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Protection and Restoration of Rural tanks through Rain Water Harvesting in Tamil Nadu

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Abstract

Traditional small water bodies erect by constructing a huge earthen bund transversely water flow paths ensuing in the capture and storage of rain water. Entirely there are about 39,202 tanks in Tamil Nadu. This work has been undertaken on the basis of secondary sources of data, which includes the in various parts of rural tanks in Tamil Nadu. The improved the quality of water be required need to restoration, they will have reduced flooding and solve the water scarcity, so the value of restoration work necessary for the timely implement and maintenance. This paper concludes for efficient preservation, emphasis should shift from rural tank to basin for long term sustainability of rural ecosystem as well as identified as an effective strategy for future purpose.

Keywords: Rural Tank, Restoration, Rainwater, Tamil Nadu.

Conceptual Framework: Tank is an important source of water in earth, these are useful to diverse function, every tank has a million of components, each of which accomplish an environmental task and present an ecological service to the village communities. In Tamil Nadu, tank is a occupy fundamental responsibility in farming, providing water supply, eco-sustainability, fish culture, domestic animals needs, and industrial uses. They are not only useful for farming activity, moreover satisfy the water needs of rural people. Since, the golden years every village has one drinking water tank further supplementary to cultivation tanks and small farm ponds covered, for serve as local people to multiple uses of rural societies. Traditionally, small water bodies erect by constructing a huge earthen bund transversely water flow paths ensuing in the capture and storage of rain water harvesting. Over the years, most of these tanks faced not proper maintenance to treat carelessly illegal encroachment and exhaustion of water, poor storage facility, domestic waste and industrial sewage water enter in the tanks.

Objective of the Study:

The objectives of this paper are:

1. to identify the problems and prospects.
2. to highlight the importance of restoration of rural tank systems towards sustainable development of rural area in Tamil Nadu.
3. to suggest policy measures for effective rainwater harvesting through restoration of rural tanks.

Methodology and Study Area: The present paper focuses on the rural tanks and their importance to protection and restoration of Tamil Nadu. This work has been undertaken on the basis of secondary sources of data, which includes the various parts of rural tanks in Tamil Nadu. The data were obtained by consulting various documents, books, government reports and statistics department of states concerned. The data include the annual rainfall, irrigated area, and profile of rural tanks and so on. The collected data were analysed and tabulated carefully to highlight the various dimensions of this study.

Traditional System of Harvesting Rainwater: Traditional System of Harvesting Rainwater is called us Tank or Eri. In Tamil Nadu there is an emphasis of rural tanks presented, the tank functioning the entire human-being necessity as well as livestock and small birds requisite. Above 50 to 60% of rural tanks are rain-fed inside in catchment place, the tank that have collected rainwater from rains and surrounding cascades moreover depending upon the rainfall during the year. The rural tank had historically, traditionally old, the great poet Thiruvalluvar referred to them "*The wealth of men who love the 'fitting way', the truly wise, is as when water fills the tank that village needs supplies."* ***-Kural*** *– 215,* but still now Most of the tanks in the state perform below their storage capacity level and the gap between the irrigation potential and actual irrigated area. In the process, area under the tank irrigation has declined, which has adversely affected people who were traditionally depending for their livelihoods on tanks[1].

Tank System in Tamil Nadu: There are about 39,202 tanks in Tamil Nadu State with classified system tanks and non-system tanks. System tanks have regularly received the supplemental water from major streams and reservoirs but, non-system tank depended only on seasonal rainfall and not connected other water sources. The tank are also classified three types first one, Panchayat Union (PU) tanks have command area less than 40 hectare under the management of village panchayat[2]. Next type Public Work Department (PWD) tanks, this tank have more than 40 hectare under the maintenance of PWD. Finally land lords of

[1] Irrigation & cad development 2007 "Andhra Pradesh Community Based Tank Management Project" Operational manual Volume – v(a) of vi Technical manual government of Andhra Pradesh

[2] Balamurugan P (2013) "An appraisal of rural tanks and their role in sustainable rural development: a study in the Deccan plateau". *Spring Journal*, 1(1), 48-53

zamindars constructed farm ponds in rural areas during British period, pre-independence of India the zamndari system was eradicated they were transferred to PU and PWD based tank sizes of capacity. Tank storage system degreased in past 50 years reason is more valuable person in the Neerkatties appointed the king ruler period, the Neerkatti community well known of the natural aspects and they are called water manager. They maintained the tank capacity, storage structure and implementation work, since British period the local government was formed the British appointed many engineers but the Neerkatti Community not accepted the continue of the work, the people migrate the urban areas so, the unauthorised people they can use to illegal activities in this tank, the recent years the tank are encroaches by various issues for population density, migration etc.

A large number of rural tanks in the catchment area encroached in 20th century. Generally the tanks are not filled to the full storage capacity. Subsequently the cultivation spreads to the water spread area when the tank water supply recedes. In the long-run this unauthorized cultivation is made permanent and the tank storage capacity is reduced.[3] After that the storage capacity will be reduce the entire command agriculture area could not be irrigated, automatically the agriculture product demanded as well as poverty deal with the poor farmers. The traditional tank is not require new physical structures but common structures of channel, drainage, storage capacity only run the tank. Storage of water is equal to capacity of the tanks and filled as a minimum time of monsoon season.

Multiple Uses of Rural Tanks: Realization that groundwater is a limited resource despite annual recharge and should be carefully guarded, to satisfy our needs during periods of drought, dry seasons and not allowed to be squandered, is yet to dawn in the minds of our people. Indiscriminate drilling of bore wells is not the answer to the problem of restoring sustainable yields.[4] River is a flow of water in all parts of place except the tank inside the fixing the boundaries of one place to save the important role of significant ground water recharge. Groundwater has availability is not guaranteed in every parts of place, ground water depended geological condition of the rain and tanks. The tank provided as good quality of water as well as preventive of ground water source.

Fishery is an essential for completeness and integrated approach body of tank activities, the economic value of the output of generated fish production of rural tanks. The inland fisheries sector has about 370,000 ha of water spread area, comprising about 52,000 ha of reservoirs, 97,700 ha of major irrigation and long seasonal tanks, 158,100 ha short seasonal tanks and ponds and 63,000 ha under estuaries, backwaters and swamps, which are suitable

[3] Palanisami.K and William Easter 1983 "The Tanks of South India (A Potential For Future Expansion in Irrigation" University of Minnesota Institute of Agriculture, Forestry and Home Economics St. Paul, Minnesota 55108

[4] Reddy.P.R (2013) "Relevance of minor irrigation and its restoration to sustain agriculture in Andhra Pradesh – An Overview" Journal of India Geophys. Union Vol.17, No.3, pp. 259-279

for both capture fisheries of state (State of Environmental Report of Tamil Nadu). So the tank is economically valuable for sustainable development of the State.

At the present condition of the rural tanks maintenance and creation is low cost but they perform many useful functions. Initially they have help to conserved and stored the rainwater and the process of reduce soil erosion. After that they provide low cost of flow irrigation to agriculture sector, and help of recharge ground water and easily assessable of drinking and domestic water. Rural tank has been control floods and droughts as well as tanks concentrate silt and minerals contained in rain water run-off in tank beds and in the command area and fertilize the soil. Most importantly, unlike large reservoirs and tanks in South India which take land in the submergence areas away from other uses, tank-beds in are used both for water-storage as well as for cultivation. As a rule, farmers grow winter – and, sometimes, summer-crops in tank beds after they are emptied; as a result, tanks are efficient in land-use[5] (Shah Tushaar & Raju K.V.2001).

Restoration of Rural Tanks: Rural tanks storage capacity reduced year by year because, the maintenance of work was very poor. So these tanks prevention is a significant role of the society, side by side the tank implement work started to the technical and scientific support of restoration will be required. The restoration of tanks will be including the repairing of surplus weir, small stream, drainage facility, tank fathom measures and watershed structures. Now days the clean water is depend on economic cost for various places. The rural people economically backward, basic water need of the community depend only on ground water and reservoirs. Major tanks and reservoirs already encroached and polluted, so the improved the quality of water be required need to restoration, they will have reduced flooding and solve the water scarcity of rural areas, so the value of restoration work necessary for the timely implement and maintenance.

Benefits of Restoration of Rural Tanks: (1) Decreased water Demand in Rural Area. (2) Conserve Environmental Sustainability and equal climatic variables (3) Improved considerable Agriculture Production and development of land structure. (4) Economic wellbeing of farmer life and increasing farm income (5) Enhanced livestock and milk production (6) Fisheries development the employment potential essential for completeness. (7) Ground water Recharge and reduced flooding (8) Improved Agro-forestry and Management of bio-diversity (9) Additionally can be Pollution control.

Under The Tank Area Irrigated In Various Years

Sl.No	**Tank**	**2005 -06**	**2006 -07**	**2007 -08**	**2008-09**	**2009 -10**
1.	With Ayacut of 40	7933	7982	7982	7984	7984

[5] Shah Tushaar & Raju K.V.2001 "Rethinking Rehabilitation: Socio-Ecology of Tanks and Water Harvesting in Rajasthan, North-West India" CGIAR Systemwide Program on Collective Action and Property Rights Secretariat: International Food Policy Research Institute K street, N.W. Washington, D.C. 20006 U.S.A.

	ha. and above					
2.	With Ayacut of less than 40 ha.	32386	33278	33278	33278	33278
	Total	**40319**	**41260**	**41260**	**41262**	**41262**

Source: season and crop report 2009-10

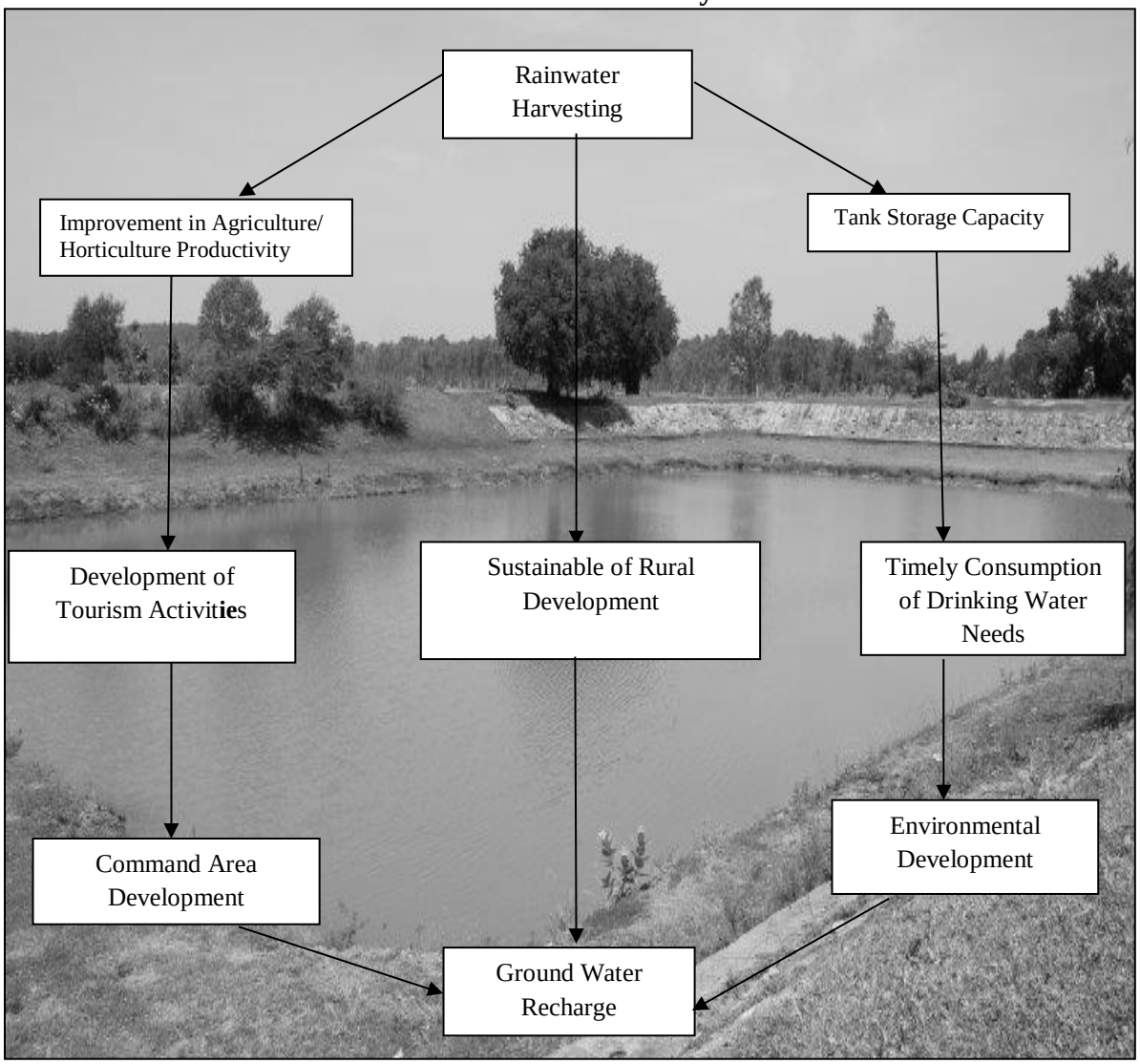
Tanks are constructed man-mode environmental system, the tank is a permanently storage of rainwater in cultivation aspects. The tables shows that area of irrigated under the various years, during the year 2005-06 was irrigated area 40319 ha Compared 41262 ha in 2008-09 year, irrigated under the tank during 2008-09 followed by 2009-2010 recording as increased 943 hectare is clearly shows the tanks is a useful source of agriculture and national development.

Conservation of Rural Tanks: Tank is useful to biologically wealth of the state and joint forest management, eco-environmental, watershed management. The protection of rural tanks have involved local communities as well as joined government and non-government organization. Sustainability of growth will be achieved only on efficiency and utilization of local resource onwards. The protection of tanks will be optimal use of resource and restoration of undamaged ecological balance due to people participation and protect the tanks may be formed that water user association such manner, the managing committee prepared small planning for restoration of tanks. Any other illegal encroach or aggression the committee can be preserved the tanks, for damage, alters, enlarges, or obstruct any irrigation tanks, the committed resolved this problems. The water user shall be responsible for the maintenance of tanks, prevention of wastage of the water or unauthorised encroachment.

Reasons for Decline Tanks

Socio-Economic	**Institution**	**Physical**
1. Poor People Participation	Lack of Maintenance	Damaged Surplus Weir
2. Lack of Interest in Village Leadership	Encroachment of tank bet area constructed from government building	organic Manure use on the farm after that the waste water inflow the tank
3. Unorganized Farmer Association	Timely improper management of administrative sectors	Abolish the tank catchment area.
	Lack of allocation funds	Reduce size of tanks and un-fill the water
		Heavy Siltation and sedimentation.

Tanks and their Function in Rural Eco-System Conservations



Need For Restoration of Tank for RH

Since streams irregularly swells, therefore some states have built extra-large capacity of reservoirs to store surplus water which will otherwise be wasted in to sea, but the rural tank had built in land to store the water above more than times the yield the crop. During the drought period they will be provided successfully irrigated land so that certainly no faced poverty problems additionally they can achieved sustainability of food production. In Tamil Nadu most of the areas of arid and semi-arid region yearly get average rainfall for sometimes continuous two or three years.

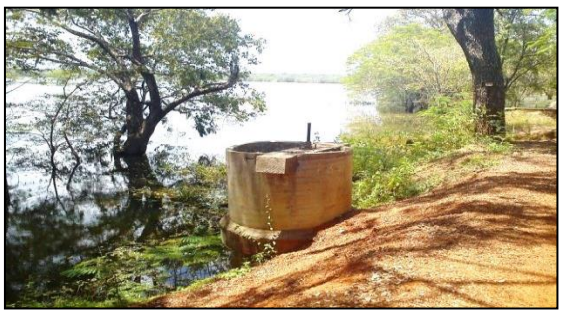
Season-wise Rainfall in Tamil Nadu (mm)

Year	Southwest	Northeast	Winter	Summer	Total Rainfall
1979-80	196.4	337.0	10.5	125.4	669.3
1989-90	348.8	341.0	90.2	136.7	916.7
1999-2000	199.9	499.5	119.5	77.9	896.8
2007-08	341.6	515.4	46.2	261.2	1164.4

Source: Performance of Agriculture in River Basins of Tamil Nadu In the last three Decades – A Total Factor Productivity Approach (2011)

From above the table it can be stated that the rainfall in various years. In Tamil Nadu mainly dependent on monsoon rains, the state has four distinct periods of rainfall southwest monsoon start in June to September periods and northeast monsoon season the state has heavy rainfall during October to December, averaged and normal rainfall summer season followed by winter season. It can be confirmed and stored in the proposed rain water harvesting through restoration of tanks and used in the northeast season. Irrigation dependent only on make use of water, 75% dependable water will be collected, conserved and consume for favourable used as it is suitable a rare water resource. Therefore, over the water evaporate and wasted into sea. Rainfall is a natural gift. We don't identify what time and which year rainfall will be increased or decreased, moreover sometimes heavy rainfall occurs non-monsoon times in one month also, so this excess water can be stored in rural tanks, for this reason it is need of the drop to drop rain water harvesting stored through tanks and utilize throughout the drought, low rainfall year. It is proposed to make rainwater harvesting tanks outside not having any canal method with a sluice to letdown water in the downwards streams for fulfil the existing minor or huge irrigation tanks.

Present Conditions of the Rural Tanks



un proper maintain of canals

Encroachments

Tank sedimentation

Un-repair of channels

Environmental Sustainability through Restoration of Tanks: Recently, major problem faced in this world environmental degradation to urban as well as rural areas because, increasing of population pressure many places drought-prone regions. Environmental Sustainability through Restoration of Rural Tank is a best way of support on eco-system. It can be equal maintenance of natural resources and management atmosphere, involve and connect with a lot of resources, uses and benefits of serve as living and non-living characteristics of the earth. Environmental surrounding which by needed the tank and restored the fresh resource. Tanks are also central in the ecology of the area, providing the necessary ecological functions for a healthy environment. Tank ecosystems include several types of different habitats, such as cereal cultivated fields, forests, tree plantations, shrub lands, riparian, or urban. Restoration of tank ecosystems can potentially be very high and guarantees the necessary functional units to provide and to ensure the supply of environmental services. Conservation of tanks is also an ecological insurance for the future that allows the ecosystem to regulate itself to the proper stable environmental conditions[6] (*Ariza Pere et al.,1999*). Environmental will affect the transformation of the eco-system. This is present condition of the world, environmental conservation linked to the quality of water. Most of the areas, tank is empty or encroached, what is the use of society only raise income generation for human being, but the tank restore they can help to prevention of the great atmosphere of the earth.

Conclusion: The study has revealed that the repairs to the tank-bed, sluices and supply of channels should have regular management as well as proper improvement works is need for rural tanks. The existing water bodies act to recharge and upgrade ground water on the downstream. The works start from not only government sector but also pressure of people interest and involve participatory approach to save the natural resource and maintenance rural water bodies. Rainwater is a gloriole resource is must be saved to stored in rural tanks, efficient preservation, emphasis should shift from rural tank to basin for long term

[6] *Ariza Pere, Galán Elena, Serrano Tarik, Victoria Reyes-García 1999 "*Water Tanks as Ecosystems: Local Ecosystemic Perception for Integral Management of Water Tanks in Tamil Nadu, South India *Water Tanks as Eco-system, tank and well irrigation crisis: Spatial, Environmental and social Issues.*

sustainability of rural ecosystem as well as identified as an effective strategy for future purpose. A long time uses of needs to be established on small cascade and catchment linked to rural tanks. They are required much more conservation and prevention efforts only should not be human - made to ensure that these tanks are polluted by discharge of sewage and manufacturing wastes. Existing tanks should be restored and removal of aggression and suitable protection must be developed.

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1. Performance of Agriculture in River Basins of Tamil Nadu In the last three Decades – A Total Factor Productivity Approach (2011) A Project Sponsored by Planning Commission, Government of India, Centre for Agricultural and Rural Development Studies Tamil Nadu Agricultural University Coimbatore
2. Season and crop report Tamil Nadu 2009-10 Department of Economics and Statistics chennai - 600 006
3. _____ "State of Environmental Report of Tamil Nadu"