An Analysis of Modernisation of Tank System and Sustainable Rural Livelihoods in Villaupuram District, Tamilnadu

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Abstract

A one 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. Both hot and cold waves prevailing are injurious to crop cultivation. The received annual rainfall is estimated to be 56 cms from both the Southwest and Northwest monsoons with scanty or erratic in nature. Regarding water, though the country has the benefit of both surface and underground sources, they are not adequate with perennial sources in terms of quantity to grow the crops as per the prevailing cropping pattern. Less rainfall means a management problem-a challenge and opportunity. The soil is predominantly reddish and blackish. 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. Therefore it is an urgent need to protect and conserve the water resources through various methods. It is asserted that majority of the water resources received through the copious rain recently is going as waste and storing and conserving the water resources is the need of the hour. In this connection, tanks are the rural resources and they 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. The ecosystem of a tank 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 microhabitats. In this connection, there is an urgent need to promote and strengthen modernisation of tanks in the of local level water and resource management, which brings better livelihoods in villages.

1. Conceptual Frame Work

As ever body know fresh water is essential to economic development as water is used for main economic activities including, domestic, agricultural and industrial purposes. The amount of water requirement is increasing every day on the basis of human activities and expanding the urbanisation and industrialisation. From global perspectives, the priority for action is to address government water related challenges. Such as mitigating growing water scarcity ensuring universal access to safe drinking water and sanitation, mitigating pollution discharged by human activities and anticipating water relater disasters. The relative importance of these four challenges differs according to geographical conditions, but most emerging and developing countries must face all of them. With the advancement of civilisation, water has found in the large and progressively increasing list of uses. Many nations which have a nation fair estimate of their oil and mineral resources, hardly know their water resources potential. In a country like India where the rainfall pattern is highly variable and most of the people depending upon agriculture and allied activities, the appraisal have became important components for sustainable environment management. According to recent World Resource Index, in ancient India, kings and regional chieftains have shown more interest to construct the water structures which is called as indigenous water technology system. In order to save the existing water resources naturally it is found throughout the country are among the most important and widespread traditional devices of water harvesting dating back several centuries. They are called as tanks, which 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 rising. 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 tanks are as follows:

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

These tanks situated in rural area, for the purpose of agriculture and domestic uses, so they are traditional water harvesting system located in all semi-arid tropical parts of India. Totally around 2,08,000 tanks available in India and majority of them located in the Southern parts. Tamilnadu state has 39,523 rural tanks irrigate 5.1 laks acre land and most of the tanks have become reduction and retrenchment due to human and natural reasons.

Based on the background, an attempt has been made to analyse the importance and contributions of modernisation of tank system to sustainable rural livelihoods, with the field evidence from Villupuram district, Tamilnadu. Villaupuram district is one of the tank intensive districts of Tamilnadu state, where 2085 tanks are functioning irrigate 57686 ha crop land for paddy, sugar cane crop cultivation. In this connection, an observational visit and personal contact only have been exercised in two select major tanks of Thiruvennainallur tank and Padhur Tank.

Tank Modernisation

Tank modernisation is one of the key strategies being recommended in policy documents. Even though tank modernisation has been undertaken as a major programme was implemented during 1984-85 to 1994-95, with financial aid from the European Economic Community (EEC). In the first phase (1984-91), 150 non-system tanks with a command area of 100-200 ha were selected for modernisation with a financial outlay of Rs. 45 crore. In the period 1989-95, an additional 499 tanks were included at a financial outlay of Rs. 50 crore. The approximate cost per hectare was Rs. 21,000. The project was expected to save about 20% of water over the present use, thus permitting the expansion of cultivation by about 9,000 ha (Government of Tamilnadu 1986). In 2008, a comparison between the modernised and non-modernised tanks showed only marginal improvements in terms of water availability in the tanks, reduction in encroachment and siltation. The presence of water users association and area irrigated by wells also increased only marginally compared to tanks which were not modernised.

One problem with the European Economic Community programme was the use of a standard package approach that used the same modernisation strategies for all tanks irrespective of their physical conditions. For greater cost effectiveness, it is important to identify selective modernisation strategies.

Table. 1. Tank Modernisation Performance

Sl. No.	Parameters	T.V. Nallur Tank	Padhur Tank
01	Tank performance (%)	88.72	70.63
02	Filling pattern (no of times)	02	01
03	Water availability (no of days)	90	65
04	Siltation (%)	44	28.60
05	Presence of WUO (%)	68.00	88.00
06	Farmer's Participation (%)	87.00	82.00
07	Presence of Neerkatti (%)	68.00	64.00
08	Maintenance of Tanks (%)	60.00	76.00
09	Farm income (Rs/acre)	7,200	6,900
10	Equal Water distribution (%)	80.00	75.00
11	Employment opportunity (Mandays)	60.00	88.00
12	Cooperation among farmers (%)	97.00	85.00
13	Encroachment (%)	40.50	38.50

Source: Palanisami et al (2008).

To identify optimal investments in tank modernisation, different components and strategies have been examined. These include sluice modification, provision of additional wells, sluice management and sluice rotation. Among these options, sluice modification did not improve system performance (Table 2). Sluice management (closing for two days after heavy rain) could increase total rice production by 14%. The options of canal lining, providing additional wells and sluice rotation increased total rice production by between 30% and 36%. The greatest production increase occurred when management and physical investment strategies were used in combination.

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. There are more than 2.08 lakh tanks exist across country.

2. Water Resource Management through Tanks

Tanks are usually constructed in chains whatever the source may be of water supply that implies the overflow from the upstream tank forms the inflow into the downstream tank. Thus a series of tanks form a chain that successively capture run off from either a seasonally flowing stream or a river during the rainy season. They are usually located close to villages, which often carry the same name as thanks. Big tanks may serve more than one village to serve as a water point for the purpose of drinking and alother uses.

The contribution of tanks for local water resources management is harmlessly endorsed by the effective participation of the water users in neighbouring villages of thank. Due to various reasons and technological advancement in irrigation development, there are pathetic conditions, which lead to degrading the system of tanks and poor performance in water resource management by local people. Hence except few multi-village tanks it does not have anything to do with management of the small tanks and very smallest water bodies in villages.

3. Problems and Issues in Tanks and Local Water Resource Management

Usually water users are not bothered about the feeding of water to the tanks and they use the water for their purposes if the tank full, which resulted to the tanks, have been less maintenance and

reduced in size. So that it is not possible to store the available run off during the rainy season due to following reasons.

1. There unavoidable variations in regional distribution of tanks which takes the irregular maintenance and less development measure.
2. Being small storages tanks have relatively small command area and corresponding little bit of its water users.
3. Poor sources of feeder and supply chain of tanks and their watershed area.
4. Due to various reasons, poor capacity and short duration of water storage and its reliability.
5. Lack of participation of local community and failure in tank institutions.
6. Severe encroachment on all big and small tanks except few large tanks is forced to less attention on local water resource management.
7. Less government programmes on tank development and appropriate policy of the government with regard to construction of buildings and provision of free land and housing to poor people.

Rural tanks continue to play an important role in people's livelihoods in social, economic, socio-cultural, and political dimensions, making substantial contributions to the national and local economy. Since they form an integral part of the environment, efforts should be directed towards their conservation and

Table 2. Evaluation of Different Tank Improvement Strategies (Tamil Nadu)

Sl. No.	Strategies	Production Ratio	Equity Ratio	B/C Ratio	IRR (%)
01	Sluice modification	1.0	-	0.5	0
02	Sluice management	1.1	2.6	10.0	142.0
03	Canal lining	1.3	1.6	1.8	24.4
04	Additional wells	1.3	1.5	1.7	23.5
05	Rotation management	1.4	1.5	10.8	159.0
06	Canal lining + additional wells	1.4	1.0	1.5	23.2
07	Sluice management + additional wells + Canal lining	1.5	1.2	1.7	23.7
08	Rotation management + additional wells + Canal lining	1.5	1.2	1.4	32.5

Source: Palanisami et al (2008a).

sustainable and wise use to support developments and human wellbeing. In temperate wetlands, environmental temperature is the chief regulator of germination timing, but the ecological significance of high moreover, low temperatures during dormancy break, and germination is still poorly understood. The wetlands sub-sector to other sectors' performances stem from the wetlands' functions and values in terms of ecological, social, and economic dimensions. Based on the dimension under consideration, can be enhance the performance of the sector under consideration. However the relationships is not as straightforward as expected and the analysis should not be limited at one dimension of wetland use at a time (e.g., wetland cultivation, collection of wetland natural resources, etc) but rather consider combination of wetland uses.

4. Modernization of Existing Tanks

The process of assisting in the recovery of a wetland that has been degraded, or maintaining a wetland that is in the process of degrading, so as to improve the wetland's capacity for providing services to society. This system can serve efficiently only if the structural works are modernised, and rehabilitation includes not only restoring these components to their originally designed standard but more important, facilitating the efficient water management and improved cropping practices. The growth of crop in the irrigation sources is creating major problems in water management and flood control. The rehabilitation and modernization by a social screening process to identify the level of co-operation among the farmers, socio economic background, inherent contradiction in the village, and whether they would be a hindrance to collective action. This criterion was formulated when the focus of

rehabilitation was on tank and wetland development works. The provisions made in the past for catchments treatment, feeder channel cleaning, and increasing the storage capacity of the tanks.The rehabilitation of selected water bodies and sustainable utilization of their resources improving water quality enhancing biodiversity and restoring the values of wetlands.

Rural tanks are in interconnection and interactive within a watershed, which influence various departments like agriculture, fisheries, irrigation revenue, tourism. Water conservation measures coupled with water harvesting that help to improve the moisture availability for supplement and off-season irrigation. The intervention through tanks conservation measures have greater role to play in transferring a part of surface water to ground water by recharge. The conservation of water resources and tanks are having good potential for supporting the livelihood. However, with water resource conservation alone particularly the small farmers owning poor conditioned tanks cannot take advantage as they do not have the capacity to irrigate for land development and critical agricultural inputs. Therefore the strategy adopted is that water resources conservation with modernization of tanks for the livelihoods security for not only their users like rural people and also all living beings.

5. Sustainable Environment and Local Water Resource Management

Rural tanks are the most diverse and productive ecosystems on Earth and they are important from conservation and sustainable management because of their rich diversity of flora and fauna. Tangible and intangible diverse resources and products of tanks' functions such as fodder, fishing, fuel wood, non timber forest products, ecotourism, and flood control have historically provided a source of income and livelihood for human beings. However, population growth and associated anthropogenic interferences have depleted these resources and reduced the rates of flow of the ecosystem services. The irregular maintenance of tanks are due to damages health and well-being of individuals and local communities and diminishes their development prospects. It is widely recognized that tanks provide several ecosystem services that contribute to human well-being. The major ecosystem services that tanks provide include fish, fiber, water supply, water purification, climate regulation, flood regulation, coastal protection, recreational opportunities, and tourism. The role of wetland resources in the livelihood of the poor is particularly important in developing peoples. However, declining fish resources in the coastal wetland alternate livelihood measures such as poultry, livestock and crop farming, handicrafts, and nonfarm day labour. In many cases, environmental and biodiversity concerns are important for sustaining rural livelihoods. However, protecting wetlands to maintain their pristine state is not always feasible, especially as population pressures increase. In Tamilandu, wetland resources play an important role in the livelihoods of cultural communities. Indigenous knowledge of cultural communities is important for conserving the wetlands and for using wetland resources.

5.1. Employment Generation

Development of agriculture is critically important for ensuring food and nutritional security for the hundreds of millions of people that still live below the poverty line, for raising rural incomes and generating employment opportunities, and for stimulating industrialization and overall economic development of the life. The Mahatma Gandhi National Rural Employment Guarantee Programme (MGNREGP) gives opportunity for all to work at least for 100 days in a year. Employment for inland fishermen and landless agricultural labourers, Duck Rearing, Cow Farming and milk production, and currently the main government rural employment generation scheme is the Sampoorna Grameen Rozgar Yojana (SGRY). Earlier incarnations of employment guarantee schemes like the Jawahar Rozgar Yojana (JRY), Employment Assurance Scheme (EAS) and the Food for Work Programme were merged into the SGRY in 2001. From the early 1980s these schemes have been looked upon as major instruments of poverty alleviation. Further, the regular employment generation scheme was also supplemented by drought relief works that were launched in different parts of the State in 2002. However, not much has been achieved via the programmes in terms of poverty alleviation in a sustainable manner. While wages earned from these programmes have definitely brought succor to the poor, their contribution to household incomes can only be termed as marginal and incidental. Typically physical works, approved by the Gram Sabha, are undertaken as part of the scheme, where the Gram Panchayat is the implementing agency and has to accomplish the approved works, combining labor and material costs in the ratio of 75:25. Under the scheme, the main works undertaken by Gram Panchayat are related to construction of rural roads, river works, de-silting and so on. One problem area relates to the 'type of works' chosen under the scheme. Most projects are temporary in natures which fail to create permanent assets and infrastructure in the village. Further, the ceiling of twenty five percent on material costs (which has now been relaxed) militated against long-term infrastructure creation, which

could substantially benefit rural livelihoods even after completion of the project. These programmes were designed with the intention of providing basic minimum subsistence and temporary employment opportunities to the poor and so fail to address the longstanding objective of removing poverty. While wages earned from employment generation programmes have Definitely brought succour to the poor, their contribution to household incomes Can only be termed as marginal and incidental there is provision for the involvement of individuals, as well as for Self-help Groups (SHGs) formed by the rural poor, to seek financial assistance (both credit and subsidies) for undertaking productive activities.

5.2. Soil and Water Resources Development

Soil is one of the most important natural resources that perform many functions essential for maintenance of ecosystem. Enhancement of soil, water, and related natural resources support the production of food, fiber, fuel and provide essential ecological services such as water filtration/purification and the recycling of atmospheric gases. Water resources are increasingly in demand to support human needs, and at risk of contamination and degradation. This specialization focuses on the management and conservation of soil and water, suggesting sustainable practices that will protect these vital resources now and in the future. Water resources comprising of surface water (river and lakes), ground water and marine and coastal waters, support all living things including human beings**.**

5.3. Development of Agriculture & Enhancement crop Production

Agricultural development needs to be on a sustainable basis such that growth in resources must be continued with little depletion and degradation in quality of resources while supply of land resources seems to have reached its limits of growth, particularly its availability for agricultural purposes and on the other hand, the demand for land resources for non-agricultural purposes is expanding. It is a new technology for increasing the rice production, reducing the cost of cultivation and increasing the agricultural income. The advantages are less seed requirement, mat nursery method, young seedling transplantation, single seedling in square planting method, water saving up to 50% using weed to plough back the weeds, getting higher tailoring which enhances yield and hence high income. In Cuddalore district, during the year 2013-14, out of the total paddy coverage of 126817 Ha., SRI coverage was 54596 Ha. For the year 2014-15, the paddy coverage target is 124500 Ha. of which SRI coverage would be 87200 ha. To encourage the farmers to go for SRI cultivation, the Government is providing an incentive of Rs.7500 per hectare under NFSM (Rice) which includes Como weedier and other inputs. Farmers are also provided training on this method by the Agriculture Department as well as by Krishi Vigyan Kendra., Vridhachalam.

Ground Water Recharging at Kayathur Tank

Tank Full Level (TFL) in Thiruvennai Nallur Peria Eri (Tank)

Real estate, industrial and factory space, schools, hospitals, expanding roads, railways and recreation set their demand and compete with agriculture. There is already a water shortage but demand is spiralling. Food and Agriculture Organization (FAO) estimates that if current practices are maintained, population growth will boost the demand for water from farming alone by another 50% by the middle of this century. The role of agriculture, which is mostly main feed, in the district economy is very significant. Though main is crop is paddy, millets, block grams, and red grams, are also raised.

Vegetable and fruits such as tomato, papaya, lemon, guava etc, also cultivated. Agriculture in the plains is practiced on the modern lines using improved seeds, fertilizer, pesticides etc. the most important wetland crop is paddy, intensively cultivated in the plains. Cultivation of coconut and cashew in coastal areas and, mango in the plains is very profitable.

5.4. Livestock Development

The animal husbandry for improving livestock population advocate stall feeding and pasture cultivation, develop dairy based economy, popularize poultry farming, piggery farming In the first phase, the decline in livestock was due to primarily to the decline in livestock other than cattle, namely poultry, goats, sheep, buffaloes etc. Agriculture allied activities such as livestock rearing and fisheries have historically played an important role in the economy. In the main reason for the overall decrease in less availability of land for agriculture and the increasing amount of land under non agriculture use. The decline of cattle, buffaloes, and sheep in particular must be understood in terms of urbanization and a shift in the rural economy away from agriculture and allied activities. The alternative and more common planning process involves experts visiting each area wetland system and working out the rehabilitation proposals themselves, sometimes in consultation with farmers. Since small wetland rehabilitation is require farmers input in the form of labour or cash, such cooperation is essential. As animal husbandry is an activity which can easily be taken up by rural communities as skill and resource requirements are minimal, inputs are locally available and marketing does not pose a major problem, it can act as an engine in poverty alleviation programmes by making asset less poor into income generating asset owing population. Further in order to improve the productivity of the livestock, thereby improving the economy of the livestock farmers, a scheme for augmenting fodder is under implementation since 2011-12. So far, a total 92,000 acres of farmers own land have been brought under fodder cultivation. Sustained rise in income and urbanization are now fuelling rapid growth in demand for animal food products and the livestock are coming under pressure to produce more. Over the last three decades livestock production grew faster than crop sector as a whole and has made significant contributions to agricultural growth, which is considered an important factor in poverty reduction among rural people. Livestock Revolution is also significantly contributing towards improving nutritional security and reducing rural poverty. The rural poor have little access to agriculture land and thus there are limited opportunities for them in crop production. On the other hand, livestock wealth is equitably distributed compared to land, and generates opportunities for the poor to escape poverty through livestock production.

5.5. Women Empowerment and Rural Energy Management at Rural Pockets

Involvement of women in all the development programmes right from the stage of project planning is essential. Although women represent 50 percent of the population, they also have the major responsibility of grooming children and procuring the basic needs required for food fuel and fodder securities. Active participation of women in development programmes will help to identify their problems and reduce their drudgery. As far as energy options are concerned there are two potential for an energy transition a) cleaner fuels based on petroleum and fossil based extractions, b) cleaner energy technologies with renewable energy as bio gas, wind, power, solar energy a micro-Hydel power, and rural women need to be empowered to choose the right option. It has been found that 54percent of rural women and 26 percent urban women are engaged in marginal occupations in order supplement their family income, by collection of fish and small grains, maintenance of kitchen gardens, tailoring, weaving and stitching in addition to collecting fuel wood and cow dung for the fuel requirements, fodder for their cattle and water for the family. During the past two decades it was planned through changes that we would all see a quick social transformation, as they had not been given their due to status in society. In fact, rural women, particularly in the third world have been traditionally skilled workers in agriculture, and have not been confined to home-making functions. In many cases their roles have been more extensive than men's and various prejudices sand biased ideas had in many cases deprived them of the traditionally guaranteed rights, to land wetland position of authority. Today it is found that rural women from the lower economic strata of society do more of farm and home management than those in medium and high economic categories of rural women, who spend more time on household, and allied agriculture activities. Energy availability in the rural areas, cannot be isolated from basic of sustenance like food, shelter, drinking water and clean environment.

5.6. Institutional Development in Rural Area

Rural livelihoods and wetland system water users' groups, agricultural producer and rural workers associations, rural credit unions, women and youth associations and other self- help groups

are all examples of institutions. Institutions can be referred to as the 'rules of the game', that include: (a) mandate; constitutional and environmental factors; boundaries within which actors and organizations operate; (b) the relationships between actors and organizations within a number of fields of interaction; and (c) the motivations, incentives and rewards for actors and organizations to engage and participate in a given activity. Institutions are also the formal and informal constraints on political, economic and social interactions. Even today villagers have traditional institution in many wetlands to manage the wetlands effectively as a common property despite the presence of the external factors that led to the decline of the wetland and tanks. Indigenous management practices and the villager's ability to adapt themselves to the changes in water supply, groundwater department, changes in the cropping pattern, and socio economic changes like land transformations given an insight in to the traditional institution development. The rural people with working small wetland commands promoting participatory management of wetlands. They follow different methods of organizing farmers and development institutional in the villages for sustainable management of wetland irrigation. For the rural poor, good institutions and organizational entities are twice as important, as isolation and weak performing institutions impact considerably on their well-being. Additionally, the rural poor suffer from extremely limited provision of public goods, which further acts against actions aimed at reducing their poverty.

5.7. Development of Rural Infrastructural Resources

Provision of basic infrastructure facilities in villages is imperative for creating economic opportunities, spurring economic growth and attaining self -reliance. Most of the villages lack basic infrastructure facilities which cramp the pace of economic growth. Currently rural development is constrained by a slew of factors such as lack of adequate employment opportunities under Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) and to maintain basic infrastructure facilities particularly roads, Indira Awas Yojana (IAY) Houses, Thane Houses, and new buildings, kitchen sheds, water supply, toilets etc., Further, it is important to break the common misconception that rural schools are necessarily worse than urban. There are indications from Tamilnadu that government rural schools may be in far better shape than urban municipal schools. This is so because most rural schools have a mix of higher and lower castes/classes whereas in urban areas where the choice of school is greater, the municipal schools cater almost exclusively to the poor, lower castes and remain relatively few and use of electricity for purposes of agriculture or industry is quite limited.

The implementation of various infrastructure programmes in rural areas. Villages lagging behind in providing the basic infrastructure facilities and Panchayat Raj Institutions This trend has resulted in reducing the gap between rural and urban in respect of the standard of living, availability of infrastructure facilities, provision of basic amenities, underemployment and unemployment, illiteracy, health and lack of expertise. Swarnajayanti Gram Swarozgar Yojana (SGSY), aims to bring the poor families above the poverty line by ensuring reasonable and sustained level of income over a period of time. This scheme is based on SHG approach and aims to graduate them from micro credit stage to micro enterprise stage by providing skill development training, bank credit, infrastructure facilities and much needed marketing support to the products produced by them.

5.8. Management of Environment Sustainability

The natural resource is a widely spread and growing challenge in many areas of the livelihoods of the rural and, particularly, the economically marginalised population. Much of the livelihoods of people in rural areas of low income and least developed area depend on natural resources like soil, water, and crops, economic, political and social issues related to wetland, forests, grasslands, and other resources. Sustainable use of natural resources underpins all of our livelihoods, and community well-being. Successful management of natural resources involves sound technical practices, good policy, and often most importantly, collaboration between individuals and groups with different interests within a landscape.

Natural resources are the common property resources and their management holds the sustainable food and livelihood security. There is need for new management system, involving the private sector based on principles of equity, to conserve the wetland and improve the natural resources. Policies are urgently needed to conserve prime wetland for agriculture and to ensure the sustainable use of the ground water. To take bio diversity, one of the key components of our basic life support system.

6. Conclusion

The decline of a tank irrigation system can be several physical reason: heavy silt accumulation in tankbed and in inlet channel; frequent occurrence of of droughts and inadequate and irregular water supply to tanks; encroachments in the catchment area, inlet channel and tankbed; poor and damaged conditions of regulatory structures such as sluices and surplus wires; erosion of tank bunds; inadequacy of funds for maintenance work, etc. With the decline in the area irrigated by tanks, on account of their poor maintenance, the number of wells and tubwells has increased. But only the reach farmers are able to afford the new technology, which has exacerbated inequality. Due to the poor state of modernisation tanks, they are slowly being used for other purposes. It is noted that the beds of many tanks have been converted into brick kilns. It is therefore concluded that modernisation of the existing tanks in rural area is only way for better management of local water resources that provides many benefits to rural poor. Modernisation rural tanks have brought out the development of not only agricultures sectors, but it is useful for development of allied sectors. That determines the livelihood security in tank based villages.

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