

Full Length Research Paper

A study on participatory management of rural tanks and their need for modernization for sustainable rural development in Tamilnadu

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Villages are the platform in large for water conservation and storage, through tanks and ponds which are the traditional water storage systems mostly built in all semi arid tropical regions of India. They have been played an important role in the water history of India as tanks are the largest source of irrigations continued until the mid 1970s. Tanks have brought out the benefits to their dependents, who are the farmers, villagers through the provision of irrigation, domestic use, fisheries, groundwater recharge, and shelter for birds, social forestry, flood regulation and drought mitigation. Majority tanks in the southern parts of the country have been reduced and decayed, due to various reasons of individual community as well as the natural factors of severe encroachment, unauthorized cultivation, heavy silt, weed and improper maintenance. In this context the present paper is aimed to disclose the importance of tanks and ponds in the rural water resources management, the problems related to tanks and ponds which including internal and external problems and the suitable suggestions were made to save the such type of natural resources viz., tanks and ponds, in order to effective management of rural water resources. The present paper is mainly emphasized the rural tanks located in the select villages of Tamilnadu, where the play a vital in rural development in sustainable manner.

Keywords: Participatory management, rural tanks, sustainable rural development, Tamilnadu

INTRODUCTION

According to recent World Resource Index, India stands seventh in the world and third among Asian countries in annual internal renewable water resources. In annual ground water recharge, India is fifth in the world and second in Asia. It is also stated that rural India mainly depends on water resources for the purpose of farm and home use. They feed wells' by percolation and fertilize the surrounding cropland, also encourage true growth and vegetation. Mostly 60 percent of such type of total tanks situated in the southern parts of India especially in the states of Andhrapradesh, Karnataka, Tamilnadu in which 30 percent of total irrigated area has benefited through tanks. It is very important to note that the deterioration of irrigation tanks and ponds have been subject of considerable discussion.

It is therefore concluded that tanks and ponds in the South India are the predominant mode of irrigation and they have used by majority population of villages. Tanks and ponds are ideally suited to the environment where the provision of a continuous flow of water. It is picture that the majority tanks and ponds are in disrepair and

decay which resulted in depletion in ground water recharge and low level natural vegetation. It is also suggested that the village level institutions all governmental organization, NGOS, concerned community and individual farmers should come forward to look the tanks and ponds of our villages, to take special care for the proper maintenance to save the local water resources, for the useful to present and future generations of human and all living things.

Water is considered to be an inexhaustible natural resource in the world, but the quantum varies from place to place. It is the most abundant yet highly underutilized by the people in many places. The amount of water in the world is finite. A third of the world's population lives in water-stressed countries now. By 2025, this is expected to rise to two-thirds. There is more than enough water available, in total, for everyone's basic needs. The UN recommends that people need a minimum of 50 liters of water a day for drinking, washing, cooking and sanitation. Providing universal access to basic minimum worldwide by 2015 would take

Table 1: District Wise Distribution of Rural Tanks in Tamilnadu during 2010-2011

S/No.	District	Total tanks	Total ayacut (in hec.)	Category
1.	Chengalpattu	3628	112993	TID
2.	South Arcot	2677	50121	TID
3.	North Arcot	1355	15074	TID
4.	Thiruvannamalai	1791	39606	TID
5.	Salem	829	4924	NTID
6.	Dharmapuri	2332	16817	TID
7.	Coimbatore	78	2532	NTID
8.	Erode	52	211	NTID
9.	Tiruchirappalli	2629	20882	TID
10.	Pudukottai	4929	79969	TID
11.	Thanjavur	428	9140	NTID
12.	Nagapattinam	NA	NA	-
13.	Madurai	2415	27276	TID
14.	Dindigul	2880	16607	TID
15.	Ramanathapuram	1830	61310	TID
16.	Virudhunagar	997	32316	NTID
17.	Sivagangai	4597	82663	TID
18.	Tirunelveli	2170	57276	TID
19.	Thoothukudi	628	22900	NTID
20.	Nilgiris	004	NA	-
21.	Kanyakumari	2593	15516	TID
	Total	39202	727448	

Source: MIDS, Chennai.

Note: TID Tank Intensive Districts (60% cultivated land by tanks irrigated area) NTID – Non Tank intensive Districts (15-20 percent area irrigated).

less than 1% of the amount of water we use today. But we are a long way from achieving the same. The total domestic water demand in 1995 and 2025 under the three scenarios, under CRI is 60 cubic kilometers in developing countries including India. Water resources are sources of water that are useful or potentially useful for agriculture, industry, household, recreational and environmental activities. It is therefore that the water resources are the precious and it will be critically challenge and socially issue based in future. Because of the heavy population pressure, misuse and over use water. Based on this background, the paper is aimed to focus on importance of rural tanks and their modernization towards sustainable rural development, with the view of the issues and strategies in the context of eco-environment.

In ancient India, kings and regional chieftains have shown more interest to construct the water structures which is called as indigenous water technology system. These works found throughout the country are among the most important and widespread traditional devices of water harvesting dating back several centuries. Among which Tanks are the smallest water bodies in villages and they are used for a variety of purposes: as a source of water for drinking, washing and bathing for human and animals, for irrigating crops and raising fish (table 1).

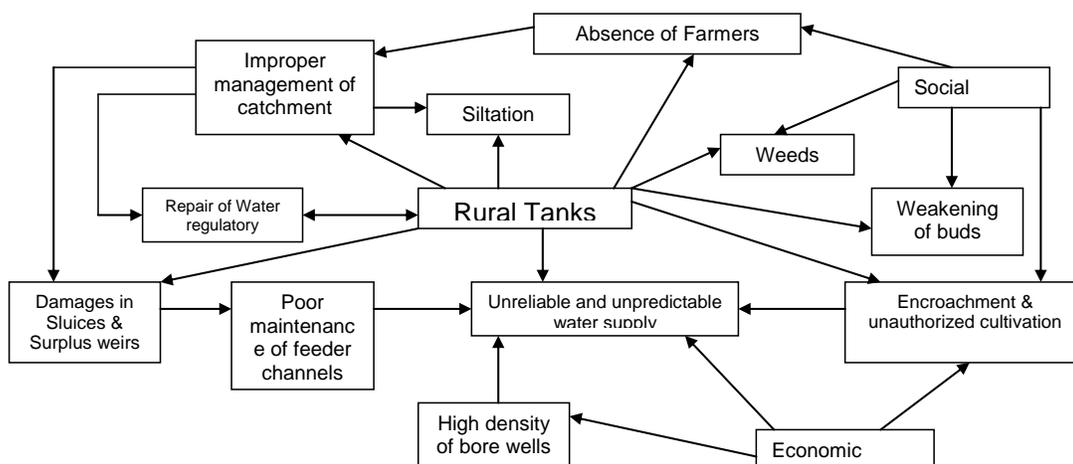
Tank ecosystem consists of catchments, water body and ayacut areas and flora & fauna around the tank, such as human being, agriculture, animal husbandry,

social forestry and other micro habitats. The major uses of this ecosystem are as follows:

- Mainly for irrigation
- Domestic purposes
- Fisheries
- Groundwater Recharge (percolation tanks and ponds)
- Shelter for birds and birds sanctuary
- Place for social forestry in general for afforestation
- Flood regulators and drought mitigators

Sustainable Rural Development

Sustainable development is mainly based on the pattern of production and consumption that can be pursued in the future without degrading the human and natural environment. It involves equitable sharing of benefits of economic activities to all section of society, to enhance the well being of humans, protect health and alleviate poverty. Similarly, rural development as sustainable is to improve the quality of life of rural people and to meets the needs of them towards an equal and natural dominated rural world. It continues to exert sustainable life support system of the earth (M.S. Swaminathan 2008). The sustainable rural development requires the integrated attention of its major components of ecological conservation, economic growth, equity, energy management and employment generation. The development of infrastructure—rural roads and



Flow Chart 1: Environmental Issues in Challenges in Rural Tanks

bridges, irrigation facilities, flood control, power supply, education, health, agriculture research and extension services, rural markets and sanitation is essential for accelerated sustainable development of rural areas. More investment in rural infrastructure gives impetus to economic activity, generates additional employment and income, facilitates and improves delivery of social services and strengthens the democratic process and skills among the rural poor. The Panchayats and the NGOs have a vital role to play in the process of building up the infrastructure towards sustainable development in villages.

Environmental issues and challenges in rural tanks

Structurally the tank system consists of the long earthen bund with a spill structure on either or both ends, one sluice in the deep bed and a few other sluices at different levels of command, the bunds on either side of the shallow valley. Each of the sluices is earmarked to serve a block of lands and thus the localization of the ayacut has been done long back. Naturally while the bunds under the other sluices have the prospect of being served for a longer period the lands coming under the high level sluices may be served for a lesser period and they get classified under lower category (taram) in respect of dependability of the water source. In the command the main irrigation channels from the sluices are aligned in contours and sometimes throw out minors and sub-minors.

With regard to the maintenance of the system, the maintenance of the channel system below the tank has always been with the village group. They have a traditional procedure of subscribing labourer cost equivalent of labour by each holding to keep the main irrigation channel system tram and in good repairs to

draw the flows satisfactorily. Of course trimming and maintenance of the water course and field both are done by the beneficiaries locally.

Maintenance of the head works namely the tank proper is with the Government. It appears as though this has been the practice over a long period. When the British took over the administration the first civilian engineering unit they created in 1819 beyond the military engineering corpse in this part of the country was a Maramath Department which gradually grew up to the designated as Public Works Department in 1858. The Government effort has all along been in maintaining the tank bund to standards, carrying out repairs to the structures of sluices and surplus weirs in the tank proper and a general up keep of the head works.

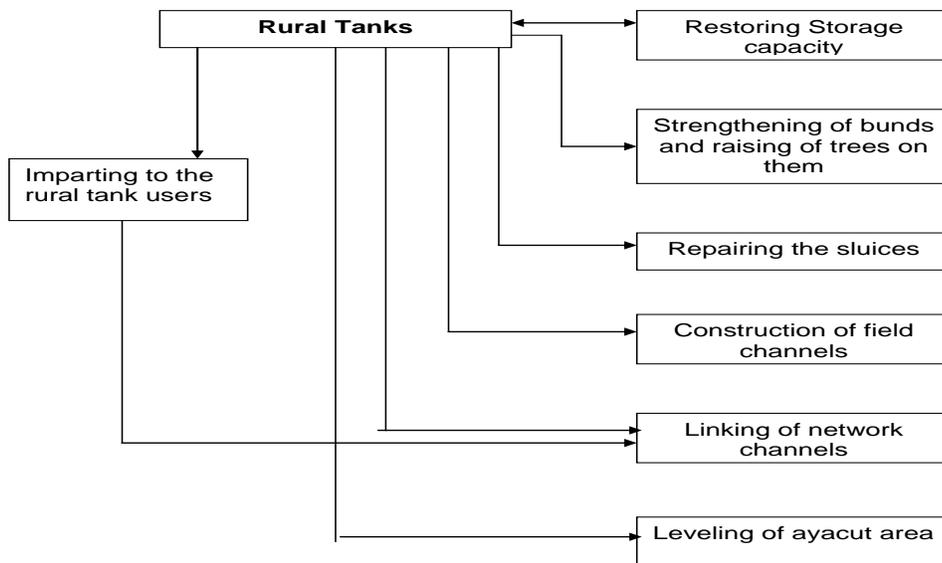
Partly due to ageing, in this case over centuries, and partly due to inadequate and indifferent maintenance, the tank systems have gone into bad repair and require special attention. The common features noticed in the tank system which impair irrigation efficiency may be listed as follows:

a. Inadequate Inflows into the tank

The feeder channels in the case of system tanks and the small streams draining the catchment get choked up with vegetation silted up and lose their water carrying capacity.

b. Weak the bunds susceptible for frequent breaches
In many cases the bunds are not upto the standards required with adequate freeboard, top widths and stable slopes. The soil used for the embankment is also not suitable since the locally available material would have been used in many cases. Leaky bunds lead to piping and breach. In a chain system of tanks these breaches cause a lot of damages due to the multiplier effect the flood wave caused by the breached upper tank impinging on the lower tank.

c. Leaky Sluices with poor controlling devices



Flow Chart 2: Components of Rural Tank Modernization

The studies are important to supply of water to the field and they are under repair which leads to wastage of water.

d. Inadequate surplussing weirs in bad repairs
In a few tanks it is seen that the surplussing arrangements are inadequate and are unable to discharge the maximum flood in times of heavy intensity of rains leading to rise in flood levels in the tank and consequent breaches.

e. Silting up of the tank bed over a longtime
This leads to reduction in storage and consequent reduction in the ayacut actually served.

f. Poorly maintained irrigation channels
Silted up and blocked by weeds these earthen channels do not carry the designed discharges. Mostly they do not have well built outlets and division weirs. In some cases they run in bad alignment too.

g. Absence of On-farm works below the outlets
Since filed to field irrigation is generally practiced, the need for these works have not been felt. Equitable and dependable supply at the right timings cannot therefore be ensured for individual holdings. Water regulation is therefore poor.

Due to these environment issues, rural tanks provide a minimum quantity of water to the crops of their command areas which result in declining of area cultivated by rural tanks which in turn leads to reduction in food production and employment opportunities among the rural masses. It also affects the ground water recharge which is the cause of the low moisture content in the fertile land. The living things including domestic animals have also been affected. Certain individuals and large land owners among rural community have diverted large areas of rural tanks for the purpose of cultivation. Urbanization of rural tanks is also one of the problems that caused to neglect of the rural tanks. To overcome these problems of the rural tanks and to store rain water during

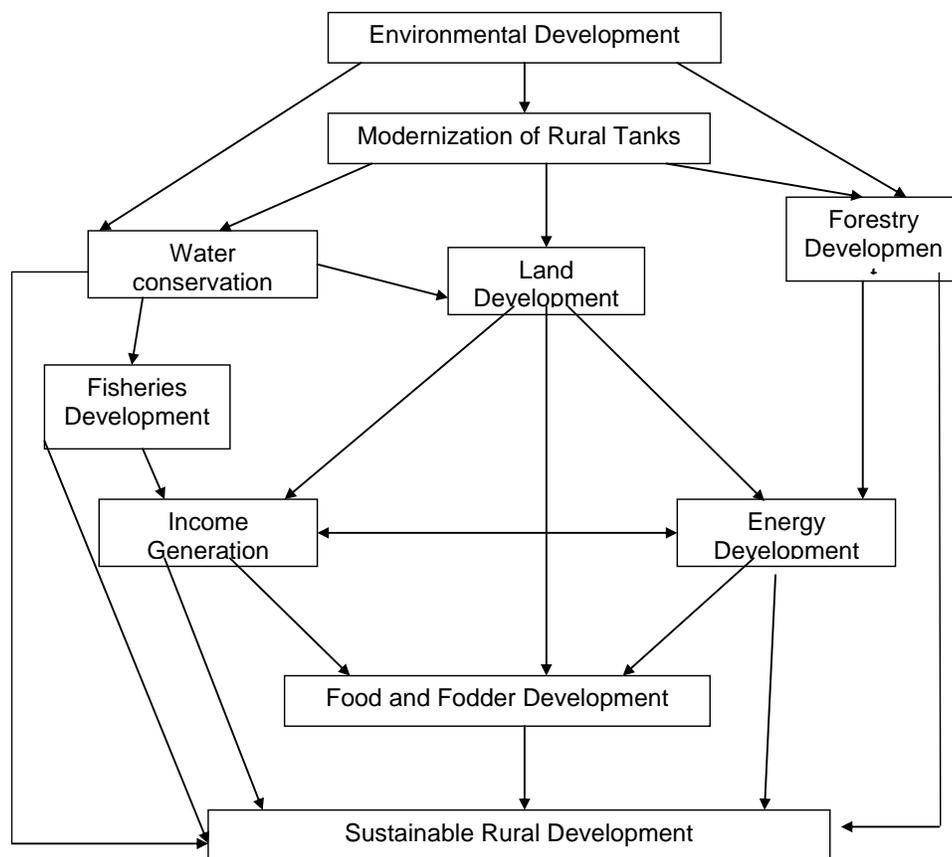
monsoons, modernization of such rural tanks is the need of the hour.

Modernization of rural tanks

The main aim of rural tank modernization is to renovate the tanks in terms of excavation of tank bed and supply channels, raising the bunds, repairing the regulators and surplus weirs, removing encroachments, on-farm development and organizing farmers’ organizations. Modernization of rural tanks is an integrated attempt for the development of local water resources to promote agriculture and allied activities. These works clear the problems in and around the rural tanks which enable tank users to avail required water to their crops. The strategy of rural tank modernization is to make an environment to catch and store water required for the crop land in time. The programme of rural tank modernization comprises:

- (i) Restoring the storage capacity of rural tanks by desilting and dewatering.
- (ii) Strengthening of bunds and raising trees on them.
- (iii) Repairing/reconstruction of feeder and surplus channels, and control structures.
- (iv) Linking the network of channels from sluices to tail-end landholdings.
- (v) Repairing the surplus weirs.
- (vi) Levelling and smoothening of uplands and undulating lands for effective water distribution in the cropped area.
- (vii) On-farm development in and around the rural tank.
- (viii) Organizing the farmers and imparting to them the proper water management practices and also proper maintenance of rural tanks.

In addition, modernization of rural tanks is a process of rehabilitation to conserve and protect the rural tanks in order to augment water supply to the irrigated land for



Flow Chart 3: Flowchart showing Environmental Conservation through Modernization of Rural Tanks Towards Sustainable Rural Development

crop production as well as to uplift rural poor.

Importance of rural tank modernization in rural development

(a) Agriculture Development

The rural tank modernization will bring a change in increasing land under cultivation, cropping pattern and changes in productivity.

(b) Rural Industries Development

Rural tanks through its modernization help the rural sector to promote various industries. Increase in agricultural production will benefit the rural artisans and new entrepreneurs by establishing new agro-based industries in the villages.

(c) Human resource development in rural areas

Indirectly, rural tanks after their modernization assist to promote the facilities for education, health and sanitation, women and child care.

(d) Water supply and sanitation

After tank modernization, water supply for the drinking purpose to the people will increase and maintain their health and sanitation through the water from the tank.

(e) Ground water Potentiality

Rural tanks after their modernization help to recharge the ground water table and enable rural people to have water for both irrigation and domestic purposes.

Overcoming the issues

The sustainable rural development includes the socio-economic, environmental and institutional development of rural people. Modernization of rural tanks plays a pivotal role in promoting sustainable rural development.

Rural tanks with modernization help to promote the eco-environmental resources of land and soil; water and water sources; forestry and trees; farming and crop production; livestock development; employment generation; semi-arid area development; conservation of irrigated area and watershed development.

This enabled process by the modernization of rural tanks enhances the quality of life of the larger number of people which leads to sustainable human well being as well as the sustainable natural resources conservation in rural areas.

In addition, modernization of rural tanks promote the sustainable development of all other resources including human resources. Many numbers of organizations have

been established for the development of various beneficiaries and stakeholders of rural tanks. Such as farmers organizations, tank ayacutdars association, Self Help Groups (SHGs), watershed development group are functioning to promote such type of development activities of rural tanks, towards sustainable rural development.

CONCLUSION

In order to make sustainable rural development the environmental resources play a very crucial role through their various outcomes that promotes development of eco-environment, economy, social and cultural change of entire rural community. Whenever the rural tanks modernized, the environmental conditions, viz., a sustainable and favourable climate change will be possible that leads to life security of all living beings on the Earth. Especially it permits to have a betterment of rural people and their live stocks through enhancement of cropping and fodder production. Rural tanks give the sustainable development in villages without damaging of environmental resources that leads to Integrated Sustainable Rural Development for our future generations.

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