TD 603 – WATER RESOURCES MANAGEMENT

A Project report on

WATERSHED PROGRAMME – GOVERNMENT PERSPECTIVE

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Overview

A watershed is defined as an area which feeds all the rainfall from it to a common waterbody. Now this area watershed could scale from few square kilometers to whole river basin. But generally a watershed in the case of management refers to an operational area which is smaller than the river basin. Micro-watershed is small area similar to the size of villages, macro-watershed refers to something larger. So we could define watershed as an appropriate geo-hydrological unit for technical efforts to manage water, soil and vegetative resources for production, utilisation and conservation.

People's participation is considered as an important ingredient for watershed management now. It includes sustainability and equity in terms of social indicators, economic indicators, ecological and environmental indicators. Equity here could be seen as equitable opportunity for livelihood and for community in watershed where people are empowered to take decisions and other stakeholders are in a supporting role.

The concept of watershed based policy making was first coined in the USA, in 1887 by John Wesley Powell, head of US Geographical Survey. Watershed approach has visible benefit in the rural areas attracting people's participation in watershed programmes.

According to United State Environmental Protection Agency (USEPA), "The land areas bounded by ridgelines that catch rain and snow and drained to specific streams or river, lake or a ground water." is known as watershed region.
According to Archana Mishra, Asian watershed can be defined as "land areas drained by common river system." In Asia, the land area located about (8%) percent slope is considered as the watershed area. The land above (30%) present slope is considered as the upper watershed. In general, watershed is referred to as geographical unit of land draining at single point or as catchment, or drainage area of a particular river.

Definition of Watershed Management
According to FAO, "watershed management is the process of formulating and carrying out a course of action involving the manipulation of resources in a watershed to provide goods and services without adversely affecting the soil and watershed base."

The watershed management is the comprehensive and holistic approach of development. It comprises a combination of biological and engineering works, participation of people in organized groups and development of human resource and capacity building. The main thrust of Watershed Management Programmes is "VIKAS MEIN JAN SAHYOG" means "People's Participation in Development."

Aims of Watershed Development Programmes

- To conserve the natural resources, like soil, water and vegetation.
- To impart good stability to crop yields through improved management and farming practices.
- To develop alternative land use system through horticulture, forestry and animal husbandry.
- To train, educate and provide experiences to the beneficiaries of watershed area and strengthen the village institutions.
- To provide income generating activities for rural women.
- To check environmental degradation and restore ecological balance.

History of Watershed Development Programmes

The history of watershed management in India started in 1880's with Famine Commission and the Royal Commission of Agriculture set up in 1928. Since 1930's, Watershed approach has been followed for the development of agriculture and rural areas. In early years, Dry Farming Research Station and demonstration centre were established and special thrust was given to soil conservation and water harvesting. In 1947, the Damodar Valley Corporation Act (DVC) was passed to protect the reservoir and basin in the valley side. After independence, the government supported programmes started in the 1950's, when the focus on soil conservation watershed programme was sharpened with the establishment of the Soil Conservation Research Demonstration and Training Centre in 1956 at 8 locations in the country. The centre started watershed activities in 42 locations, mainly at a small scale, to understand the technical process of soil degradation and option for that contributes to soil conservation.

The first large scale government supported watershed programme was launched in 1962-63 to check the silt in the multipurpose reservoirs as soil conservation work in catchment of river valley project. This was followed by another major project on Drought Prone Area Development Programme during 1972-73 and Desert Development Programme in 1977 was added for the development of desert area. These schemes were implemented in 45 catchments spread over 20 states in India covering 96.1 million hectares of area. Later the National Watershed Development Project for Rainfed Areas (NWDPRA) was launched during the Seventh Five-year plan in 99 selected districts of the country. Integrated Wasteland Development Programme (IWDP), a centrally sponsored programme, was implemented during 1989-90. Integrated Wastelands Development Programme envisages the development of non-forest wastelands in the country.

Watershed Programs

Drought Prone Areas Programme (DPAP)

The Drought Prone Areas Programme (DPAP) was launched by the government during 1973-74 to handle the special problems faced by the fragile areas which are repeatedly affected by drought. The programme is being implemented on Watershed basis from 1995. The responsibility of planning, executing and maintaining the Watershed Projects is given to local people's organization specially instituted for this purpose.

Objectives of DPAP

- To minimize the adverse effects of drought on the production of crops, livestock, productivity of land, water and human resources.
- To promote the overall economic development and improve the socio-economic conditions of the poor and disadvantaged sections inhabiting the programme areas.
- To take up development works by watershed approach for land development, water resource development and afforestation or pasture development.

947 blocks of 155 districts in 13 States are covered under the programme. Under Drought Prone Areas Programme (DPAP), 6515 watershed projects have been targeted for development over 4 to 5 years, against which 6002 projects covering an approximate area of 30 lakh hectares are under various stages of implementation. The expenditure on DPAP was being shared equally by the central and State Governments till March, 1999. This funding pattern had been revised to 75:25 from April, 1999.

Desert Development programs (DDP)

Over the years, the increase in human and livestock population in drought prone and desert areas placed the natural resources of these regions under great stress. The major problems are continuous depletion of vegetative cover, increase in soil erosion and fall in groundwater table. All these factors accounted for diminishing of natural resources.

As per the recommendations of the National Commission on Agriculture, mentioned in the Interim Report (1974) and the Final Report (1976) the Desert Development Programme (DDP) was started in the year 1977-78. The programme was started both in the hot desert areas of Rajasthan, Gujarat and Haryana, and the cold desert areas of Jammu & Kashmir and Himachal Pradesh. Since 1995-96 the coverage has been extended to few more districts in Andhra Pradesh and Karnataka.

National Watershed Development Project for Rainfed Areas (NWDPRA)

National Watershed Development Project for Rainfed Areas (NWDPRA) was launched during 7th Five-year plan in 99 selected districts of the country. It was intended to develop sustainable biomass production system and restore ecological balance in the rainfed areas. However, the main priority was on increasing crop production on arable lands.

National Watershed Development Project for Rainfed Areas was implemented in 2479 watersheds covering 350 districts spread over 25 states and 2 Union Territories. The project was implemented with greater emphasis on people's participation at both planning and implementation stages.

Integrated Wastelands Development Programme (IWDP)

Integrated Wasteland Development Programme (IWDP), a centrally sponsored programme, has been under implementation since 1989-90. From 1st April 1995, the programme is being implemented through watershed approach under the common guidelines for Watershed Development. Integrated wastelands Development programme focuses on the development of non-forest wastelands in the country.

Objectives of IWDP

- To develop wastelands or degraded lands on watershed basis, keeping in view the capability of land, site conditions and local needs.
- To promote the overall economic development and improving the socioeconomic conditions of the poor and disadvantaged sections inhabiting the programme areas.
- To restore ecological balance by harnessing, conserving and developing natural resources i.e. land, water, vegetative cover.
- To provide simple, easy and affordable technological solutions and institutional arrangements that makes use of, and build upon, local technical knowledge and available materials.
- To contribute to employment generation, poverty alleviation, community empowerment and development of human and other economic resources of the village.

Weakness of existing system and paradigm shift

In early phase of watershed development, it was all top down approach with the biophysical framework of the watershed as a priority. Watershed programs tends to be more efficient and effective people are included in managing role. Another thing that was prevalent in earlier watershed development was the efforts were land based rather than the people's capacity based. Third problem was the technology transfer than development and support of the local indigenous technologies.

Participatory watershed's evolution

Participatory watershed management provides opportunity to the people and stakeholders to set targets, bring their interest, implement and monitor. Initiation of participatory technology can be traced back to 1978 to Anna Hazare in Ralegan Siddhi in Maharashtra and R.P. Mishra. But Government of India adopted participatory watershed management after the Hanumantharao Committee report in 1993.

Hanumantha Rao Committee report - 1993

Under DDP, DPAP, NWDPRA many projects are initiated. Most of the projects were performing poorly than expected due to various reasons. The Projects are selected based on the block system. A block of area is selected based on some priority and projects are implemented. Hanumantha Rao Committee suggested the funds must be sanctioned based on the action plans on watershed level rather block level and objective of the watershed development should be ecological improvement and conservation of natural resources as well as socioeconomic development of the local population.[1]

Scarcity of drinking water is given most preference for an area to be selected as watershed development region. The key reasons highlighted in the report are

1. Lack of people's participation in DDP, DPAP and NWDPRA
2. Lack of coordination between guidelines and norms for the implementation of those projects.

Based on the report, GoI introduced a common guidelines for watershed projects in 1994.

In 1994, the Ministry of Rural Development, GoI established set of guidelines for watershed programs. This was a progressive policy, it was people centred, it incorporated several initiatives about awareness raising, bottom-up planning, participation of NGO and communities. The role of participation of community in enhancement of sustainable productivity of natural resources is widely accepted now.

Common Guidelines for watershed projects - 1994

The MoRD had introduced the common guidelines for watershed projects.

Main Objectives

1. To improve the economic development of the overall village community.
2. Ecological restoration.
3. To improve the socio and economic development of resources poor or weaker sections.

A Participatory approach called Participatory Net Planning was mainly focused. The reason behind the focus is simple. when the stakeholders i.e., are involved in the planning and implementation, they understand the objectives and share the responsibilities. Empowering of the poor. who involved in planning and implementation. A transparent implementation is achieved. The Readings from [3] says the projects a positive impact on the crop yield. A rise of 60% in crop yield was observed. A study on Gujarat Drought affected people says watershed implemented region faced less severeness of drought than a non watershed region.

The sustainability of the watershed after the end of project is still question- able. These Guidelines are followed till 2001. The Guidelines are revised again in 2001 by MoRD.

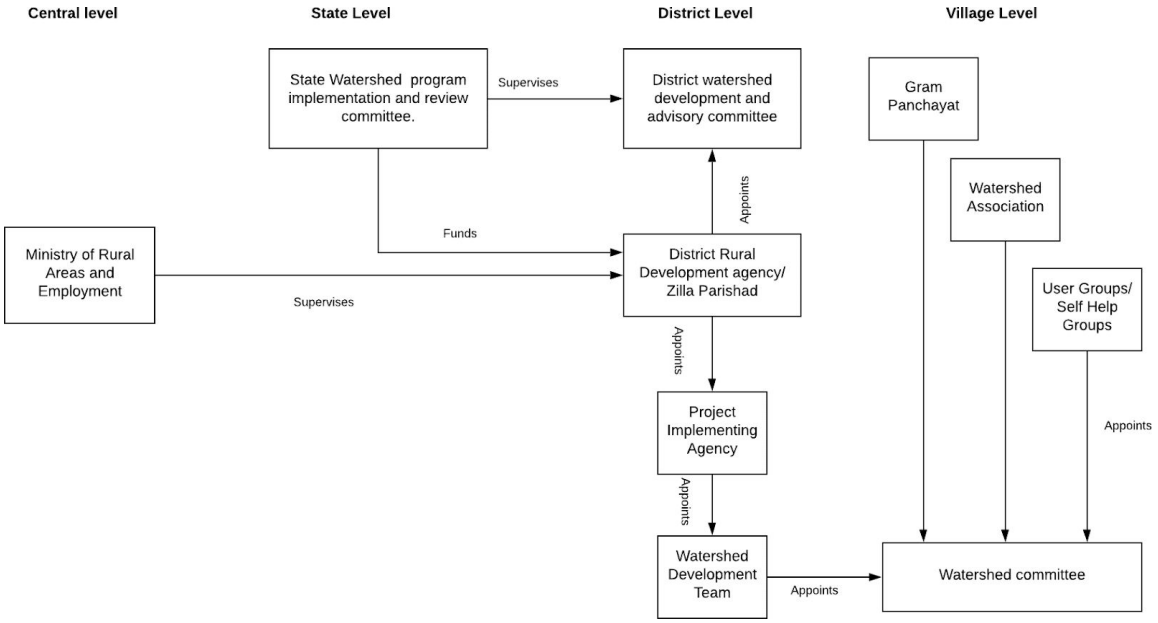


Figure 1: Hierarchy of watershed development in India 1994

Guidelines of watershed Development were again revised in 2001, for greater flexibility, with a focused role on Panchyati Raj Institution, greater community participation at implementation stage and post project management. With 7-8 years of experience government further remarked that the framework of water association and watershed committee for implementation of watershed become parallel bodies with very little coordination with Gram Panchayat and Gram Sabha. So the ministry brought out the initiative **Hariyali** to empower PRIs(Panchayati Raj Institutions), both financially and administratively. This shaped a new approach by recognising and providing implementing authority and enhancing its role in diverse concerns.

Need for Revision

1. To provide much freedom and power to village/watershed level adminis- trations.
2. To blend into contemporary situations.
3. to establish institutions like Panchayat raj institutions, Indian Council of Agricultural Research ICAR and Krishi Vignan Kendras.

Main Objectives

1. Developing wastelands on watershed basis.
2. Encouraging Village community for sustained community action and use of simple , cost effective technological solutions instead of old practices.
3. Employment Generation in both skilled and unskilled work.

However, these guidelines failed to put attention towards community mobilization, institutional development, capacity building and convergence of activities to restore ecological balance and enhance livelihoods opportunities. Govern- ment of Andhra Pradesh came up with "*Operational Guidelines*" in 2002 with a view to improve above neglected activities. GoI made serious efforts to overcome the failure of implementation and pro- posed another revision of Guidelines in 2003.

National Water Policy - 2002

NWP 2002 is almost same as NWP 1987 with some minor changes.

Hariyali Guidelines - 2003

The main objective of the Haryali guidelines is to empower the panchayat raj institutions in implementation of the watershed development. some other ob- jectives are:

1. Harvesting every drop of water: To supply water to agricultural activities and drinking purposes
2. Preventing a climatic adverse effect turn into a disaster.

The revisions of guidelines in 2001 and 2003 retained the Guidelines introduced in 1994. Additional guidelines have been added to it progressively.

A revision was again done in 2006 in the form of **Neeranchal**. This guideline was developed due to the failure of PRI's to take into consideration the watershed objectives. It proposed a series of institutional structure to govern watershed management and setting up of NASDORA (National Authority for Sustainable Development of Rainfed Areas). It was a quasi independent authority which is to manage the central government watershed programmes.

Parthasarathy Committee- 2006

This is a technical committee constituted by the Department of Land Resources and Ministry of Rural Development. The goal of this committee is to analyse the programmes implemented from Haryali guidelines. This committee looks into the DDAP, DDP, IWDP projects.

Functions of Parthasarthy committee

1. Modification to the existing categorization of arid, semi-arid, humid areas and Block level implementation of DDP and DPAP
2. classification of degraded lands under IWDP
3. Identification of Non feasible watershed approach areas under DPAP, DDP and IWDP. Suggesting alternatives approach in those areas.
4. To assess the socio- economic level of the community under watershed programmes and suggest schemes to ensure sustainability of watershed resources.
5. Examine the impact of existing Area Development Programmes
6. To review the issue of the integration of the DPAP, DDP and IWDP. To suggest a suitable scheme for convergence
7. To investigate and suggest the public-private partnership to increase in- vestment in DPAP, DDP and IWDP and execute the programs in dead line manner

The committee acknowledged so many NGOs, support groups and researchers working on watershed development in their report. Their feedback and sugges- tions were considered in framing the suggestions.

Suggestions:

1. Much public participation in watershed projects.
2. Strategies of Harvesting water for sustainable livelihoods
3. Capacity Building
4. Research in watershed development
5. Public Private partnership
6. Administrative Problems

Similar to Hanumantha Rao committee report led to the framework of the guidelines 1994, The Parthasarathy Committee report led to the framework of *"Common Guidelines of watershed development 2008 "*. Unlike the previous revisions, these are fresh guidelines framed according the current position of the watershed activities in India and current water crisis in India.

Common Guidelines for Watershed Projects - 2008

After analysing the past 15 years growth and the lessons learned, the eleventh five year plan was introduced putting major weight on the development of rainfed areas which are given least importance till 2008. Rainfed areas are those where irrigation is less than or equal to 30% of the net sown area, and irrigated areas are those with extent of irrigation exceeding 30%. National Rainfed Area Authority was set up in 2006 to improve the livelihood of the village community in the rainfed area. The objectives are also added to Common Guidelines 2008.

The issue of integration of DPAP, DDP and IWDP was also considered and they were included in the Guidelines 2008.

Main objectives

1. Equity and Gender sensitivity : Equity are the outcomes or benefits of the watershed projects. Previously they were mostly inclined to the rich and marginal farmers. Unlike before, PIAs should make sure the access of the equity for the poor and weaker sections. Role of Women in the decision making process must be enhanced.

2. Decentralisation : The setup of Panchayat raj institutions enabled us to improve local projects. This decentralisation in terms of financial and ad- ministration enabled the flexibility of the projects implementation suiting to local situations.

3. Facilitating Agencies : Facilitation agencies are funded to have proper ba-sic amenities for the Members involved in development and implementing organisations.

4. Centrality of Community Participation : At the end these watershed project stakeholders are the people who were benefiting from the project outcomes. They were considered as the central point in each planning process, implementation.

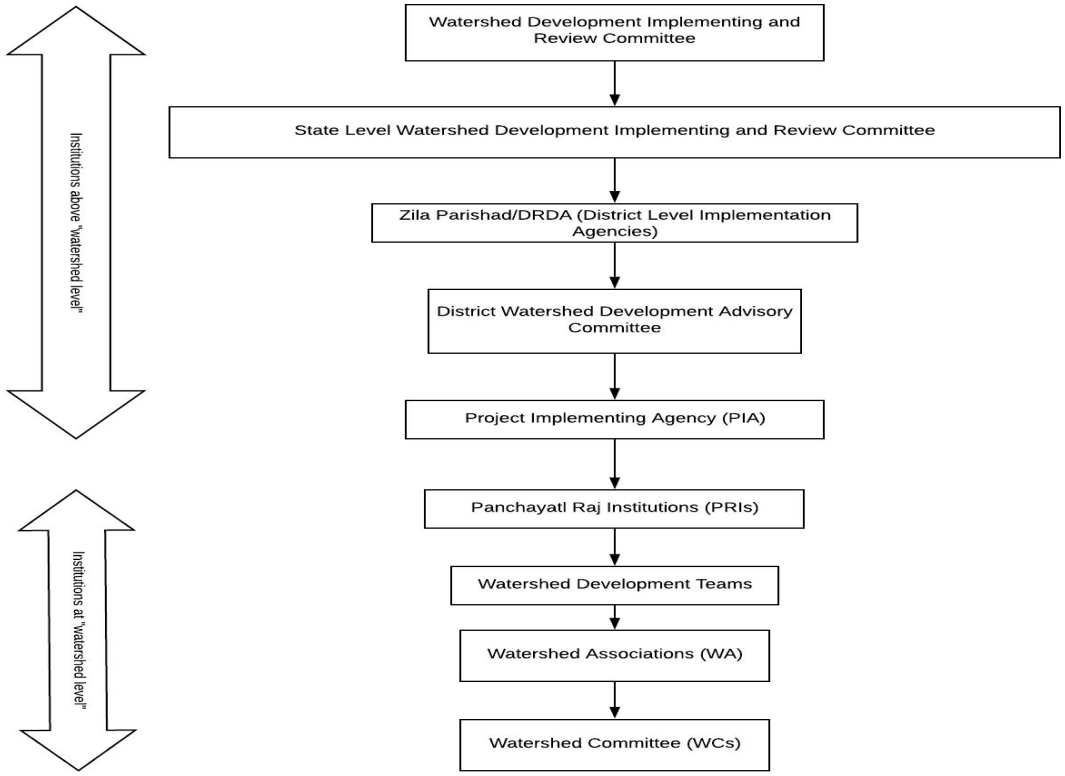
5. Capacity Building and Technological inputs : *capacity building is defined as the "process of developing and strengthening the skills, instincts, abili- ties, processes and resources that organizations and communities need to survive, adapt, and thrive in the fast-changing world."* . This improved knowledge enables to use of latest technology. Remote sensing technology enabled us to extract the data of groundwater level, climate changes. This data enables the research in the watershed development area.

6. Monitoring, Evaluation and Learning : A periodical feedback would help in quickly identify the failures of the implementation and take actions to mitigate the failures.

7. Organisational Restructuring : Appropriate technical and professional support to the organisations at National, state, district and Village level.

Until 2008, a micro watershed i.e., 500ha level is considered. But from 2008, the area selected for the watershed is 5000-10000ha

Hierarchy of Watershed development Projects 2008



Hierarchy of Watershed development Projects 2008

Comparison of 1994 and 2008 organisational structure.

In 1994, PIAs are voluntary organisations. A criteria is framed to act as PIA in 2008. Prior experience and Dedicated team for watershed development are the criteria.

Zilla panchayats and DRDA acts as nodal agency in 1994. In 2008, State level nodal agency is formed by the government for the watershed implementation.

Panchayat raj institutions are introduced after 1994 guidelines. Panchayat raj institutions act as supervisor for watershed development teams, watershed association and watershed committee. Watershed committee members are recruited by watershed association in 2008 organisational structure whereas in 1994, including watershed association , gram panchayats are also involved. NGOs also played an important role in implementation of watershed programs in 1994. In 2008, NGOs are included in the part of the organisation.

Institutional setups for Watershed Management

According to Indian constitution water is everybody's business and the surface water is listed under Union and State list and as an individual right regarding its access.
Under statutory law, all surface water is public property but the responsibility for its management is fragmented and with number of organisations like the Ministry of Water Resources, Ministry of Agriculture, Ministry of rural development and Ministry of Environment and Forests with their own research and development projects and programs.

District Rural Development Agency (DRDA) or Zila Parishad was made responsible for the implementation of that district. Participatory watershed management starts with survey at micro level. This was helpful in generating local information, identification of problems and opportunities for watershed development. It leads to watershed development plan with details regarding funds, list of stakeholders, required activities and user's contributions.

Challenges

Our water sector today is facing many challenges. A country with 130 crore population, with rapid urbanization and industrialization and changing consumption patterns and lifestyles, the challenges facing the water managers of our country are immense. Managing water is not just about developing new sources by construction of reservoirs, digging wells and laying canals and pipelines, but also allocating the limited water amongst various competitive uses. It involves consider both demand side and supply side management. Many times what happens if water is available in sufficient amount then farmers shift to water

The role of the central level agencies such as Central Water Commission (CWC), Central Pollution Control Board (CPCB) and Central Ground Water Board (CGWB) is constrained to hydrological monitoring of rivers (for river discharge and sedimentation); flood forecasting; groundwater survey and assessment (recharge estimation and GW quality monitoring); and water quality monitoring of aquatic systems, so most of the reforms should happen at state level.

Over-exploitation of aquifers occur because of not having well-defined water rights in groundwater (Saleth, 1996) and inefficient pricing of electricity supplied in the farm sector (Saleth, 1997). The developed countries such as the United States, Australia, Mexico and Spain have robust institutions which can define water rights of individual users and enforce them or put tax on groundwater use based on volumetric withdrawal (source: based on Rosegrant and Gazmuri S., 1994; NWC, 2010; Rosegrant and Binswanger, 1994; Saleth, 1996). These institutions should get support from legal framework.

Utopian Idea of 'River Rejuvenation'

Groundwater and surface water withdrawals should be minimized in the river basins to get water back in the river and to maintain the base flows from aquifers.

Capacity Building

All the stakeholders including NGOs should get involved in water resources management (Shah, 2016: p 85). Funds are required to manage water resources. It would come from resource tax (from water users) and pollution tax (from the polluters), which are also part of institutional reforms.

Impact and Effectiveness of "Watershed Development Programmes" In India

The main objective of the WDP was to improve water conservation, irrigation facility, and land use pattern leading to increased agricultural productivity in drought prone and desert prone areas. Poverty reduction, better livelihoods and improved bio-physical and socio-economic environment may lead to sustainable development. Watershed development approach involves economic development of the rural area, employment generation, and restoring ecological balance (DoLR, 2006). Wani, et al (2001) has developed a model for effective participation in watershed management in Kothapally, Andhra Pradesh. Studies by Deshpande & Narayanamoorthy (1999), Kshirsagar, K.G., M.P. Madhusoodhanan, S. Chavan and R. Rathod (2003) and many others have mentioned that the watershed development programmes reduce poverty among the watershed communities.

Components of Watershed Development Programme

Following components are interdependent and interactive.

1. Soil and land management
2. Water management
3. Crop management
4. Afforestation
5. Pasture or fodder development
6. Livestock management
7. Rural energy management
8. Other farm and non-farm activities
9. Development of community skills and resources.

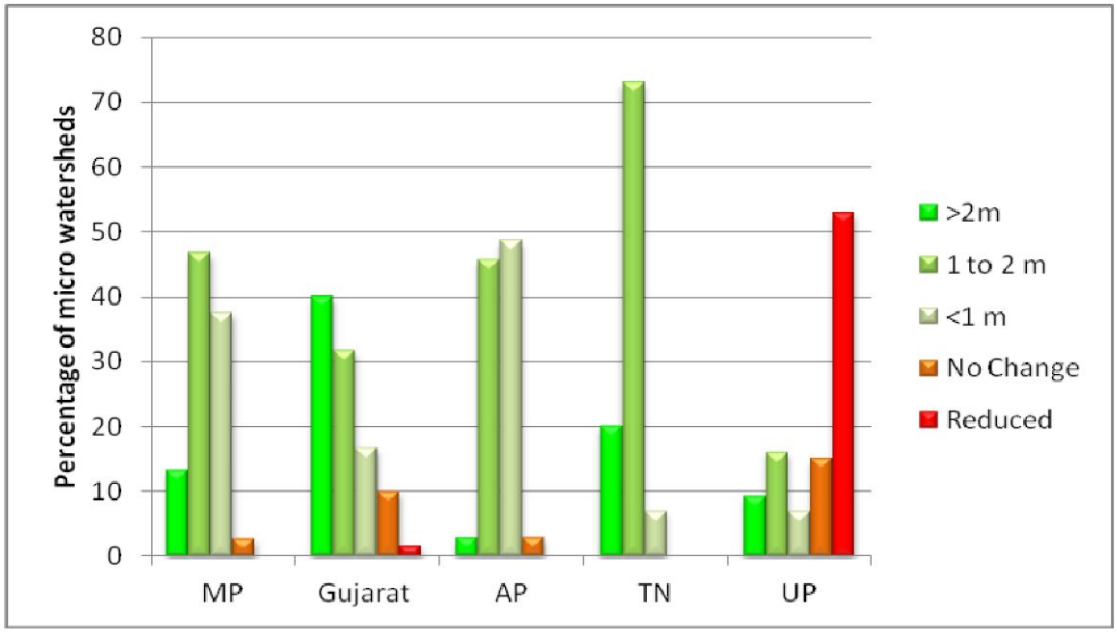
Watershed Development Programmes (WDPs)

Watershed Development Programmes (WDPs) are among the very important programmes placed under the purview of Department of Land Resources (DoLR), Ministry of Rural Development (MoRD). Three important schemes namely, IWDP, DPAP, and DDP are widely implemented by the State Governments with due priority. Over the years, with the attention shifted from more centralized to a decentralized system of governance, watershed development programmes are focused on decentralized approaches such as more community and people‟s participation and involvement of PRIs in planning, executing and monitoring of the projects, etc. Social auditing, periodic review and better documentation processes are best practices in some of the WDP regions.

Impact Assessment

Increase in ground water level

Figure-2: Change in ground water level after WDPs in different states



Increment in ground water table in watershed territories is one of the significant quantifiable markers of fruitful watershed program. Different elements are responsible for increment in ground water. The ground water level experienced negligible increment in Andhra Pradesh, Jammu and Kashmir and Uttar Pradesh. In Andhra Pradesh, larger part of watersheds have detailed minor increment in ground water level much after WDPs (Figure-2). Uttar Pradesh confronted serious dry season conditions after consummation of watershed program which could be one of the significant purposes behind this minor increment or somewhat decrease in ground water level. WDPs came about moderate increment in ground water level in Gujarat, Himachal Pradesh, Rajasthan, Madhya Pradesh, Maharashtra, Tamil Nadu, Karnataka and Nagaland (Singh P et. Al.,2010).

Soil erosion reduction

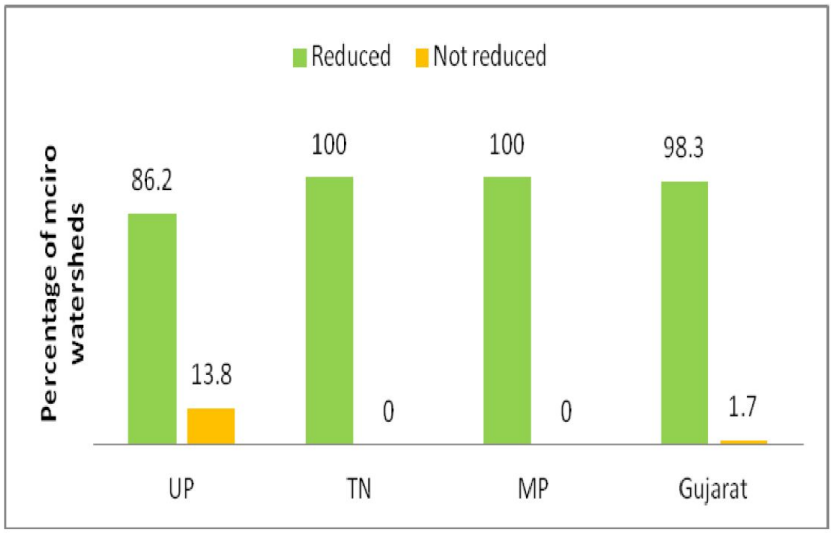
The best performing watersheds are those where soil disintegration was decreased by in excess of 50 percent and the most exceedingly awful performing are where there is an expansion in soil disintegration or the execution bombed in capturing soil disintegration.

Table-1: Impact of WDPs on soil erosion reduction in different States across schemes

States	Schemes	Reduction of soil erosion in different states (percent)		
		>50%	Upto 50%	Not reduced
UP	DPAP	11 (26.8)	25 (61.0)	5 (12.2)
	IWDP	7 (15.2)	32 (69.6)	7 (15.2)
MP	DPAP	0	46 (100.0)	0
	IWDP	0	48 (100.0)	0
Gujarat	IWDP	21 (70.0)	9 (30.0)	0
	DPAP	6 (30.0)	13 (65.0)	1 (5.0)
TN	DDP	8 (80.0)	2 (20.0)	0
	IWDP	12 (27.0)	33 (73.0)	0

Around 75% of the soil erosion has been reduced in Uttar Pradesh. In total, 75 watersheds out of the 87 shown decrease in soil erosion. In the remaining 12 watersheds there was no change seen in soil erosion or soil erosion was not there. Moreover, for 75 watersheds soil erosion was reduced up to 50 % or even more as 11 DPAP and 7 IWDP watersheds. In the remaining 57 watersheds the soil erosion got controlled up to 50% after watershed. Among these 57 watersheds 25 watersheds were implemented with DPAP funds and 32 watersheds with IWDP funds. (Singh P et. Al.,2010).

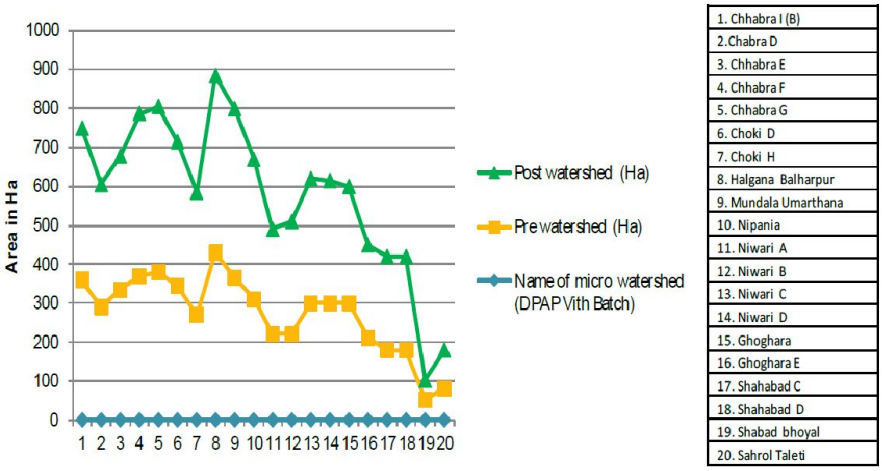
Figure-3: Overall impact of WDPs on soil erosion in different states



Gujarat has revealed that for 98.3% watersheds there is decrease in soil disintegration (Figure-3). In DDP it is 80% small scale watersheds where there is a decrease of soil disintegration over half and among 20% smaller scale watersheds the decrease is up to half. Further among IWDP watersheds, it is 70% miniaturized scale watersheds where there is a decrease of soil disintegration above half and in 30% watersheds there is decrease of soil disintegration up to half. The IWDP undertakings have 30% smaller scale watersheds which show over half soil decrease and 65% miniaturized scale watersheds display up to half decrease in soil disintegration (Table-1).

Change in land use pattern

Figure-5: Increase in net sown area after WDPs (example: Baran, Rajasthan)



Rajasthan shows positive change in land use pattern after implementation of the watershed management programme. For example, in Baran positive change is observed in all watershed areas (Figure-5). The average net sown area increased from 274.8 Ha to 309.65 Ha after watershed programme. In Jaipur, the average net sown area has increased from 333.29 Ha to 346.71 Ha. However, the distribution is much skewed. In Dungarpur, almost all watershed areas have an increase in area under both kharif and rabi crops (Singh P et. Al.,2010).

Table-2: Increase in net sown area after WDPs implementation in Rajasthan

Districts	Pre-watershed (Net sown area in Ha)	Post watershed (Net sown area in Ha)
Baran	274.8	309.65
Jaipur	333.29	346.71
Jhalawar	426.0	490.22

The normal net planted region expanded from 274.8 Ha to 309.65 Ha after watershed program. In Jaipur, the normal net planted territory has expanded from 333.29 Ha to 346.71 Ha. In Dungarpur, all watershed regions have an expansion in territory under both kharif and rabi crops. Jhalwar locale has experienced a period of change with more zones from a normal 426 Ha during pre watershed period to 490.22 Ha in post watershed period in are being secured under development with better water system offices, an expansion of 41.67 Ha in the normal zone flooded during post watershed period (Table-2). Thus, different areas too have positive effect ashore use design in the post watershed period.

Guidelines, Component and impact of IWMP & PMSKY Programs

Out of about 141 mHa of net area sown in the country, about 65 million hectare (or 45%) is presently covered under irrigation. Substantial dependence on rainfall makes cultivation in unirrigated areas a high risk, less productive profession. Empirical evidence suggests that assured or protective irrigation encourages farmers to invest more in farming technology and inputs leading to productivity enhancement and increased farm income.

WDC-PMKSY is not only about construction of structures and catchment area treatment. It try to include directly even bottom most person of the society. Special treatment has been given to SC/ST, landless/asset less people and families having female head during the selection of beneficiaries through livelihood component, agricultural productivity enhancement and training and capacity building.

PMSKY components

A. Accelerated Irrigation Benefit Programme (AIBP)

To focus on faster completion of ongoing Major and Medium Irrigation including National Projects.

B. PMKSY (Har Khet ko Pani)

1. Creation of new water sources through Minor Irrigation (both surface and groundwater)
2. Repair, restoration and renovation of water bodies; strengthening carrying capacity of traditional water sources, construction of rain water harvesting structures (Jal Sanchay).
3. Command area development, strengthening and creation of distribution network from source to the farm.
4. Ground water development in the areas where it is abundant, so that sink is created to store runoff/ flood water during peak rainy season.

C. PMKSY (Per Drop More Crop)

1. Programme management, preparation of State/District Irrigation Plan, approval of annual action plan, Monitoring etc.
2. Promoting efficient water conveyance and precision water application devices like drips, sprinklers etc.
3. Water lifting devices like diesel/ electric/ solar pump sets including water carriage pipes, underground piping system.

D. PMKSY (Watershed Development)

1. Effective management of runoff water and improved soil & moisture conservation activities such as ridge area treatment, drainage line treatment, rain water harvesting, in-situ moisture conservation and other allied activities on watershed basis.
2. Converging with MGNREGS for creation of water source to full potential in identified backward rain fed blocks including renovation of traditional water bodies.

Programme Architecture: States will allocate about 50% of the PMKSY funds by prioritizing projects among those districts having larger share of unirrigated areas, lesser agriculture productivity vis-à-vis State's average and higher population of SC/ST and Small & Marginal Farmers (SMF).

Monitoring & Evaluation: Twenty five percent (25%) of the projects sanctioned by the State shall have to be compulsorily taken up for third party monitoring and evaluation by the implementing States. Besides, the accounts of all these assets created will have to be put before the Gram Sabha for social audit. All these steps ensures that program is implemented well on ground.

Convergence: PMKSY will ensure convergence with all rural assets/infrastructure based programmes related to water conservation and management programmes/schemes like Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS), Rashtriya Krishi Vikas Yojana (RKVY), Jawaharlal Nehru National Solar Mission and Rural Electrification programmes, Rural Infrastructure Development Fund (RIDF) etc.

Agricultural productivity enhancement:

Under this component of watershed program soil test, distribution of modern agricultural kit/ machines, distribution of Higher Yielding Variety seeds, soil nutrient management and pesticides etc. is distributed among farmers to enhance productivity.

Due to construction of soil and water conservation structures water availability for irrigation improved. Also groundwater recharge took place, all this resulted in more vegetation greenery in respective watershed areas, conversion of barren land into agricultural land, increase in cropping intensity and increase in overall productivity.

Livelihood component:

Under this SHGs have been formed and seed money has been provided to them to start any income generating activity such as goat farming, poultry farm etc. apart from this individual persons has also been given to start their own business like to start general store, bicycle repairing store. In all this priority has been given to the marginalized section of our society. Most of the SHGs formed are women Self Help Groups (SHGs), it has made women not only economically independent but they have now involved in the process of decision making, thus it is empowering women. Training and exposure visits to different places ensured the overall development of all the deprived section of the society.

Training and Capacity building:

Five percent of the total cost of the project has been allocated for training and capacity building. This amount is utilized on both level at Watershed Committee (WC) level and Programme Implementation Agency (PIA) level. Under this training and capacity building of Watershed Committee President, Secretary of WC, members of WC, all the members of SHGs, Farmers and other individuals of that watershed area. Exposure visits of villagers to different places has also been done under this to encourage them to choose the same path.

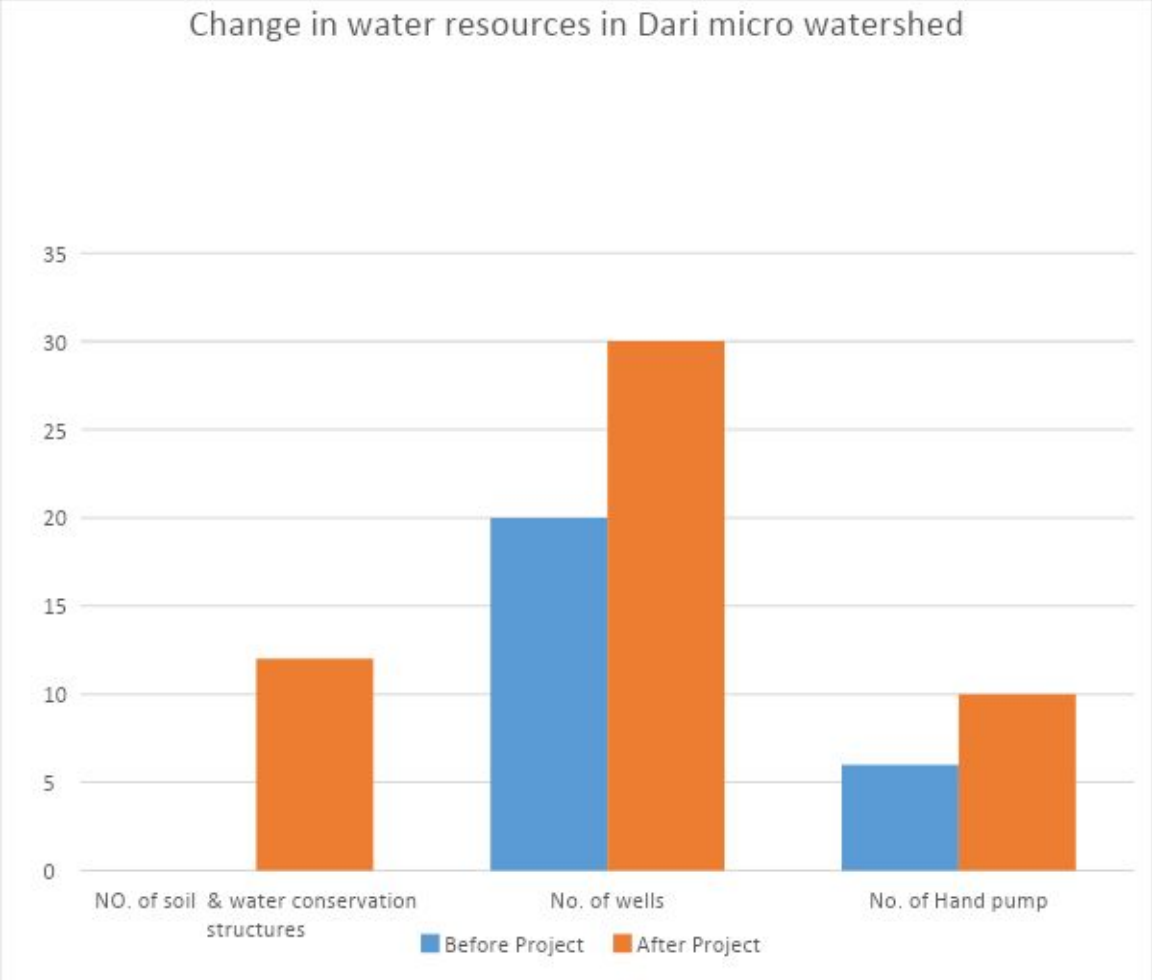
Fig: Women successfully running SHG and involved in goat farming in micro watershed of Jhalpipli, District- Sehore (M.P).

Case study:

Impact of watershed development programme on farming system of micro watershed Dari of Tikamgarh district of Madhya Pradesh (2015_2016).

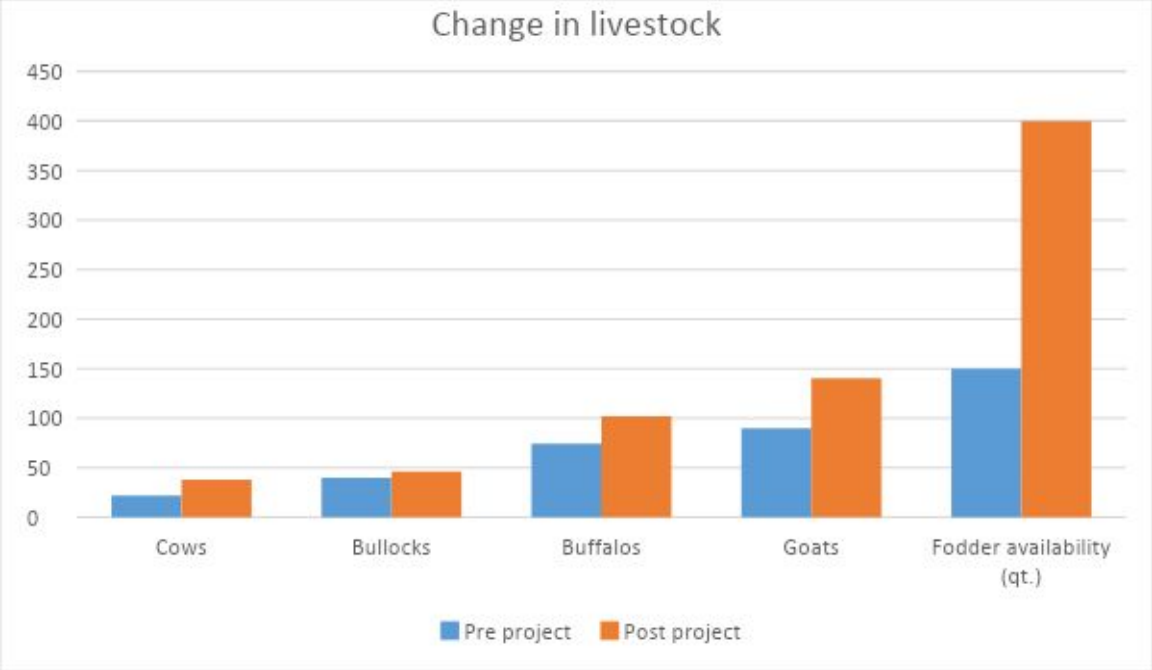
This micro watershed covered 1220 ha land, 613 total household and project was started in 2010-2011. The total 250 benefits were benefited through soil and water conservation structures.

- 12 Water harvesting structures have been constructed.
- Ground water level increased as a result more wells and hand pumps are now available to deliver water .
- Wells and hand pumps are now capable to deliver water 12 months.
- Apart from all this various other direct and indirect effects has been observed in this micro watershed area.



Due to construction of water harvesting structures, which improved the water availability condition in the micro watershed area.

- Arable land increased by 14 ha.
- Cropping intensity increased by 12%.
- Area under irrigation increased by 333% (15 to 65 ha).
- Average productivity of kharif crops increased by 33%.
- Average productivity of rabi crops increased by 20%.



- Livestock population increased in the micro watershed area due to various factors seed money provided through livelihood component of IWMP, training has been provided by veterinary doctors and availability of resources for fodder production through different land uses such as agriculture, agroforestry and pasture land ensured higher production of fodder.

Critical issues in Watershed management and way forward

Critical issues in watershed management can be seen from different perspective like at the level of the watershed program, at the assessment, evaluation and monitoring level and finally at the conceptual and philosophical level.

Way forward

1. Strong need for a common guideline for monitoring data.
2. Institutional mechanism needs to be developed for research in the field of watershed development.
3. Evaluation methods also needs to be properly designed and implemented.

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