with experts and tank user farmers. The procedure used for ranking the non-agricultural benefits is as follows.

The response of each non-agricultural benefits was obtained on a three point continuum viz., 'most important', 'important' and 'least important' with weightage of 3, 2 and 1, respectively. For each non-agricultural benefit, the frequency of the response under each category was multiplied with the respective scores and added up to get the total score for that particular non-agricultural benefit. Then the mean scores were worked out and non-agricultural benefits were ranked based on the mean scores in the descending order of importance.

## Results and Discussion

*Contributions of tank irrigation system in supporting the livelihood of farmers*

Tank systems have been source of village economy development in southern India over centuries. It is well known that tanks traditionally performed a useful role in providing irrigation, water for domestic use, including water for livestock and for washing clothes, supporting livelihoods of the poor, protecting local environment and sustaining water resources. In other words, besides the farmers in the command areas, livelihoods of several others revolved around the tank.

Table 1: Contribution of tank in terms of agricultural benefits in total household income

| Farm income contribution from tank (%) | F | % |
|---|---|---|
| < 50 | 36 | 18.00 |
| 51-70 | 78 | 39.00 |
| 71-90 | 72 | 36.00 |
| >90 | 14 | 7.00 |
| Total | 200 | 100.00 |

Table 2: Contribution of tanks in terms of non agricultural benefits

| Statements | Means Score |
|---|---|
| Rain water harvesting | 2.97 |
| Flood moderator | 2.96 |
| Ground water recharge | 2.95 |
| Employment generation | 2.92 |
| Livestock water | 2.40 |
| Use of Silt | 2.21 |
| Afforestation | 2.16 |
| Grazing for animals | 2.12 |
| Fisheries | 2.01 |
| Washing and bathing | 1.70 |
| Socio cultural aspects | 1.53 |

It was found from the table 1 that, tank based agricultural income contributed 51-70 per cent in total household income of 39.00 per cent of the of the respondents followed by 71-90 per cent in 36.00 per cent of the respondents, less than 50.00 per cent in 18.00 per cent per cent of the respondents and above 90.00 per cent in 7.00 per cent of the respondents. This trend might be due to majority of the respondents were tank command area farmers and they were doing tank based farming. It was also reported in the study that most of the farmers were farming with wage

earning and faming alone category.

On the basis of perceived importance, ranking of contributions of tank in supporting livelihood of farmers was done by tank user farmers. Careful examination of the Table 2 revealed that, among the eleven major contributions, rain water harvesting (2.97), flood moderator (2.96), ground water recharge (2.95) and employment generation (2.92) were ranked as the most important contributions of the tanks. It was reported that tanks are used to store the rain water during rainy season and use it for irrigation during dry season. It also reported that once if the tanks filled its capacity ground water gets recharged and also there was a marked improvement in the level of water table in the nearby area. From the field observation and interaction with farmers it was observed that tanks are linked with temples therefore it could be used for socio-religious cultural activities. This might be the probable reason for the trend of this finding.

*Constraints experienced by the farmers in tank irrigation management*

The information on various constraints experienced by the farmers in tank management is presented in Table 3.

Table 3: Constraints experienced by the farmers in tank irrigation management

| Constraints | Mean score |
|---|---|
| Lack of knowledge about tank management practices | 1.94 |
| Non-availability of required water for irrigation | 2.63 |
| Lack of knowledge about crop planning | 1.72 |
| Lack of time to participate in tank user group meetings | 1.93 |
| Lack of guidance regarding tank management practices | 1.99 |
| Lack of motivation from the tank user group leaders | 1.82 |
| Accumulation of silt | 2.24 |
| Poor maintenance of tank structures | 2.29 |
| Poor distribution of water | 2.28 |
| Over irrigation to the crops | 1.92 |

It could be observed from the Table 3 that, non-availability of required water for irrigation (2.63), poor maintenance of tank structures (2.29), poor distribution of water (2.28) and accumulation of silt (2.24) were ranked by the respondents as most important constraints followed by lack of guidance regarding tank management practices (1.99), lack of knowledge about tank management practices (1.94) lack of time to participate in tank user group meetings (1.93) and over irrigation to the crops (1.83) were ranked as important constraints. The other constraints viz., lack of motivation from the tank user group leaders (1.82) and lack of knowledge about crop planning (1.72) were ranked as least important constraints.This finding is in line with the findings of Umamaheshwara (2009).

## References


Amarnath and Karthikraja (2006). An economic analysis of tank rehabilitation in Madurai district of Tamilnadu. *Agricultural Economics Research Review* 19: 187-194.

Balasubramanian K. and Selvaraj (2004). Tank degradation and poverty reduction. The importance of common property resources in sustaining the rural poor. SANDEE. Policy Brief, No.2.4.

Janakaran, S. (1993). In search of tanks. Some Hidden facts. *Economic and Political Weekly*, Jan. 26, 453-460.

Keikajisa, Palanisami , K. and Takeshi Sakurai (2006). Effect on poverty and equity of the decline in collective tank irrigation management in Tamil Nadu, *India Journal of Agricultural Economics* 36, 347-362.

Kolavalli, S. and Brewer, J.D. (1999). Facilitating user participation in irrigation management. *Irrigation and Drainage Systems* 13: 249–273.

Meenu Singh (2000). An Analysis of common pool resources in institutional economic framework: Evidence from tank irrigation and group owned wells in south India. Michigan State University, 15-5.

Ostrom, E. (2000). Reformulating the commons. Swiss Political Science Review 6(1): 29–52.

Palanisami K and Ester KW (2009). Tank Irrigation in the 21st Century: What Next? New Delhi: Discovering Publishing House. 23-27.

Palaniswamy K and Easter KW (1986).The tanks of south India: A potential future expansion in irrigation: Economic report ER 83-1, Department of Agri and Applied Economics, University of Minnesota, U.S.A.

Tang SY (1992). Institutions and collective action: Self governance in irrigation, ICS press.

Thiruchelvam S (2004). Economic effects of irrigation management transfer in Mahaweli system H. 'Water Professionals Day Symposium', University of Peradeniya, Sri Lanka.

Umamaheshwara MS (2009). Study on community participation in irrigation tank management in Haveri district. Thesis, Univ. of Agric. Sciences, 63-64.