



Policy Brief 10

Water Series

Translating Practice into Policy and Practice Changes

Tank Based Watershed Development for Sustaining Farmers Livelihoods



Tank treated under Watershed Development Programme



Treated Tank based Watershed



People involvement in Watershed Development work



Tank treated under Watershed Programme

Executive Summary

The main objective of Watershed Development Programme is to protect the land from soil erosion and prevent sedimentation of the reservoirs, tanks and the other water bodies, besides enhancing in-situ moisture regime in the soil profile and the groundwater recharge in the area. But the tank situated within the watershed which has a major stake is ignored from being included as a component

of watershed development. The tank is a larger water harvesting structure than a check dam or a farm pond and serves the purpose of impounding the rain water and recharging groundwater. Hence it has to be treated as an integral part of a watershed for all purposes of development. Both the 10th five year plan document of Government of India on development of wastelands and degraded lands and the Common

Guidelines for Watershed Development Project, Govt. of India, 2008 emphasise the importance of including the existing tanks and village ponds in watershed development project. The recommendations by the working group for 11th five year plan on water resources development, the guidelines on National Project for Repair, Renovation and Restoration (RRR) of water bodies directly linked to Agriculture, also lay stress on the importance of tanks and other small water bodies in Watershed Development Programme. Restoring the existing water bodies is less expensive than building new ones. Focus on enlisting community participation and its contribution will lead to the revival of community spirit and management of common property resources like tanks and ponds. Strengthening local institutional arrangements and supplementing funds from other related programme like the National Rural Employment Guarantee Programme (NREGP) into watershed development will facilitate periodical maintenance of watersheds and the water resources. Special attention is needed to address the inclusion tanks in watershed development

programme for comprehensive conservation and development of all available water resources.

DHAN Foundation through the Vayalagam Programme was able to successfully demonstrate the implementation of Tank based Watershed Development in collaboration with Andhra Pradesh State Government, NABARD and Indian Tobacco Company (ITC). It has also demonstrated the impact of Tank based Watershed Development in a cascade approach (Chain of tanks/micro watersheds), wherever possible, as it gives greater benefits than the isolated tank rehabilitation.

This brief deals with the need for inclusion of tanks and other water bodies in the watershed development and converging of funds from various other development programmes for its complete implementation. Based on the field experiences of DHAN Foundation and the recommendations of seminars and workshops, suggestions are given for making some changes in policies and practices to Govt. of India, State Governments and Panchayat Raj Institutions, as well as academic institutions, for adoption in their developmental and research activities in future.

Summary of suggested changes in policies and practices

Present Status / Existing Policies / Guidelines and Practices	Changes suggested in Policy and Practice
1. Ministry of Water Resources, Government of India	
<p>The 11th five year plan working group recommendation on water resources suggests that where there are minor irrigation tanks, minor surface lifts etc., in the command, they should be integrated with major project works and are not to be treated as separate entity. The old water bodies should be taken up selectively in 11th five year plan period and given due consideration for community requirement as well as their efficacy in serving the purpose of irrigation.</p> <p>In the guidelines on National Project for Repair, Renovation and Restoration (RRR) of water bodies directly linked to Agriculture, GOI, Ministry of Water Resources, 2005 - states that the State Government concerned shall take up</p>	<p>On the same analogy of the recommendation by the working group of 11th five year plan on water resources, old water bodies and minor irrigation tanks situated within a watershed need consideration for development along with other watershed development measures.</p> <p>The major ongoing development scheme under which smaller water bodies can be renovated will be the watershed development scheme being implemented in various states. Similarly, the periodical maintenance of small water bodies and their feeder channels can be undertaken under NREGP.</p>

restoration of water bodies having original irrigation cultivable command area from 40 hectares upto 2000 hectares, to augment and utilise their storage. With regard to water bodies having original irrigation cultivable command area of less than 40 hectares, it states that they are to be covered under other ongoing development schemes/existing schemes at State level.

Watershed development work ends within the stipulated project period as sanctioned in the project guidelines. But continuity of the project would provide livelihood sustainability with people's maintenance.

The 11th Five year plan working group recommendation also suggests that minor irrigation provides plenty of scope for employment of unskilled labour force. It is therefore important to link NREGP with minor irrigation. The recommendation also suggests the revival of water bodies in disuse, by improving inflow, augmentation of storage and improving the efficiency of the systems.

Common Guidelines for Watershed Development Project, GOI, 2008: Some of the relevant recommendations made in these guidelines are that repair, restoration and upgradation of existing common property assets and structures (such as village tanks) may be undertaken to obtain optimum and sustained benefits from previous public investments on traditional water harvesting structures.

Special attention is therefore needed at state level to allocate funds from watershed programme for rehabilitation of all water bodies situated within the watershed, simultaneously supplementing funds from other water resources and related development projects.

Pilot project/special project could be taken up funded by National Horticultural Mission, National Agriculture Development Programme (NADP) etc., for the promotion of livelihood activities like raising horticultural crops, community nursery etc.

Trust needs to be built up with people's movement to enhance their stake and motivation for implementing each and every phase of watershed programme in order to improve the transparency in implementation of watershed activities.

Promotion of monitoring and water information system is required as a part of Government policy for the detection and recognition of the adverse impact, such as falling water table due to over extraction of groundwater and damage to structures due to negligence of maintenance. This will be useful for planning the treatment of watersheds in future projects.

Special attention is needed to raise/allocate funds from various programmes as a policy measure. NREGP and RLEGP funds should be made available to user groups, mainly to take care of periodical maintenance activities of the water conservation structures built under watershed development projects. Supplementing funds from various programme into watershed programmes and linking it with NREGP has to be considered.

The design of watershed development projects should include restoration of traditional water harvesting structures. Renovating them is less costly than building new structures and it would also provide quicker benefits to the stakeholders (multiple users of the assets) as the utilization potential is readily available.

2. Ministry of Agriculture, Government of India

Rain fed Agriculture Development through conservation of rainwater is best accomplished in watershed development. The water so conserved is used for provision of drinking water for the inhabitants and the livestock, besides agriculture.

In rain fed farming areas, a comprehensive land improvement programme is envisaged at the watershed level through emphasis on improved water harvesting and soil conservation. The main approach has been through land improvement structures.

Water availability has catalysed the adoption and spread of value added activities to improve the livelihood of farmers.

Common Guidelines 2008 on watershed project issued by Government of India have come up with the decentralisation of procedures, active involvement of watershed community in planning, implementation/execution, maintenance and evaluation of the programme. The important activities included in the guidelines are development of water harvesting structures such as low cost farm ponds, nalla bunds, check dams, percolation tanks and ground water recharge wells, bore wells and similar other measures.

Tank based watershed development project helps to supplement the in-situ moisture in the soil along with the storage of rain water in the existing water bodies (tanks) to stabilise rain fed agriculture during periods of long dry spells. Hence inclusion of rehabilitation of tanks as a part of watershed program is essential.

Cropping systems need to be planned and advocated to suit different rainfall cum soil zones.

Strengthening of local institutional and infrastructure arrangements for processing of value added products and marketing is needed for long term sustainability of development and livelihood.

Watershed projects need to be planned and implemented on a contiguous and cluster basis, with the local community getting involved right from their initiation up to completion of the project and thereafter for maintenance as well, choosing the type of work appropriate to the locality and context.

Present Status / Existing Policies / Guidelines and Practices

Changes suggested in Policy and Practice

The Common Guidelines (Para 9.6 and 9.7) have emphasised on convergence of funds from various schemes through State Level Nodal Agency.

Convergence of funds from various departments for all watershed development activities and for training, where tanks form part of watershed is necessary. Special efforts are needed from State and District level agencies for convergence of funds from relevant schemes at project level.

Watershed Associations and local Panchayat Raj Institutions (PRIs) should have flexibility and capacity to mobilise resources on their own from various sources, to build up their revolving fund for maintenance of tank/watershed development works.

3. Ministry of Finance, Government of India

Investment in the minor irrigation sector has come down from 3.35% of total allocation during First Five Year Plan to 1.61% in Tenth Five Year Plan. Twelfth Finance Commission has recommended that Panchayats are to be encouraged to take over water supply assets and recommended an allocation of Rs.20,000 crores for improving the service delivery by Panchayats in respect of water supply and sanitation.

A part of the fund allocated by the Twelfth Finance Commission for improving the service delivery by Panchayat for water supply and sanitation can be utilised for tank rehabilitation in places where drinking water from tanks for domestic usage is in practice.

4. Planning Commission, Government of India

Tenth Five Year Plan document of GOI on development of wastelands and degraded lands recommends the importance of people led approach and inclusion of existing village ponds and other water bodies in the watershed projects.

Tank based watershed development programme which precisely advocates this important recommendation of the 10th five year plan has to be implemented during the future five year plans as well, in order to enhance the efficacy of water bodies through reduced sedimentation and increased storage capacity.

5. NABARD

RIDF, Watershed Development Fund, Tribal Development Fund and Hariyali guidelines do not provide flexible approach for tank based watershed development.

The common guidelines on watershed development provides adequate flexibility according to the context for implementation of tank based watershed programme. As a policy all Government and Non Government agencies may follow this.

A flexible approach is needed for the convergence of funds from the respective programme

6. Ministry of Rural Development, Ministry of Water Resources, Government of India and Rural Development Department, Andhra Pradesh State

Convergence guidelines of NREGP, Ministry of Rural Development and Programme of Ministry of Water Resources as suggested in common guideline will be mutually beneficial. Such convergence will facilitate the full utilisation of the water resources

State Government departments, especially Rural Development Department and Irrigation Department at State level have to work together to follow the common guidelines, areas of work, especially related to development of water resources.

7. Department of Agriculture and Co-operation and Department of Rural Development, Government of Andhra Pradesh (Panchayat Raj)

Lack of collaboration among the Watershed Associations and local Panchayats has created a gap, which in turn affects the overall development of the tank systems & the focus on watershed development.

Limited co-ordination between tank associations/watershed associations and line departments is another issue that requires attention.

Induction of the tank user committee members in the working group of Panchayat on water related programme will bridge the gap. It is to be included as a policy in the Rural Development Department.

There is need to bring an effective interface between people's institutions promoted in watersheds and concerned line departments of government in order to bridge the gap.

Watershed committee being a people's institution, there is needed to give proper role and recognition for it in the local Panchayat. Watershed plus activities need to be carried out by the watershed committees on a continuing basis instead of closing them after implementation of physical works.

Watershed development requires an integrated approach for bringing comprehensive development. It will become possible through ridge to valley approach and revival of tanks and other water bodies in the watershed through cascade approach.

8. Irrigation and Command Area Development Department, Government of Andhra Pradesh

Implementation of World Bank aided Andhra Pradesh Community based Tank Management project gives focus on rehabilitation of minor irrigation tanks and emphasis on irrigation development

Watershed development works being undertaken by the State Agricultural Departments can with advantage be linked with tank rehabilitation works to derive synergic benefits from both the programme

in the state with the active involvement of Water User Associations (WUAs). Under this project about 3000 tanks with an estimated Cultural Command Area(CCA) of about 2,50,000 hectares spread across 21 districts of the state are proposed to be rehabilitated with sub-basin as a basic planning unit.

The District Level Implementation Committee (DLIC) approves the annual action plans of the project like watershed development in tank catchments areas

The role and responsibility of DLIC is critical to appraise the plan on tank rehabilitation work on sub basin approach. Joint planning and approval to implement both tank and watershed development work with the sub basin approach will enhance the water resources development as well as prevent rapid sedimentation of water bodies.

9. PWD (Water Resources Organization), Planning and Finance Departments, Government of Tamil Nadu

World Bank aided Tamil Nadu “Irrigated Agriculture Modernisation and Water Bodies Restoration and Management (IAMWARM)project is being implemented through contractors in Tamil Nadu.

NGOs/WUAs should be given the responsibility to plan and implement the project, so that the community participation can be enhanced at the field level and post rehabilitation operation and maintenance works can be ensured to sustain the benefits.

Greater stress on river basin approach is needed by Minor Irrigation Tank Development to meet the domestic needs of people and livestock and ensure the livelihood of small and marginal farmers.

10. Department of Agriculture, Rural Development Department and Public Works (Water Resources)

Common watershed guidelines 2008 contain important features like

- Delegating powers to states
- Building dedicated institutions through shifting powers from district level to village level
- Cluster approach
- Livelihood focus
- Scientific planning
- Involving PRIs
- Involving NGOs

State departments can follow these guidelines based on the context and implement the watershed and water resources development projects to maximise the effectiveness of those projects.

The convergence guidelines introduced by GOI between NREGP and Water Resource Organisations have to be considered to ensure flow of funds and activities. For that to happen, joint planning between the departments of Rural Department, Agriculture and WRO is necessary.

11. Department of Fisheries

Fishery Department / FFDA collects the revenue from fishery activities in tanks. The WUAs are unable to utilise the revenue derived from inland fishery

Usufruct rights for raising fish in water bodies should be given to WUAs with a provision to share the profit with local Panchayat on a mutually agreed basis. That will enable the WUAs and the Panchayat to use part of the revenue so generated for long term maintenance of the completed works.

Agreement between PRI and WUA is to be facilitated to access the usufruct rights for raising and selling fish and for maintaining the tank / watershed development works.

12. Department of Forestry

Forestry department has stake on the trees grown on the water spread and foreshore areas and tank bunds. Hence the people are not allowed to cut the trees and utilise the sale proceeds for operation and maintenance of tank irrigation systems.

Usufruct rights should be given to WUAs along with local Panchayat for raising and preserving trees in the common lands of water bodies. Resources mobilised from fodder as well as felling of mature trees should be used for the maintenance of tanks and the village development.

13. Scientific, Research and Academic Institutions and NGOs

Many scientific, research and academic Institutions & NGOs are showing interest in field oriented and action research studies. They need information on problems that could be studied to benefit the community and to meet their immediate needs through action research.

Before initiating watershed intervention activity, a baseline survey and complete water balance study of the watershed, with reference to the rainfall over the past 35 years has to be made. This can be done by the concerned department with the help of academic and research institutions, NGOs and Indian Meteorological Department.

Action research project on eco-system / context based watershed programme needs to be undertaken by the research institutions/universities and competent professional NGOs, so that the blanket approach practiced presently can be made site and context specific and to include conservation of water bodies.

Tank Based Watershed Development for Sustaining Farmers Livelihoods

I. Introduction

The increasing emphasis on Watershed Development in India in the last two decades, which seeks to integrate land and water management is a direct result of the realization that the natural resource base of the country (land, water and forests) is facing severe degradation due to pressures of population and economic development. This degradation is clearly visible in the form of increased soil erosion, declining land productivity, declining groundwater table, reduction in quality and quantity of drinking water and loss of forest cover. Furthermore, frequent occurrences of floods and droughts are seen as evidence of improper land use in catchments. The primary focus of watershed protection and development in India to date, has mainly been on reversing the negative impact of land degradation on the rural poor at the local level rather than at a wider macro scale (Kerr and Chung 2001).

India shares about 16 percent of the global population but it has only 4 percent of the world's total water resource (Planning Commission 2001, Government of India). The Government has long recognized water as one of the most limiting resources to development. In 1987, a National Water Policy was enacted, and this has been reviewed and updated as National Water Policy, Government of India, 2002. The focus of this policy is on improving water resources to meet the identified water based priorities such as drinking-water, irrigation, hydropower, ecology, agro-industries and non-agricultural industries, navigation and other uses.

The National Water Policy advocates Watershed Management and increasing forest cover as a means of conserving water.

Rainwater harvesting includes three components: a watershed area to produce runoff, a storage facility (soil profile, surface reservoirs, or groundwater aquifers), and a target area for beneficial use of the water (agriculture, domestic, or industry). Community based rain water harvesting has traditionally been practiced in

India. Tanks were built and maintained under the leadership of kings, temple committees or local lords. Common pool resources, including rivers, streams, forests and grazing areas were also maintained in good order. Any income generated from them was used to pay for their maintenance in particular and village development in general. For various reasons the maintenance of these common property resources has suffered in recent years. Individual land owners have also traditionally tried to capture and retain rainwater on their land by building water harvesting structures, such as field bunds, ponds, open wells, check dams and infiltration areas. These structures augmented the moisture content of the soil and increased crop production. These measures are extended through the soil conservation programme of the Central and State Governments from time to time. During the 80's land conservation activities have culminated into an integrated watershed development programme. (Reddy and Reddy)

Historically, ever since the breakdown of traditional resource management systems took place during the colonial times, regulation of water has been the main approach followed for natural resource management of the government agencies in India (Guha 1991, Gadgil & Guha 1992).

Evolution and Genesis of Watershed Development in India

In India most of the cultivated area is rain fed and hence to improve the productivity and to sustain the people living in those areas, watershed programme are initiated by the Government. The main aim of the watershed programme is to conserve soil and water, to obtain optimum productivity per unit of water used for crop production, maximize the storage of rain water in the watershed and increase the ground water potential and thus improve the livelihood of people. These works are proposed to be carried out by conserving the natural resources in the area. These programmes which were hitherto implemented by government line departments alone are now given a new shape as participatory

programme with the local community as the primary stake holder. During 2003 the Hariyali guidelines were updated by involving Panchayat Raj Institutions (PRIs) and the local community in watershed programme

Watershed development programme are considered as holistic village development programme and are aimed at developing land, water and other natural resources with the participation of relevant stake holders. Water conservation and land development are best accomplished when they are taken up on watershed basis. The watershed being a natural hydrological unit, any intervention to store the rainwater or moderate the runoff, responds very favorably when the programme is organized on watershed basis. Watershed management has emerged as a new paradigm for planning development and management of land and water and biomass resources with a focus on social and institutional aspects apart from bio-physical aspects, by following a participatory “bottom-up” approach.

Stake holders in watershed implementation

Watershed programme in India are mostly implemented through various departments such as Ministry of Rural Development, Ministry of Agriculture, Ministry of Land Resources and Ministry of Environment and Forests. Apart from these departments, corporate houses also fund the implementation of watershed programme. For example M/s. ITC “Mission Sunehra kal”, M/s. Hindustan Unilever, M/s. Jain Irrigation Systems and M/s. TVS Motors are involving themselves in watershed management. NGOs act mainly as project implementing agencies.

The allocation of funds with defined guidelines to develop watersheds in an area development approach has always been the focus of Government of India. The efforts by the government are quite encouraging. Yet there are serious concerns on implementation of Watershed programme without building the social capital and empowering the people towards sustaining the efforts taken. There are three major streams of stakeholders that get involved in Watershed development process. They could be categorized into Supply Stream, Demand Stream as well as Enabling Stream with clearly defined roles and responsibilities.

Need for Tank based Watershed Programme

Why tank based watershed development?: Tanks are water harvesting structures which capture and store the runoff from monsoon rains for later use by crops and to meet other multifarious needs of the local community. They are usually constructed across the streams and sloping lands in undulating terrains. Tank is considered as an important water resource for rural people. It is not only a physical structure but also a social phenomenon, for it is at the centre stage of an agrarian economy and society. Tank fulfils the multiple livelihood needs in an area by supporting different users. A range of users viz., farmers, livestock, birds etc depend on the tank either directly or indirectly.

In Watershed development programme, the Government as well as some NGOs ignore the small scale water resources like tanks, because they are considered by them as irrigation structures like reservoirs and canals. The Watershed development programme give importance to treating the upper part of a micro watershed and to creating new water harvesting structures like farm ponds, percolation tanks lower down and with appropriate soil and moisture conservation measure check dams along the drainage lines. The main objective of watershed programme is to protect the land from soil erosion and prevent sedimentation of the reservoirs, tanks and the other water harvesting structures, besides enhancing in-situ moisture regime in the soil profile and enhancement of ground water recharge in the area. But the tank which has a major stake on the watershed treatment is ignored from being included as a component of a watershed. An existing tank or cascade of tanks within a watershed captures the rain water runoff and conserves it for later use, which would otherwise flow down the gullies and streams and mostly get evaporated or otherwise dissipated.

The tank is a larger water harvesting structure than a check dam or a farm pond and serves a similar purpose of impounding the rain water and recharging groundwater besides providing supplemental or life irrigation to rain fed crops. A tank is also a water source for use by livestock and a sanctuary for birds. It improves the biodiversity and the ecosystem of the area. Tanks act as drought mitigators and also as flood moderators at a basin or a large watershed level. Thus the tanks

and ponds serve the main objectives of watershed development and hence have to be treated as an integral part of a watershed for all purposes of development. There is a school of thought which apprehends that, while watershed development works in an area help to retain more in situ moisture and a part of surface run off in farm ponds and check dams, there would be a correspondingly lesser runoff flowing into the existing water bodies situated lower down in the watershed. That being so, investing in construction of new water bodies in such watersheds will not be hydrologically a good proposition.

Where already an adequate number of tank structures exist in a watershed for storing runoff water, the potential benefits from constructing more and more artificial water harvesting structures like farm ponds, check dams and percolation tanks need to be examined carefully before embarking upon large scale construction of those structures, as they would be able to only share and store the available runoff and not augment it.

Besides, presently the cost of creating a new water body to serve a hectare of irrigated area is about four to six times the cost of revival of an existing tank to its original design standard and performance level. Therefore the existing tanks should be developed as an integral component of the watershed, as such works will be both cost effective as well as be more useful than creating new structures.

Hence the advocacy for tank based watershed development which will be both cost effective and will preserve these shallow and small water bodies from sedimentation caused by soil erosion from their catchment's areas.

II. DHAN Foundation's Experience in Tank based Watershed Development in Andhra Pradesh and Tamil Nadu States

DHAN Foundation has been implementing tank based watershed in Tamil Nadu and Andhra Pradesh in collaboration with government agencies like DPAP Department of Agricultural under NWPR, NABARD. DHAN has developed around 70 tank based watersheds in Tamil Nadu and 15 tank based watersheds in Andhra Pradesh. In

Tamil Nadu eight districts namely Madurai, Sivagangai, Tuticorin, Ramnad, Vellore, Thiruvallur, Kancheepuram and Viruthunagar under NWDPR, NABARD - WDF and ITC-RD trust and two districts namely Chittoor and Nalgonda have been covered in Andhra Pradesh with the support of DPAP and RIDF of NABARD. With more than a decade of experience in working with tank based watersheds, DHAN would like to bring the leanings and outcomes for policy changes and approaches in watershed development.

Tank Based Watershed: Development Approach

Tanks by design are a part of the watershed, when their catchment's area, water spread and command area lie within the watershed. The tanks are rain water harvesting structures like the farm ponds and percolation tanks built by our forefathers. DHAN Foundation therefore decided to include tanks as a part of a watershed. The steps adopted for tank based watershed development are as follows:

- Institution building in a nested institution model
 - Promotion of water users associations at village level with each family as a member
 - Promotion of watershed associations and committees at watershed and tank cascade level with representation from all the village level interested groups.
 - Promotion of federation at Mandal or district level with all village level associations
- Capacity building of the local community through awareness creation, trainings and exposure visits.
- Mobilization of people's contribution in cash or labour, up to the limit specified in the project guidelines, for stake building.
- The treatment: Watershed development works are undertaken from ridge to valley in order to provide the optimum benefits.
 - Rehabilitation of existing small scale water bodies like ponds and tanks, both individual and cascade of tanks

- Taking up insitu soil and moisture conservation measures to prevent soil erosion and to induce moisture conservation in the soil profile and farm ponds to store rain water within the land holdings.
- Horticulture development and Afforestation works in order to improve vegetative cover and bio mass production thereby addressing ecological balance.
- Agriculture development through information dissemination on appropriate methods and techniques for effective land and water use, collective input procurement, promotion of Primary Producers Groups (PPGs) etc.,

An Overview of DHAN Foundation's experience in Chittoor and Nalgonda Districts of Andhra Pradesh and Sivagangai District of Tamil Nadu

1. Chittoor District

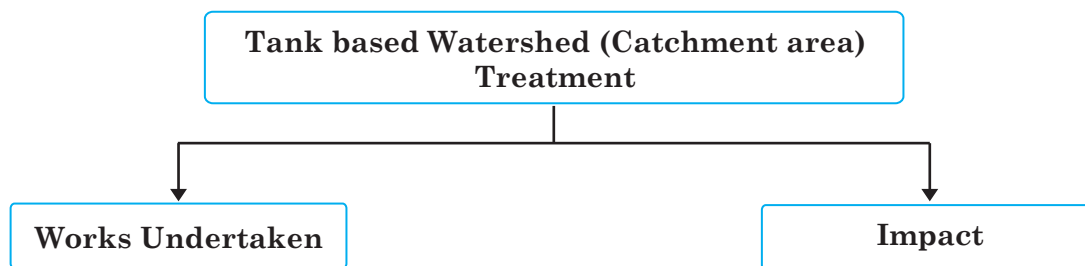
Chittoor, a historically well-known district in Rayalaseema region of Andhra Pradesh lies in the rain shadow area and is consequently drought prone. The geographical area of the district is 15,152 sq. kms. (5.5% of the state total).

Tanks in Chittoor district

Even though the district has only a limited number of irrigation projects, it is well endowed with a vast network of tanks. The natural undulating topography of this area is well suited to form many individual as well as cascades of tanks. Many of the tanks are ancient and have been constructed during the times of Vijayanagara kings and Zamindars and subsequently by the British rulers.

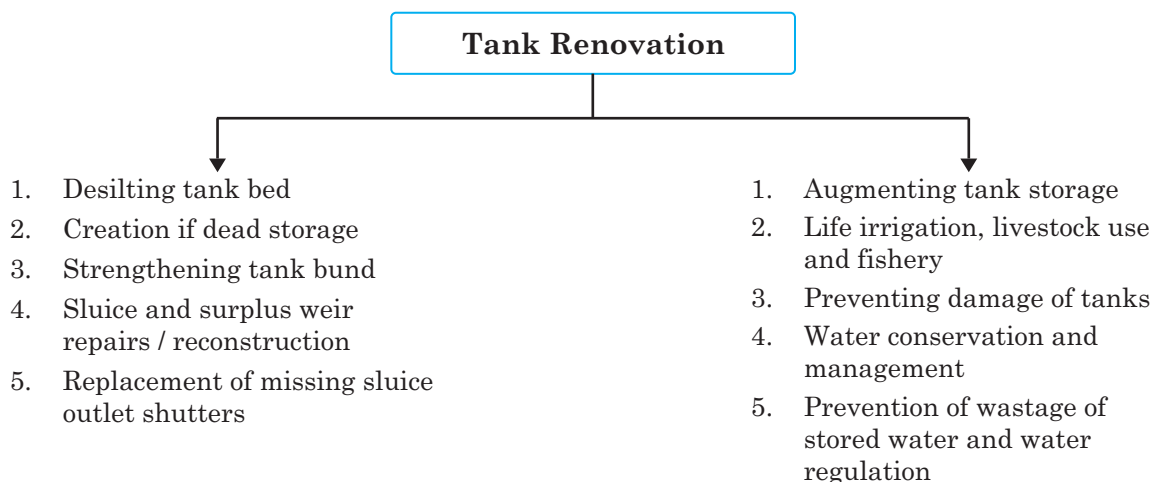
The district has a high density of Minor Irrigation (MI) tanks numbering 8814 with a total command area of 104373 hectares. These tanks are under the control of Irrigation Department and Panchayat Raj Department. Being a drought prone area, the tanks play a major role in agriculture in this district. Apart from direct irrigation, these structures recharge the ground water. During 1997, DHAN Foundation organized a workshop on Tank Rehabilitation at Hyderabad and a presentation was made to the senior government officials to incorporate tanks, ponds, supply channels and other water bodies as part of the watershed development works. During 1998 the tank based watershed programme was launched and so far fifteen watersheds in the region have been developed.

Development works undertaken and their impact



1. Field Building
2. Contour trench, Gully control
3. Afforestation
4. Desilting of feeder channels to tanks
5. Creation of small water bodies
6. Tank silt and FYM application
7. Horticulture plantation
8. Ground water recharge

1. Erosion control and moisture conservation
2. In. situ moisture conservation
3. Bio mass production, regulation of runoff flow additionally those measure have substantially minimized the sedimentation in tanks, ponds and reservoirs
4. Augmenting in flow of water into water bodies
5. Water conservation
6. Enriching the soil fertility and modifying soil texture
7. Increased income
8. Water table rise in wells



Tank based Watershed Development in Chittoor district - Success at the Grassroots

- Totally around 8000 hectares of land were benefited through 13 tank based watersheds covering 10 villages.
- Around 5000 farmers were organized into 99 village level associations with 186 Micro Finance Groups (MFGs)
- A sum of Rs.239 lakhs was leveraged from DWMA for watershed development with people's contribution of Rs.35.9 lakhs and capacity building of 80 user groups was undertaken.
- Funds leveraged for other development activities
 - Credit for MFGs through bank linkage - Rs.105 lakhs
 - Endowment for associations - Rs.6 lakhs from donors like NOVIB and Sir Ratan Tata Trust.
- Totally 870 small water harvesting structures (Farm ponds and percolation tanks) were created for agriculture development
- Around 1500 farmers were covered under social security for life.
- In watershed treatment, importance was given for vegetative barriers and earthen and stone structures rather than for cement structures like masonry check dams.
- Generated employment opportunities for the weaker sections viz landless, marginal and small farmers.
- Silt application to dry lands from tanks has become a very useful activity in all watersheds. Silt has been applied over an area of 445 ha of dry land and in turn 84,000 cu.m of additional storage space was created in 40 tanks. Agriculture interventions like tomato seed production, introduction of alternate cropping such as groundnut and horticulture development with mango, sapota, jamoon and acid lime were undertaken.
- Fodder and bajra napier grass cultivation have been raised in 15 ha.
- Constructed farm ponds to prevent lowering of water table and conserve providing for cattle feed. water scarcity followed by income generation activity like fish rearing etc.,
- For small and marginal farmers, vegetable cultivation practices were introduced on tank bund and bed, like tomato, chilly, brinjal, and snake-gourd, to get additional income for their livelihood.
- Bund cropping was introduced on the tank bunds and on the bunds of the farm ponds for additional income generation.

- A mandal level Farmers' Federation was promoted in the name of "Punganur Mandala Vayalaga Rythula Samakhya" to provide capacity building for multilevel monitoring and sustaining the development works.
- Out of 15 Watershed Committees formed for the implementation of the tank based watershed development programme, 10 Watershed Committees were formed exclusively with women by giving due importance to gender issues.
- About 500 farmers have started growing crops for one season additionally due to the water available from the water harvesting structures, and another 400 farmers have received assured water supply at least for one crop.
- The synergistic effect of undertaking tank based watershed programme appeared to be quite high as compared to the benefit from each individual programme, (Tank renovation and watershed development being complementary to one another.)

2. Nalgonda District

Nalgonda District is spread over a geographical area of 14.24 lakhs hectares has 15 blocks with 59 mandals. Six mandals are in the Krishna River basin and while the rest reel under drought. The district's average annual rainfall is about 740mm, received mostly during may October. The monsoons are erratic and dry spells are long. There are 4434 small tanks each with less than 40 ha of command area. Many of them are in chains with the terminal tanks draining into small river systems. As per 1992-93 data, irrigated a gross area of 17,697 hectares but this has reduced substantially.

Irrigation: The district's topography makes irrigation from canals, tanks, wells and streams feasible. Nalgonda's chief sources of irrigation are Nagarjunasagar, the Musi, the Dindi, the Asif Nagar, the Pendlipakala and the Shaligowravaram project, beside a good number of tanks and wells.

As most tanks are heavily silted, the main irrigation source is ground water, which is being pumped out through bore wells. The Season and Crop report of 1992-93 shows that 1,29,411 ha irrigated with ground water, out of a total irrigated area of 2,82,566 ha. Even so many farmers most of been small and marginal suffer as they depend on rain-fed agriculture to grow castor, red gram, jowar, bajra, cotton and chilli for their livelihoods.

Since 1995-96 the district administration has been implementing a revised watershed development programme in all the nine DPAP

blocks covering 35 mandals. The 334 watersheds cover 1.70 lakhs ha in 180 villages.

Given its long experience in renovating tanks, especially chain of tanks, DHAN was invited by the Nalgonda district administration in June 2000 to study the status of the tanks, and to enumerate the steps needed to restore their original capacity and performance. Finally, a joint decision was taken to revive the Gundrampalli and Aipoor tank cascades in Chityal mandal.

Gundrampalli and Aipoor tank Cascades

The rehabilitation of the tank cascades were based on the following criteria:

- The extent of tank cascade degradation and the scope for restoring its original standard
- Scope for getting adequate water for the tanks
- Scope for recharging ground water
- The number of small and marginal farmers, including those from the Scheduled Castes, who would be benefited
- Willingness of farmers to contribute cash or labour towards a part of the rehabilitation work.

Impact on the performance of the tank systems

None can doubt that the supply channels are the main conduits for water to flow into the tanks. The supply channel reclamation works done in Aipoor Cascade and Gundramaply Cascade had a spectacular impact on those systems. Cleaning and deepening the supply channels ensured that the rainwater runoff from the catchment areas

reached the tanks and was available for stabilising rainfed agriculture.

Weeds were a serious problem in almost all the tanks where the dense weeds reduced the storage capacity. The tank bed desiltation work eliminated the problem considerably. With reclaimed supply channels the water from subsequent rains got stored in the tank. The earth removed during desilting was used to strengthen the tank bunds.

Another major impact of the project was on the ground water table. The farmers could see the water level rise in the near-by wells. In the ayacut area of Kammaravani kunta, the water table increased by up to 1.2 meters. In the shallow bore wells, the farmers noticed a steady inflow of water. It provided them water for an assured crop yield for the next two seasons.

Impact on village economy and village development

The crops in this region were often affected for want of water, particularly during the critical stages of crop growth. So the higher water storage in tanks and improved performance of the system and the bore wells provided dependable water supply. Soon crop failures became a thing of the past.

In some of the villages the command area would be left uncultivated fully or partially due to lack of water in the tanks. Soon after the rehabilitation the area received good rains. The 273 ayacutdars were able to get good crop yields during both the seasons in 2004 -2005, some of the farmers after several years. It also provided farm labour to work in the villages. The rehabilitated tank systems had become an asset that raised the productivity of agriculture and improved the village economy. As a direct impact the project provided jobs when the local jobs scope was nil. Nearly 40 per cent of the total expense was wages for 3695 labour-days of work in these cascades.

Livestock rearing is a major additional income generating activity of the villagers of Aipoor and Gundrampalli Cascades. The availability of water in these tanks for a longer period meant the cattle could get drinking water especially in the summer.

Details	Aipoor Cascade	Gundrampalli Cascade	Total
No of tanks	8	7	15
No of Ayacutdars benefited	191	82	273
Command area benefited in acres	191.20	82.80	274
Labour days generated			
Men	1,068	491	1,559
Women	1,767	369	2,136
Total labour days	2,835	860	3,695

3. Sivagangai district in Tamil Nadu

Singampuneri block is one of the backward and highly drought prone blocks of Sivagangai district having an area of 226 sq.km. The lifeline of the people in this block is agriculture. Therefore the productivity depends on the water availability in minor irrigation tanks. Singampuneri block has a total of 544 tanks (24 PWD, 485 PU and 35Ex. Zamin) that are in a degenerative and poor state of performance.

Project objectives: The Indian Tobacco Company (ITC)-DHAN collaborative tank based watershed and livelihood development project is a new model of sustainable development initiatives undertaken in Singampuneri block of Sivagangai district over a period of three years 2005-2008 with a total outlay of Rs.100 lakhs. The overall objective of the project is to enhance the economic development and improvement of socio-economic condition of the resource poor rural people through participatory rehabilitation and management of natural small scale water bodies i.e. tanks, Ooranies etc. and enhancing agricultural productivity.

Project coverage: The project covering 34 villages has been well received by the people of Singampuneri block with more than 50 different development activities undertaken based on the people's needs benefiting 2500 farming families.

Institutional coverage: The first and foremost importance was given to the people's institutions dependent on the water bodies with emphasis on gender participation. Several people's institutions were promoted by organising homogeneous groups

Details of the interventions made and the benefits accrued to the community are as follows:

Community	Intervention	Benefits
Tank farmers	Tank development activities including feeder channel improvement	Increased functional efficiency and regulated irrigation
	Water management in Command area	Increased cropping area and stabilised crop production
	Community well creation	Facilitated conjunctive use of surface and groundwater and improved food security
	Seed money distribution	Ensured quality seeds in time
	Best farmers award	Increased motivational level of the farmers
Dry land farmers	Creation of farm ponds	Ensured additional/life saving irrigation
	Laying of field bunds	Soil and moisture conservation and prevention of soil erosion and sedimentation of water bodies
	Avenue and foreshore plantation	Increased biomass productivity and additional income
	Medicinal plant cultivation	Diversified crop production
Land less people	Vermicompost production	Provided additional income for the family
	Neem oil extraction unit	Value added product and better livelihoods
	Revolving funds	Initiation and strengthening livelihood activities and enhanced employment generation
Whole villagers	Drinking water Oorani development.	Partially met the drinking water needs of the community
	Employment generation	Skilled and unskilled labourers get adequate employment
	Flood relief and rehabilitation	Reconstructed flood affected houses

of people having single needs as follows; Total tank users associations (Kanmoi Vayalagam) are 70; Total drinking water Oorani association (Oorani Vayalagam) are 9; Total dry land farmers associations (Manavari Vayalagam) are 3; Vayalagam Micro Finance Groups (MFG) are 55; Primary Producers Group (PPG) are 3; Cascade association (Cascade Vayalagam) are 5; Total tank command area was 2241 ha; Total dry land area was 735 ha.

Tank Rehabilitation in a cascade approach (Chain of tanks): Tanks act as flood moderators and drought mitigators. Isolated tank rehabilitation approach will yield limited benefits

in a watershed. To make tank rehabilitation more effective, all the tanks in a chain are covered to have complete treatment which would lead to the conservation of most of the rain water and runoff and ensure the filling of all the tanks in the cascade / chain. This will also protect the crops from flood damage as the chain of tanks would absorb the floods up to their cumulative storage capacity.

On rare occasions, when unprecedented heavy rainfall is received and breaches occur in the embankments of any tank in the cascade, there will be the danger of the downstream tanks also breaching due to the cumulative impact of the

flood waters. To protect the tanks from such calamities breaching sections are provided in the embankments of surplus courses, by diverting the floods into other nearby streams.

Mechanisms for sustainability of development works and people's institutions in tank based watershed: Key learnings

People's Institutions: The process of building people's institutions for watershed development among men and women is for sharing of resources and responsibilities. This is the concept that has been introduced in the tank based watershed programme of DHAN. Inclusion of the poor landless, small and marginal farmers on tank based watershed development, across caste, religion and other barriers has been the primary focus.

Promotion of Micro Finance Groups (MFGs) among tank users: For keeping the watershed tank associations active round the year (through regular meetings), undertake periodical maintenance of development works and to support the farming community in agriculture development, DHAN promotes Micro Finance Groups (MFGs) with men farmers through savings and credit. Through these MFGs, DHAN facilitates provision of micro credit for agriculture and livestock development, business initiatives etc. The sources of micro credit are the MFG savings and the corpus at village level, and linkages with mainstream institutions like commercial banks. Apart from meeting their own needs, these MFGs are contributing some portion of their common fund earnings and labour for the maintenance of the development works to ensure their sustainability.

Agriculture development through Vayalagam Agriculture Development Centers (VADC): After completion of tank and watershed development works, the follow up action mainly focuses on their conservation and effective utilisation. So DHAN initiated agriculture development centers at Panchayat or cascade level and it provided services like technical guidance, awareness creation, input supply and building marketing linkages.

Creation of endowment for tank maintenance: To rebuild the tradition of endowment, DHAN mobilizes people's contribution and a matching grant. The fund would become a

corpus and a rallying point for the villagers. The interest derived from the above source is utilised for small repairs and development works of common interest. This helps the association to become self reliant and sustainable.

Social security for tank farmers: To address the issue of vulnerability and risk the farmers face, they are mobilized for micro insurance for human, livestock and crops, in collaboration with the mainstream insurance firms like, LIC, Birla, MetLife, ICICI Prudential etc.

Cost coverage: People are made to share a part or total cost of the management service for the services provided by the institutions, which include micro finance, input supply, produce marketing and social security. This is expected to help the institutions to be self reliant in a sustainable way over a period of time without depending on external support.

Critical policy issues

- 1. Non inclusion of tanks in watersheds:** Even though water harvesting is one of the components in watershed development programme, the major focus is given to construct new structures rather than rehabilitating the existing structures - mainly the tanks and ponds
- 2. Overlapping of schemes:** Overlapping of various schemes with different guidelines affect the community organisations and also lead to some malpractices.

Key constraints in implementation

Usage of machinery: It is well demonstrated in many projects that appropriate use of machine and human power will be effective in tank rehabilitation rather than using human power alone. Works like bund strengthening or desiltation cannot be done using man power alone because of limitation of time, cost and quality of work. Also some soils are too hard for excavation by manual labour.

Rights on usufructs: Even though the primary stakeholders viz. tank user groups are contributing for and implementing the tank rehabilitation works for future maintenance, they have to depend on external funding for maintenance, because they are not in a position to utilize the income that can be generated from the

tank system. Transfer of rights over the usufructs in tanks, such as trees, fishery, and tank silt will greatly help those groups to maintain the rehabilitated works in good shape year after year.

Lack of collaboration between local Panchayats and tank associations: Lack of collaboration among the tank users and local Panchayat has created a gap which in turn affects the overall development of the tank system or village development. Induction of the tank user committee members in the working group of Panchayat for water related issues will bridge the gap.

Limited coordination between tank associations and line departments: This is a major issue from the time of implementation to management of tanks. This needs to be improved for effective rehabilitation and the sustainability of these small scale water resources the life line for the livelihood of the people.

III. Sectoral Review Analysis

An analysis of the various watershed programme and committee reports suggests the following recommendations on Tank based watersheds.

The expert committee constituted by Govt. of India under chairmanship of C. H. HANUMANTHA RAO states, based on review of the watershed projects under the Drought Prone Areas Programme, that their overall impact has been positive and significant. There has been a marked improvement in the access to drinking water in the project areas. Crop yields have risen and there has been a substantial increase in the area under cultivation in the rabi season, leading to rise in employment and reduction in migration of labour. Availability of fodder has also improved leading to a rise in the yield of milk.

When watershed development programme itself could provide so much of positive benefits, tank based watershed programme would further stabilise the productivity of crops raised and enhance the livelihood security of the people.

According to a study made on the status of water resources in India, the requirement of ground water would emerge as a critical bottleneck. The requirement of groundwater would exceed its

availability for irrigation by nearly 30 per cent. Since the requirement will exceed the replenishable supplies for irrigation at the existing rate of recharge of groundwater, it will lead to over extraction of groundwater in several states and by 2020 as much as 71 per cent of irrigated area is likely to be from groundwater sources (Chopra and Goldar 2000). Under such circumstances, replenishment of groundwater aquifers become imperative which tank based watershed programme would ensure.

Many people continue to remain skeptical about the prospects for ensuring peoples' participation on a wider scale under the government-sponsored watershed development programme, even as they are convinced from the experience of success stories that when peoples' participation is ensured, watershed development leads to a substantial improvement in the livelihoods of the people. The single most important factor accounting for the positive impact of watershed development under the government sponsored programme in different parts of the country enumerated above is community participation and decentralization of programme administration made possible under the new guidelines. This has come about on account of political and bureaucratic commitment to the new strategy. This encouraging experience points to the large potential for extending such participatory programme under government sponsorship.

When the local NGOs committed to the welfare of the society are actively involved in watershed development activities, experience shows that people's active participation would emerge.

Working Group Report on Water Resources for the Eleventh Five Year Plan 20072012, Government of India

Minor Irrigation (MI): The ultimate potential is 81.43 m.ha. The potential created is 60.42 m.ha. and the potential utilisation is 52.81 m.ha. The expenditure on minor irrigation sector during 10th five year plan was Rs. 13,775 crores. The strategy and plan set to minor irrigation for 11th five year plan by the working group is

- The financial outlay proposed for Minor Irrigation for surface water would be Rs.13,500 crores.

- The cost of creation of irrigation potential Rs. 90,000/ha
- The financial outlay for Repair, Renovation and Restoration of water bodies is Rs.11,000 crores.

The working group recommendation also includes “where there are minor irrigation tanks, minor surface lifts etc in the command, they should be integrated with major project works and not to be treated as separate entity. Such tanks should be filled with canal water as per requirement.

It is suggested that the consideration of old water bodies should be taken up selectively in 11th plan period giving due consideration for community requirement as well as their efficacy in serving the purpose of irrigation.

Minor Irrigation provides plenty of scope for employment of unskilled labour force. It is therefore very important to link NREGA with minor irrigation. The recommendation on revival of water bodies in disuse (about 72,000 tanks and storages have gone into disuse) includes improving inflow, augmentation of storages, improving the efficiency of systems etc.

Parthasarathy Committee Recommendations for Inclusion of Tanks and small water bodies in Watershed Development Programme

1. **The life of our irrigation sources themselves, whether they are dams (big, medium or small) or wells/tube wells, depends crucially on the treatment of their catchments to reduce rates of siltation, and on groundwater recharge works, which are both key ingredients of watershed development.** By reducing siltation rates through control of the volume and velocity of surface water runoff, watershed programme make a big contribution to maintaining storage capacities of not only big dams and reservoirs but also the smaller water bodies like tanks, ponds and streams.
2. **The National Advisory Council has rightly observed, “The existing guidelines for watershed development are designed basically to augment water resources through water harvesting with virtually**

no stipulation for conserving the harvested water: It is necessary that watershed programme address this important issue on livelihood by formulating programme for conserving the harvested water and using it purposively in times of need. Fisheries in newly created water sources is one such activity that could include the following components:

- Enhancing capacity of existing ponds and traditional water harvesting structures through periodic desilting and creating dead storage in them
- Entitling groups of marginal farmers and the landless to leasing rights over the newly created water harvesting structures;
- Introducing fish-cum-prawn culture with different varieties of fish suitable for different depths of pond water;

Revival of Traditional System of Water Harvesting: Implementation of a watershed programme in a plateau region with flat topography, hard rock geology and highly depleted aquifers will have to simultaneously engage with both supply augmentation as well as demand management. The priority areas are mentioned below:

1. Revival of Traditional Tanks
2. Excavation of Farm ponds
3. Construction of sub surface Dams
4. Artificial Recharge works
5. Low cost Micro irrigation systems
6. Crop diversification

As a part of ICRISATs integrated watershed program, a study was made in three watersheds Kothapally in Andhra Pradesh, Lalatora in Madhya Pradesh and Gokulpura-Goverdhanpura in Rajasthan to assess the cost-effectiveness of various groundwater recharging structures. At these sites several types of structures, viz, earthen check dam, masonry check dam, Gabion structure, stone gully plug, mini-percolation tank, sunken pit and dugout tank, were constructed and evaluated under different soil, rainfall and runoff conditions. The salient findings from the study are as follows:

- In most situations, small earthen structures are found to be most economical for recharging groundwater. The effective unit cost of water storage in small earthen check dams was in the range of Rs.12 to Rs.52 per cu.m, while in case of masonry structures it was Rs.38 to Rs.92 per cu.m.
- Compared to masonry structures, more number of small and medium earthen structures can be constructed with the project money, benefiting more number of wells and farmers (equity of benefits).
- Small earthen structures can be easily constructed and maintained by the local community, improving the sustainability of the structures. Most of masonry structures demand the help of engineers for their construction.
- Seven-years (1999-2005) of observations from various watersheds clearly indicate that the small earthen structures can withstand the high rainfall and runoff conditions and are quite stable even under these conditions.

The small and medium earthen structures play a vital role in recharging groundwater. In most of the situations, these structures will be more cost-effective and sustainable and will provide better equity in the groundwater availability. Tank bunds by and large are earthen embankments constructed and maintained with local labour. When tanks are situated within a watershed proposed for development, they have to be included as an important component of that watershed, considering the multifarious benefits they provide.

Tenth Five year Plan Document of Govt. of India on development of wastelands and degraded lands, has made the following recommendations on importance of people led approach and inclusion of existing village ponds and tanks in the watershed projects.

1. The basic objective of the watershed programme will be “holistic development, seeking sustainable livelihood security system for all life forms in the area”. There is no conflict between production systems and the need for conservation measures. The conservation measures and production systems will have to be conceptualized in the relationship of means and ends, i.e. conservation measures as means and production systems as ends.
2. The Perspective Plan emphasizes the fact that the watershed development programme will have to become a people's movement in order to succeed.
3. The new paradigm of Watershed Plus recognizes the need to involve the community as a necessary condition for the sustainability of a watershed programme. Watershed development is not just a technical project but encompasses a social programme as well. The inclusion of women and vulnerable groups and a strong focus on equity is what distinguishes the Watershed Plus approach from previous watershed programme. The programme seeks to ensure convergence of all other programme that promote economic activities and generate increased employment opportunities.
4. Rainwater harvesting and conservation would be the focus of development planning in this context. Use of indigenous technology and local materials would be promoted. Construction of check-dams in the lower reaches of water sources is expensive and its benefits are restricted. A series of small structures for water harvesting in the watershed area would be undertaken to reduce costs and maximise benefits from watershed projects. The existing village ponds and tanks that have got silted over the years will have to be desilted on a priority basis during the Plan period. Rainwater management should also take into consideration multiple uses of water such as drinking, domestic use, livestock and irrigation requirements. Equitable distribution of water should be a part of the water management policy.
5. To tackle the rapidly declining water table and prevalence of dry conditions in many parts of the country, traditional methods of harvesting and conservation of water will be encouraged. During the Tenth Plan, existing village ponds, tanks and other harvesting structures would be restored in a campaign mode by involving PRIs, NGOs and Self-Help Groups (SHG).

Tank based watershed development programme precisely advocates these important recommendations of the 10th plan to be continued over the future plans too.

SANDEE Policy Brief: A study made by Balasubramanian and Selvaraj (2004) suggests that

- Private wells and tanks are complementary to some extent, and both are required for agricultural growth. However, the current imbalance in irrigation investments, with subsidies for private wells and gradual neglect of tanks, needs to be rectified.
- Stricter implementation of existing rules related to optimal number of wells and well-digging would go a long way in decreasing the imbalance between government supports for private wells versus public tanks.
- Ongoing watershed and wasteland development programs should be linked to tank up gradation to promote integrated water harvest and management regimes.
- The poor are very dependent on tanks. It is appropriate therefore to consider tank productivity as an integral part of the government's poverty reduction efforts, and, to invest in various aspects of tank maintenance.

Common Guidelines For Watershed Development Projects, Government of India, 2008 have raised hope among state governments and civil society institutions that a radically new watershed programme is being formulated.

Some of the relevant recommendations made in these guide lines are presented below.

- Detailed resource-use agreements (for surface water, groundwater and common/forest land usufructs) among user group members in a participatory manner, based on principles of equity and sustainability need to be worked out by the user groups even during the preparatory phase.
- Repair, restoration and up gradation of existing common property assets and structures (such as village tanks) may be undertaken to obtain optimum and sustained

benefits from previous public investments and traditional water harvesting structures.

In the watershed works phase one of the important activities included in the guide line is

- Development of water harvesting structures such as low-cost farm ponds, nalla bunds, check-dams, percolation tanks and ground water recharge through wells, bore wells and other measures.

The design of watershed development projects should not ignore traditional water harvesting structures. Projects can gain a lot from supporting the rehabilitation of traditional water harvesting structures. This is less costly than building new structures and gives a focus for communities' contributions and participation. Reviving community structures can lead to the rebirth of community spirit and community management, things that are crucial to sustaining the achievements of watershed projects.

Watershed Development in Andhra Pradesh A Policy Review: Livelihood-Policy Relationships in South Asia Working Paper 5 by Oliver Springate-Baginski, makes the following recommendation

Key Policy Issues and Relationship with Livelihoods: In the light of successful experiments the watershed development model has gained currency. In rainfed farming areas, a comprehensive land improvement programme at the watershed and micro-watershed level, through emphasis on improved water harvesting and soil conservation, will lead to the sort of agricultural productivity benefits associated with irrigated areas, as well as securing drinking water supplies. The main approach has been through land-improvement structures such as check-dams, infiltration dams and contour trenching amongst others. Traditional water harvesting and soil conservation structures, as well as tree plantations may also play a role. From the initial conditions, with these land-improvement structures, and given sufficient rain over a number of years, it is anticipated that the ground and surface water will recharge giving an improved hydrological regime. This in turn will allow more ground and surface water extraction, an extension of irrigated area, double and even triple cropping, and so higher land productivity.

This should lead to a more dynamic village economy and diversified livelihood opportunities. It is also hoped that agricultural practices may move onto a more sustainable basis - with less water-demanding crops.

The watershed development policy, as it has become manifest in the most recent DPAP approach, has six stated technical aims:

- Regenerate, preserve and utilize natural resources (water, soils vegetation) sustainable.
- Improve the catchment protection, reduce erosion, improve moisture retention in priority catchments.
- Ensure community participation throughout the project cycle.
- Establish and strengthen local institutions so that they are able to support the local population.
- Increase employment opportunities and level and security of incomes including those of poor families and landless and women.
- Increase alternate livelihood opportunities with specific focus on women, poor and landless.

Patterns of Livelihood Dependency on Resources: The watershed programme envisages a great opportunity for improving the productivity, profitability and sustainability of dry farming areas through social mobilization. Water resource development, management, harvesting and equity in sharing, form the nucleus of watershed development (GoAP, 2001). With assured availability of water, farmers become motivated to accept more profitable, sustainable and innovative farming systems. Water availability has also catalysed the adoption and spread of value-added activities in the entire area of the watershed, such as horticulture. Cropping systems need to be tailored to suit different rainfall-cum-soil zones. Watershed development is the only solution to ensure drought proofing and to mitigate the distress caused by frequent droughts (GoAP, 2001).

There are wider issues which have been highlighted in the study as follows:

Watershed development is essentially a community based developmental programme

Whilst watershed development is associated with physical infrastructure and technology (the success of which is well established), watershed management is an institutional approach, which implies a particular participatory philosophy. The participatory philosophy of watershed management is proving to be the main constraint for the widespread success of the programme in mobilising local people on a sustainable basis. Strengthened local institutional arrangements may be needed to ensure the watershed treatment measures are maintained after external support is withdrawn.

In tank based watershed development programme people are formed into primary stakeholder groups and their contribution as well as active participation is automatically ensured. As these groups will be involved even in the preliminary planning exercises as well as the implementation activities, they would easily be taking over the maintenance of the watersheds including the rehabilitated tanks and ponds within the watershed.

In the Proceedings of the Assam Regional Workshop on watershed management on “Rethinking watershed development in India: strategy for the twenty-first century” Sharma comments as follows.

Watershed management needs to take a multipurpose approach to improving land and increasing water availability for crop growing, livestock and human use through soil and moisture conservation measures. An effective watershed project should aim to drought-proof areas by capturing every falling raindrop. This is technically possible.

The experiences of watershed development projects have been quite varied. The few successful projects are outnumbered by the many unsuccessful ones.

A few community groups have taken the initiative themselves with some external assistance. For example, the villages of Sukhomajri in Haryana and the Chakriya Vikas Pranali scheme in Jharkhand have improved their socio-economic

conditions in a relatively short time by linking improved in situ moisture conservation with economic activities that build up social capital. These examples show that watershed development is a viable model for the economic development of poverty-stricken rural areas.

Guidelines On National Project For Repair, Renovation and Restoration of Water Bodies Directly Linked To Agriculture, Government of India, Ministry of Water Resources, 2005

Through the ages, Indian agriculture has been sustained by natural and man-made water bodies such as lakes, tanks, ponds and similar structures. It has been estimated that there are about five lakhs water bodies/tanks used for irrigation. Many of them have fallen into disuse and are in urgent need of repairs. These water bodies have been a part and parcel of minor irrigation in the country under which even today two-thirds of irrigated agriculture is covered in our country. Such Minor irrigation schemes generally suffer from problem of loss of storage due to silting of the tanks, poor maintenance and management, encroachment etc. Damage to various structures, inadequate surplussing arrangements, silting are some of the reasons for deteriorating conditions in the irrigation system. It is necessary to restore the storage capacity of water bodies with the purpose of recovering their lost irrigation potential.

The States shall take up restoration of water bodies having original irrigation cultivable command area of 40 hectare up to 2000 hectare, to revive, augment, and utilize their storage and irrigation potential. Water bodies having original irrigation cultivable command area of less than 40 hectare are to be covered under other ongoing schemes/existing schemes.

Community involvement for project implementation and handing over of project to community on completion of project: Active community participation is necessary to ensure optimum utilization of assets and facilities created under the proposed scheme and, to sustain the scheme on long term basis.

The WUA will include all stake holders associated with the tank system such as women, SC/ST, landless and other vulnerable groups and not only command area farmers.

No land is table top level in nature. Lands in a watershed slope in one or more directions and hence cannot fully absorb and store the rainfall run off from the watershed. Soil and water conservation measures intercept the runoff caused by rainfall in excess of the infiltration capacity of the soil, and enhance the in-situ moisture content, which improve rainfed crop production. More importantly they arrest soil erosion and the resulting sedimentation of the reservoirs and other water bodies lower down. They do not totally impound the runoff. The excess runoff flows naturally down or is guided through the existing drainage lines of the watershed. Many of these drainage lines convey the rain water as inflow to existing water bodies like tanks, ponds, streams and rivers. Water which cannot be stored within the watershed or a river basin flows out of it for multifarious uses lower down. The most valuable product resulting from the watershed development is the increased in-situ moisture held in the root zone of the soil profile, which helps to increase the productivity of rainfed crops. It mostly benefits the small and marginal farmers who are entirely dependent upon the monsoon rains for their livelihood. Additionally the water stored below the root zone percolates down the soil profile and recharges groundwater, to replenish part of what is lost by over exploitation through deep take wells.

Traditional Rainwater Harvesting Systems - Our Field Experiences, DHAN Foundation (2006)

Conservation of rainwater is best accomplished through integrated watershed development. The rainwater so conserved is used primarily for provision of drinking water for the inhabitants and the livestock, besides agriculture. Tank based watershed development help to supplement the in-situ moisture in the soil, with the runoff stored in the existing tanks to stabilize rainfed agriculture during periods of long dry spells. It also facilitates increased recharge of groundwater.

Tanks as multi purpose structures

Although the primary use of tanks is irrigation, they contribute as much as 40 percent of their storage to augment groundwater resources through recharge. According to a study report by the National Geophysical Research Institute (ICAR), Hyderabad, measurements carried out in

about 20 river basins well distributed over the various climatic and geomorphic zones in India, 5 to 10 percent of the seasonal rainfall is contributed as annual recharge in the peninsular hard rock regions, whereas in alluvial areas, about 15 to 20 percent of the rainfall contributes to groundwater. The Central Ground Water Board in its manual on “Groundwater resources of India (1995)” accounted nearly 30 to 40 percent of applied irrigation water as seepage return from irrigated fields and field channels. Irrigated fields also contribute to augmentation of groundwater resources. The average infiltration rate from paddy fields is reported to be generally higher than that from nearby tanks. The paddy field infiltration ratio (that is, the ratio between the water infiltrated underground to water applied) varied between 55 and 88 percent. Paddy fields can be used as ground water recharge basins by harvesting the rainfall effectively. Water spreading as a recharge method is practiced on an increasing scale all over the world, in areas where the aquifer is shallow. Our experience of the effectiveness of rehabilitated irrigation tanks & Ooranis as groundwater recharge structures in Theni and Ramanathapuram districts shows a perceptible rise in the water table ranging from 3 to 4 metres (m). Before restoration of the tanks, the water table in the wells was between 30 and 45 m below ground level. After the desilting of the feeder channel & tank bed, the tanks filled up in the next rains and within a few weeks the water table in 169 dug wells situated close to Silamalai tank in Theni district rose by 3 to 4 m.

When watershed development is integrated with tank rehabilitation work, groundwater recharge is perceptibly increased, the sedimentation of tanks is minimized and its useful live storage is used more effectively for the multifarious purposes. Thus it provides a synergistic benefit to the people in several ways. Even the landless people in the villages would gain through inland fish culture in tanks by becoming members of Water Users' Associations.

The review analysis of the sectoral policies and guidelines brings the following summary synthesis for recommendations.

1. Thrust needs to be given to people's involvement and to build their stake in implementing each and every phase of

watershed development programme, in order to improve the transparency in implementation of watershed activities.

2. Inclusion and rehabilitation of tanks as a part of watershed treatment.
3. Promotion of monitoring and water information system is required as a part of Government policy for the detection and recognition of the adverse impacts such as falling water table, due to over use of ground water. This will be useful for planning the treatment of catchment areas in watershed and treatment of water bodies or water storage structures.
4. Research and policy gaps need to be bridged. Gap exists between knowledge and understanding. Hence need to bridge the gap by raising awareness on technical issues and constraints in water management. The earlier methods which are used for calculation of water inflow in to tanks are outdated. It has a constraint in technical issues in the present context where bore wells and other water storage structures exist. So the method for calculation of water inflow in to tanks needs revision.
5. The Neeranchal guidelines envisages future watershed programme to have duration of 8 years with 3 phases: Preparatory phase (2 years), resource augmentation and institution building phase (4 years) and a sustainable livelihoods and productivity enhancement phase (2 years) with a cost outlay of Rs. 12,000 per hectare.
6. Supplementing of funds from various programme into NREGP for tank rehabilitation under tank based watershed programme has to be considered as a special issue.
7. The treatment of catchment areas of water bodies in the watershed has decreased the silt deposition in the tanks. Hence instead of constructing permanent water harvesting structures like concrete or masonry check dams, check walls etc., construction of brush wood check dams, rock fill dams and Gabion structures will be useful in checking run off water and silt flow outside the watershed.
8. Ministry of Rural Development (MRD) (1994) guidelines specifically prioritise participatory

approaches to watershed management, and the MRD strictly adopted these guidelines from 1995-96 onwards. It is important to remember that there is no formal legislation existing for watershed development. There are only guidelines which are evolving over time through the learning process and pressure from funding agencies, non-governmental organisations (NGOs) and academics.

Tank based watershed development has many positive and potentially long-term impacts. Desilting and deepening of tanks and open wells increase common access for washing, bathing, feeding of livestock and in most cases, irrigation of nearby fields. Hence the importance for tank based watershed development.

IV. The Seminar

A Seminar on the theme Tanks and Tank based Watershed Development was organised at Hyderabad focusing mainly on issues related to tank rehabilitation within a watershed and its impact. The participants were farmers, Central and State Government Officials, Academicians, Scientists from Research Institutions and DHAN Foundation Executives. The seminar dealt with various issues related to watershed development with special focus on inclusion of tanks in the programme. As a follow-up of the seminar, review of sectors experience and further deliberations, this policy brief has been formulated with the following recommendations.

V. Recommendations

To make the tank based watershed programme a success, the following are the suggested recommendations

Policy changes needed

1. Convergence with Government Schemes: As the watershed programmes of Andhra Pradesh are coming to a close and the rehabilitation of tanks is to be done through NREGP as well as the World Bank funded project, the concept of tank based watershed has to be emphasized and the funds of NREGP should be used for development of infrastructure and other resources as a convergence programme.
2. Strengthening/ augmenting of funds: Special attention is needed to raise / allocate funds from

various programmes as a policy measure. NREGP and RLEGP funds should be made available to user groups (watershed areas) mainly to take care of maintenance activities of the irrigation structures constructed for watershed and water resources development.

3. NABARD RIDF, and Watershed development fund may be utilized according to the context for implementation of tank based watershed programme. A flexible approach is needed for the utilization of those funds for the implementation of the respective programme.
4. The period of watershed project is limited to five years. In these five years, doing physical work through mobilization of community takes most of the time. Hence as a follow up of the watershed projects and to sustain the livelihood of the people, pilot projects could be taken up along with National Horticultural Mission, NADP etc., for the promotion of horticultural crops, Community nursery etc.,
5. Social security schemes for the farmers like crop insurance need to be made available through federations of self help groups on a group approach. Collaboration between farmers, NGOs, Govt. officials from various state departments and National Agriculture Insurance organizations is needed. Piloting of the crop insurance scheme needs to be taken up.
6. Local level institutions like the Panchayats should be empowered to evict encroachments widely prevalent in water bodies and to prevent those in future.
7. Mobilization of contribution from the people in order to build their stake on the project during and after completion of the project is needed. Creation of awareness among the people about the various watershed programmes and in particular about the tank based watershed development programme is a pre-requisite.
8. Involvement of people's institutions in decision making based on local context in the activities of the watershed has to be ensured in the guidelines of the various watershed programmes.

Practice changes needed

1. DHAN's experience in tank based watershed as a concept shows that it has been quite successful in various parts of Tamil Nadu and Andhra Pradesh. Hence awareness creation and dissemination of the concept of tank based watershed among farmers, other NGOs and

government officials of various departments is the need of the hour.

2. The treatment of catchment areas of water bodies in the watershed has decreased the silt deposition in the tanks. Instead of constructing permanent water harvesting structures like concrete or masonry check dams, check walls etc., construction of brush wood check dams, rock fill dams and Gabion structures will be useful in checking soil erosion and arresting the silt along the drainage lines in the upper reaches of the watershed.
3. To bring the tank based watershed model as a sustainable activity, user groups, watershed associations, tank associations and MFGs have been promoted. To ensure adequate credit to these groups, the Government may suggest to all lead banks to give loans to these groups at "Pavalavaddi" (Like money advanced to Velugu groups at three percent interest rate in AP). The loan can be used during agricultural seasons by the small and marginal farmers for purchase of inputs to agriculture. During the non agricultural season, the income generated from it can be used for creation of assets like purchase of livestock and milch animals.
4. Thrust needs to be given to people's involvement and to build their stake in implementing each and every phase of watershed development programme, in order to improve the transparency in implementation of watershed activities.
5. Community procurement as well as marketing with institutional support has to be made / strengthened for raising farmers income and eliminating middle men.

Research focus needed

1. Tank based watershed approach should as far as possible be on a cascade basis. DHAN Foundation, based on its experience, can take

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the role as a resource agency in capacity building to the various stake holders, creating awareness on a pilot basis and collaborating with the research and academic institutions in action research projects.

2. Before initiating watershed intervention activity, base line survey and a complete water balance study of the watershed with reference to the rainfall over the past thirty five years has to be made. This can be done with the help of academic and research institutions and Indian meteorological department.
3. Independent studies need to be undertaken periodically on the impact of tank based watershed programme.
4. Action research project on eco system based / context based watershed programme needs to be undertaken by the research institutions and universities, so that the blanket approach practiced presently can be made site and context specific.

Way forward

- Watershed development needs to be undertaken with an integrated approach for bringing comprehensive development, which is possible through ridge to valley approach and revival of all water bodies tanks in the watershed through cascade approach
- There is a need to bring an interface between people's institutions promoted in watersheds and line departments of government. NGO's can be given that responsibility.
- Watershed Committee being a development oriented group, there is a need to give proper role and recognition for it in local Panchayats
- Watershed plus activities need to be carried out by the Watershed Committees on a continuing basis instead of closing them after completion of watershed programme for which they should be given usufruct right in the watershed villages.

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Abbreviations

DPAP	- Drought Prone Area Programme
DWMA	- District Water Management Agency
ITC	- Indian Tobacco Company
ITDA	- Integrated Tribal Development Agency
CCA	- Cultivable command Area
DDP	- Desert Development programme
DLIC	- District Level Implementation committee
IWDP	- Integrated Wasteland Development Programme
MFGs	- Micro Finance Groups
MRD	- Ministry of Rural Development
MI	- Minor Irrigation
MRD	- Ministry of Rural Development
NABARD	- National Bank for Agriculture and Rural Development
NADP	- National Agriculture Development Programme
NWDpra	- National Watershed Development Project for Rainfed Areas
NGOs	- Non Governmental Organisations
NHM	- National Horticultural Mission
NREGP	- National Rural Employment Guarantee Programme
PPGs	- Primary Producers Groups
PRIs	- Panchayat Raj Institutions
PU	- Panchayat Union
PWD	- Public Work Department
RIDF	- Rural Infrastructure Development Fund
RLEGP	- Rural Landless Employment Guarantee Programme
RRR	- Repair, Renovation and Restoration
VADC	- Vayalagam Agriculture Development Centres
WRO	- Water Resources Organization

Why this policy brief?

DHAN Foundation is involved in Natural Resources Management focusing mainly on Community based Development and Management of Water Resources in South India. The initiatives taken so far have reached several villages through rejuvenating water bodies benefiting thousands of families. By working closely with the community, DHAN has gained valuable experience over the past two decades. DHAN believes that for better management of water resources, certain changes in the present policies and practices are needed. Hence it has now been decided to come out with Policy Briefs to disseminate the changes needed in specific sectoral issues. This will facilitate Administrators and Field level Organisations in their attempts of better management of scarce water resources.

Policy Brief 10 focuses on importance of inclusion of tanks, ponds and water bodies in the Watershed Development Programme. It highlights the experience in Andhra Pradesh and Tamil Nadu and recommend to the State Governments to include the tanks in the Watershed Development. The brief is planned for focusing the attention of Tamil Nadu and Andhra Pradesh State Government Departments of Agriculture, Irrigation, Water Resources Organisation, Rural Development and Ministry of Water Resources, Government of India.

About DHAN Foundation

DHAN Foundation is a grassroots development organisation and was initiated with the objective of bringing highly motivated and qualified young professionals to the development sector for new innovations in development programmes and for up scaling development interventions to eradicate poverty. The Foundation works towards bringing significant changes in the livelihood of the poor through innovation in themes and institutions.

The approach of the Foundation is to promote Tank farmers' association and their networks aiming at improving the livelihoods of poor communities by organising development works around themes. These Tank farmers' associations would sustain themselves and excel in long run. Presently DHAN Foundation is working on the themes namely Community Banking, Conservation of tanks, Information and Communication Technology for Poor, Rainfed Farming and Panchayats.

About the Centre for Policy and Planning

The Centre for Policy and Planning of DHAN Foundation provides support to the programmes and institutions of the DHAN Collective so that they evolve, develop and modify their policies and fulfill their aims. It shapes the sectoral policies to practice at the grassroots. DHAN Foundation as a member of many policy making bodies on Micro Finance and Water Conservation strongly advocates pro-poor policies. The Centre takes up policy study and initiating research on Micro Finance, Water Conservation, Rainfed Farming, Panchayat Raj Institutions and Disaster Mitigation. As a resource centre, it organises many capacity building events and training programmes for bankers, government officials and representatives of NGOs within and outside the country.



Central Office:
DHAN Foundation
18, Pillaiyar Koil Street, S.S. Colony
Madurai - 625 016. Tamil Nadu, INDIA.
Tel : +91 - 452 - 2610794, 2610805
Fax : +91 - 452 - 2602247
E-mail : dhan@md3.vsnl.net.in
Website : <http://www.dhan.org>

Centre for Policy and Planning:
DHAN Foundation
23, West Park Road, 1 Floor
Shenoy Nagar,
Chennai - 600 030. Tamil Nadu, INDIA.
Tel : +91 - 44 - 26280236, 26265189
E-mail : dhan_cpp@airtelmail.in
Website : <http://www.dhan.org>