

EVOLVING INSTRUMENTALITIES FOR WATERSHED POST PROJECT SUSTAINABILITY: EVIDENCES FROM FIVE STATES

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In recent years, the watershed programme has increasingly become more poverty focused. There has been a shift from assessing the impact of watershed management on regeneration of natural resource base, health of the environment and agriculture productivity to enhance to overall impacts on poverty and livelihood security in a sustainable manner. There is a need for more attention to quantify the costs and benefits attached to watershed development projects to ensure rationality in investments as well as post project sustainable maintenance of assets which have been created during the project period. Keeping in view of the need, the paper addresses the post project sustainability of successful completed watershed projects in five states, namely Andhra Pradesh, Karnataka, Madhya Pradesh, Maharashtra, and Uttarakhand. The results reveal that the considerable amount of investment has been utilised properly in the lifeline activities of capacity building, common pool resource development and revival of water bodies in the watershed. Decentralised and demand-driven capacity building measures were carried out in the watershed. Efforts were put by the Project Implementing Agencies (PIAs) to strengthen the natural resources. It was also learnt that the budget is very low for capacity building and from the data, there appears the need for enhancing budgetary provisions under the training and capacity building component so that the post project sustainability of the projects will be ensured.

Keywords: Investment, Asset Creation, Post-project Sustainability

INTRODUCTION

Watershed programmes in the country were undertaken with multiple objectives ranging from the rehabilitation of degraded areas to conservation of resource base and improvement of productivity in agriculture. In recent years, the watershed programme has increasingly become more poverty focused. There has been a shift from assessing the impact of watershed management on regeneration of natural resources base, health of the environment and agriculture productivity to enhance to overall impacts on poverty and livelihood security in a sustainable manner. Integrated watershed development is an approach that combines Soil and Water Conservation (SWC) works with social and institutional development in addition to pursuing a broad range of activities such as rural access to drinking water and income generating activities across many sectors to meet the needs of communities. A watershed can be sustainable through decentralized project planning, implementation and management by the local communities at the village level. Geographically, physical area of watershed and the Gram Panchayat (GP) area do not necessarily coincide. However, Panchayat Raj Institution (PRI) has the responsibility of planning for Natural Resource Management (NRM) within its boundaries. On the other hand, Watershed Committee (WC) receives funds directly from Government of India (GoI) to take up NRM which is the job assigned to PRIs. There is a need to be careful of not undermining the respective roles of the two systems which have to be complementary to each other. Also, there is a need for better investments in the long run (Baumann, P. 1998). The experiences of stakeholders in the watershed development projects have been quite varied. While, the land owning families experienced high

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level of income which created fissiparous tendencies in the community, the sections left out have very little stake in maintaining the watershed structures or adhering to the strict conventions that WC imposed on itself in initial years of the project for natural regeneration of grasslands or forests within the watersheds (Anonymous, 2001). The World Bank (Thomas *et al* 2011) emphasized that externalities such as lack of secure property rights (even lack of secure tenure) hamper the management of watersheds. Also, externalities were associated with common lands, management of which as of now is not on sound lines. Water Harvesting Structures (WHSs) have not received enough attention to site-specific factors influencing water resource supply and demand (e.g. more groundwater pumping; climate anomalies). They further suggested that fiscal decentralization and community empowerment need to be strengthened along with local institutional framework. There was also an emphasis on the training of PRIs to create proper awareness. To sum up stating there is a need for more attention to quantify the costs and benefits attached to WSD to ensure rationality in investments as well as post project sustainable maintenance of assets which have been created during the project period.

The available literature still reflects some gaps in prudent management of NRs, particularly land, water and biomass. However, these trends coupled with increasing pressure on resource base causing adverse impacts over resource preservation in future. To overcome these adverse impacts, certain attempts were made through soil and water conservation and biomass practices in sample villages of five selected states. The approach to these interventions is certainly in the realm of natural resource base. To overcome certain imbalances while dealing with these resources, it has to refer the dynamics of institutions, participatory approaches and livelihood security and act accordingly. Hitherto, the research study findings available in the vast literature have not highlighted the impact of investment in watershed interventions. Where the visible impact is positive towards the small and marginal farmers have associated mostly with the natural resources to cope up the climate change effects as well as maintain the livelihoods in sustained manner. *The paper aimed at to examine the post project indicators critically for sustainability of successfully completed projects in the sample states.* The paper is designed in five sections. Section II covers the thematic discussion and the brief profile of the sample watershed villages/states. Institutional arrangement for implementation and the management of the projects were discussed in section III. Section IV explains the impacts on Natural Resource Management (NRM) with an emphasis on investment pattern and project sustainability and the last section V has the concluding observations.

SECTION II

METHOD AND DETAILS OF SAMPLE WATERSHEDS

The inferences made through the analysis are that the collective action arrangement (norms, rules, equity, distribution, delivery and linkages of forward and backward), training and exposure and dynamic leadership have made much dent for successful management of watershed projects. The study has been carried out in five states - Andhra Pradesh, Karnataka, Madhya Pradesh, Maharashtra, and Uttarakhand during 2011-12. The indicators of successful watersheds have been identified following the guidelines developed by Government Agencies and Civil Society Institutions. The selection of watersheds in the Five Sample States was made with the consent of the State Level Nodal Agency (SLNA). Two successful watersheds were selected in each state. The study covered the Pre and Post Watershed Project scenarios. The primary data were collected selecting the sample of 10 for User Groups including SMF (small and marginal farmers) and LMF (large and medium farmers), one each for Watershed Committee, Village Secretary, Gram Panchayat, PIA and three for self-help groups (SHGs) and 10 for Labour/asset less) through

structured questionnaires at different levels. The study of Effectiveness of Watershed Management was taken up in 10 watersheds; covering 6 under drought prone areas development programme (DPAP), 2 under Integrated Waste Land Development Programme (IWDP) and one each National Watershed Development Programme under rainfed areas (NWDPA) and Uttarakhand Decentralised Watershed Development Programmes (UDWDP). In all 5 districts in 5 states 300 beneficiaries were chosen for the study. In the sample, there were 50 beneficiaries each from SMF and LMF categories, and 100 beneficiaries from landless/asset less and the rest 100 beneficiaries from WC, SHG, Village secretary, GP and PIA (Table 1). First, the allotment of funds for these components and their use with reasons for shortfall or excess, were studied. The 'works' are supposed to involve the NRs (land, water, vegetation), encouraging farmers to adopt better production systems. Accordingly efforts were made to assess the pre- and post-project NRM, Production systems and Institutional building (include Human Resource Development). The pre-project data was taken as control. Not less than 30 primary stakeholders per watershed (both SMF & LMF) were selected and their views were elicited. In the case of eliciting views on community benefits, focus group discussions (FGDs) approach was adopted. However the main focus of the paper is on post project sustainability in selected sample watershed projects.

Brief Profile of the Sample States/Watershed Villages

The land utilisation pattern in sample watersheds reveals that the total geographical area of Andhra Pradesh, Karnataka and Maharashtra is more when compared to other two sampled States. The information is based partly on village records and primary data. There was considerable amount of uncultivated barren land in 10 sample watersheds. The barren land classified as : barren land, such as mountains, deserts, etc. which cannot be brought under cultivation, and area under non-agricultural uses, that is, lands occupied by buildings, roads and railways, rivers and canals, and other lands put to uses other than agricultural . The total cropped area is more or less 200 ha and up to 1,200 ha in sample watersheds. Out of the total cropped area, more than 70 per cent area is under rainfed. Except 5 out of 10 sample watersheds, 10 to 15 per cent area falls under forest. Area under forests includes all land classified as forests by law or administered as forests, whether state-owned or private, and whether wooded or maintained as potential forest land. Very limited area falls under pastures and grazing land such as permanent pastures and other grazing lands include all grazing lands such as permanent pastures and meadows and village common grazing land in our sample watersheds.

Rainfall varies over time and space in tropical and subtropical region of the country. Among the 10 sample watersheds selected for the study, these vary from as low as 620mm/annum (Kannemangala/Chikballapur, Karnataka) to as high as 1265mm (Satnoor/Chindwara, Madhya Pradesh) with an average of 888mm. Between the different climatic zones, it was 620mm to 1265mm in semiarid and 1050mm to 1250 mm in hilly humid regions. However, our sample watershed villages have experienced three consecutive drought years during 2001-2010 period. The average rainy days in sample watersheds has a range of 30 days in Uttarakhand to 90 days in Maharashtra sample watersheds. At the time of project implementation, the water retention period in 10 sample watersheds was in a range of 4 to 6 months. The villages have considerable proportion of small and marginal (SMF) as well as large and medium (LMF) farmers. In almost all the sample watersheds the composition of small and marginal farmers (SMF) has large proportion as compared to the LMF. It was observed that the composition of SC/ST household to total household also is more in comparison to other social class group households in our 10 sample watershed villages.

The sample watershed projects were sanctioned during different periods. Andhra Pradesh sample watersheds (IWDP) were sanctioned during 2003-2008. Whereas Karnataka sample watersheds (National Bank for Agricultural and Rural Development (NABARD) Funded Project-Kannemangala and DPAP) projects were sanctioned during the period 2002-2008 and 2002-2007. The Maharashtra sample watersheds (DPAP) were sanctioned during 2003-04 to March 2012. While the sample watersheds of Uttarakhand (NWDPR) was sanctioned during 2007-08 and continued till the time of data collection. Another sample watershed in Uttarakhand (UDWDP) was sanctioned during 2005-06 and continued till the time of data collection. The Madhya Pradesh sample watersheds (DPAP) were sanctioned during 2007-08 to 2011-12. The following tables give the detailed financial allocation of watershed projects as well as works carried out utilising the earmarked allotted funds in 10 sample watershed in five states. 100% total expenditure was incurred as against the total investment made under DPAP while 95 to 98 per cent expenditure was incurred for the rest.

Table 1
Details of Sample Villages/Watersheds

Sl No.	State	District	Mandal/ Block	Watershed Name/ Village	Sample size			
					SMF	LMF	Landless/ asset less	Others (include WC/VS/ GP/PIA/ SHGs)
1.	Andhra Pradesh	Visakhapatnam	Kotavarutla	Pandur/IWDP (2003-2008)	05	05	10	10
			Makavaripalem	Rachapalli/IWDP (2003-2008)	05	05	10	10
2.	Karnataka	Chikballapur	Siddagatla	Kannemangala/DPAP (2002-2008)	05	05	10	10
			Chintamani	Hirekattigenahalli/DPAP (2002-2007)	05	05	10	10
3.	Madhya Pradesh	Chindwara	Mohkhed	Sarungbehri/DPAP (2007-08 to 2011-12)	05	05	10	10
			Parasia	Satnoor/DPAP (2007-08 to 2011-12)	05	05	10	10
4.	Maharashtra	Sangli	Kadegoan	Nerli/ DPAP (2003-04 to March 2012)	05	05	10	10
				Sonkeri/DPAP(2003-04 to March 2012)	05	05	10	10
5.	Uttarakhand	Dehradun	Kalsi	Aragad/NWDPR (2007-08- continued)	05	05	10	10
			Pauri (Garhwal)	Sarnoka Khala (UDWDP-World Bank) (2005-06-continued)	05	05	10	10

The main activities carried out in the sample watersheds were soil conservation measures such

as gully control, earthen nala bunds, farm bunds, continuous contour trenches (CCTs) and check walls and the water harvesting structures like check dams, farm ponds, percolation tanks etc. The other activities plantations were also made in the sample watersheds. There were considerable earmarked funds utilised for entry point activity (EPA) and community mobilisation in the sample watersheds.

In view of bio-physical as well as socio-economic factors of the sampled watershed projects, the overall effectiveness ultimately lies with the active participation of the beneficiaries at the different layers. The land- water profile of the projects catches the attention of the project implementing agencies to bring about the results in an equitable manner. This will help in sustainability of the project in a gainful way.

Financial management is the base for successful designing of watershed project that witnesses the positivity or negativity of investment in the larger interest of the stakeholders. The sustainability of the project ultimately depends upon the prudent financial management. For better financial management, watershed programmes need to be initiated with knowledge and skill-based entry-point activities at the community level that result in tangible benefits to the farmers. Further, institutions at all levels need to be strengthened in order to successfully implement and manage watershed programmes. The past experience envisages a multi-disciplinary approach need to be percolated at different stages in the watershed area. Suitable capacity building measures for all stakeholders especially women and the landless need to be included in the decision-making process during all phases of the project.

SECTION III

INSTITUTIONAL ARRANGEMENTS IN SAMPLE STATE WATERSHEDS

Institutional building implies the formation of groups, conduct of meetings, participation in the decision-making, planning, implementation and post-project maintenance of the project and finally maintenance of records. In the composition of watershed committee, landless/assetless, women and other socially backward people (SC/STs) were considerably involved so as to minimise inequalities and social conflicts. As size-class-wise composition also some sort of equity was maintained to some extent. Considerable composition of marginal and small farmers was involved in watershed development activities. Each SHG was given some amount of money as revolving fund which they could use for providing loans at mutually agreed rate of interest to their members. Some sort of considerable mechanisms for conflict resolution, rules, norms and post-project arrangements were made in almost all the sample watersheds. The selection of members and meetings were held democratically. The priority of watershed viewed by the villagers was first in drinking water, improvement of fuel and fodder and income generating activities. Interestingly, the groups such as SHGs, UGs and Labour Groups were formed during project period in almost all watersheds and surprisingly the survival/functioning of these institutions after the project completion period were visible.

The activities of PIA include formation of homogeneous groups such as SHGs, UGs, LGs and also formation of WC as per norms. Training, capacity building, exposure visits and DPR preparation with participatory approach are the other activities of the PIA. Besides, PIA has to ensure the gender equity in the planning and execution of the works. In addition to the above, the issues such as regular meetings of the WC and WA, social audit and sharing of usufructs with a pro-poor bias were examined in the selected watersheds, mostly by FGD and by eliciting information from the PIA's.

a) Formation of Homogeneous Groups

On an average 7 SHGs, 7.2 UGs and 2.4 LGs were formed in the sample watershed areas. The groups were more in Andhra Pradesh, with 12 SHGs, 7 UGs and 4 LGs whereas very less in Maharashtra and Uttarakhand sample watersheds respectively (Table 2). The formation and strengthening of groups as well as continue even after withdrawal of the project by PIAs was positive impact as it was observed in our sample watersheds.

Table 2
No. of Groups Formed per Watershed

Name of the State/Watershed (Average)			Programme	SHG (Nos)	UGs (Nos)	LGs (Nos)
Andhra Pradesh	Visakhapatnam	Pandur/Rachapalli	IWDP	12	7	4
Karnataka	Chikballapur	Kannemanagala/Hirekattigenahalli	DPAP	7	6	2
Madhya Pradesh	Chindwara	Sarunbehri/Satnoor	DPAP	6	11	6
Maharashtra	Sangli	Nerli/Sonkeri	DPAP	5	6	0
Uttarakhand	Dehradun	Aragad / Sarnoka Khala	NWDPRA, UDWDP	5	6	0
Average				7.0	7.2	2.4

b) Formation of WC

Table 3
Social and Institutional Impacts of Watershed

Name of the State/Watershed(Average)			Programme	Representation of CBOs, Women, Landless, SC/ST in WC (%)	Social Audit (%)	Pro-poor bias in benefit sharing (%)
Andhra Pradesh	Visakhapatnam	Pandur/Rachapalli	IWDP	100	88	100
Karnataka	Chikballapur	Kannemanagala/Hirekattigenahalli	DPAP	85	100	100
Madhya Pradesh	Chindwara	Sarunbehri/Satnoor	DPAP	100	100	100
Maharashtra	Sangli	Nerli/Sonkeri	DPAP	78	0	70
Uttarakhand	Dehradun	Aragad / Sarnoka Khala	NWDPRA, UDWDP	100	74	100

Representation of CBOs, women, landless, SC/ST in WC was almost as per norms in the watersheds but varied in nature (Table 3). One of the effectiveness of watershed management

indicators was the pro-poor bias in benefit sharing from the resource/asset developed in almost all the sample watersheds.

c) Training and Capacity Building

The frequency of training per year was more in Uttarakhand followed by Karnataka sample watershed projects. The participation per training was also more in Uttarakhand and Karnataka sample watersheds (Table 4). It was observed that considerable participation from women as well as SC/STs also ensured in almost all the sample watersheds.

Table 4
Capacity Building by Watershed

Name of the State/Watershed (Average)			Programme	Frequency of trainings/ year (Nos.)	Participation per training (Average)	Women Participants (Nos.)	SC/ST Participants (Nos.)
Andhra Pradesh	Visakhapatnam	Pandur/ Rachapalli	IWDP	6	26	16	12
Karnataka	Chikbhallapur	Kannemanagala/ Hirekattigenahalli	DPAP	7	32	20	8
Madhya Pradesh	Chindwara	Sarungbehri/ Satnoor	DPAP	6	18	8	4
Maharashtra	Sangli	Nerli/ Sonkeri	DPAP	4	22	12	14
Uttarakhand	Dehradun	Aragad / Sarnoka Khala	NWDPRA, UDWDP	12	54	32	18

There seems to be an active participation of women in the training programmes about more than 50 per cent of the trainees was women. SC/ST accounted for more than 40 per cent of the trainees. It was highest in Maharashtra (63 per cent).

d) Exposure Visits

On an average 54 in Uttarakhand, 32 in Karnataka and 26 in Andhra Pradesh participated in exposure visits out of which, 62.5 per cent in Karnataka 61.5 per cent in Andhra Pradesh and 59.3 per cent in Uttarakhand were women participants (Table 5). As far as participation of SC/ST is concerned, about 63 per cent in Maharashtra, 46 per cent in Andhra Pradesh and 33.3 Per cent in Uttarakhand of the total was participated in the exposure visits.

e) DPR Preparation

In all the watersheds, DPR was available. About 4/5th of the DPR was prepared with participatory approach. In almost all the sample states about 3/4th of the DPR was in participatory mode (Table 6). Almost in all the cases of arid areas (96 per cent) DPR was prepared through participatory mode.

f) Women in Planning and Execution of Works

The participation in the planning and execution of works by women was found (Table 7) in Uttarakhand 90 per cent, 82 per cent in Karnataka and 78 per cent in Andhra Pradesh.

Table 5
Exposure Visits: Participation of Women and SC/ST members

Name of the State/Watershed (Average)			Programme	Women participants (Nos.)	Women (%)	SC/ST Participants (Nos.)	SC/ST (%)
Andhra Pradesh	Visakhapatnam	Pandur/ Rachapalli	IWDP	16	61.5	12	46.1
Karnataka	Chikbhallapur	Kannemanagala/ Hirekattigenahalli	DPAP	20	62.5	8	25.0
Madhya Pradesh	Chindwara	Sarungbehri/ Satnoor	DPAP	8	44.4	4	22.2
Maharashtra	Sangli	Nerli/ Sonkeri	DPAP	12	54.5	14	63.6
Uttarakhand	Dehradun	Aragad / Sarnoka Khala	NWDPR, UDWDP	32	59.3	18	33.3

Table 6
DPR: Peoples Participation

Name of the State/Watershed(Average)			Programme	DPR Available (%)	No. of Watershed where Watershed Map is Available (%)	Preparation of DPR	
						Participatory (%)	Only PIA/ WDT (%)
Andhra Pradesh	Visakhapatnam	Pandur/ Rachapalli	IWDP	100	100	100	0
Karnataka	Chikbhallapur	Kannemanagala/ Hirekattigenahalli	DPAP	80	80	80	20
Madhya Pradesh	Chindwara	Sarungbehri/ Satnoor	DPAP	100	100	90	10
Maharashtra	Sangli	Nerli/ Sonkeri	DPAP	100	90	100	0
Uttarakhand	Dehradun	Aragad / Sarnoka Khala	NWDPR, UDWDP	100	100	100	0

Table 7
Participation of Women in Planning & Execution of WDP

Name of the State/Watershed(Average)			Programme	Participation of Women (%)
Andhra Pradesh	Visakhapatnam	Pandur/ Rachapalli	IWDP	78
Karnataka	Chikbhallapur	Kannemanagala/ Hirekattigenahalli	DPAP	82
Madhya Pradesh	Chindwara	Sarungbehri/ Satnoor	DPAP	66
Maharashtra	Sangli	Nerli/ Sonkeri	DPAP	55
Uttarakhand	Dehradun	Aragad / Sarnoka Khala	NWDPR, UDWDP	90

SECTION IV

RESOURCES CONSERVATION: APPROACHES AND INTERVENTIONS

Land Development:

The comprehensive land development activity is looked at resilience capacity of *biodiversity* through plantations, improvement of *soil quality*, improvement of *soil biota* in tune to the good practices of cropping systems, improvement of soil organic matter (SOM) through better land husbandry techniques and finally reduce the volume of run-off and thereby the soil loss. Watershed approach is the only platform where the proper land husbandry techniques would operate and enhance the SOM in efficient manner.

Proper land husbandry made by the farmers in sample watersheds has positive impact on conversion of waste land into arable land (Table 8). The average existing cultivable waste land in pre-project period was 110.0, 87.9, 123.4, 62.2 and 56.1 ha in Andhra Pradesh, Karnataka, Madhya Pradesh, Maharashtra and Uttarakhand sample watersheds respectively. It was reduced to 45.0, 41.0, 55.0, 37.8 and 23.2 ha respectively in post project scenario. The percentage change was 40.9, 46.6, 44.6, 60.8 and 41.3 respectively which indicate positive impact due to the investments made on conservation of soil, water and biomass activities the conversion of non- arable in to arable land. Construction of filed bunds, increase of soil moisture and soil fertility was the key role for wasteland reduction in sample watersheds. The catchment area development includes sunken pits, CCTs and check dams helped the conversion of non-arable area brought under cultivation.

The project has created a number of drainage line and soil and water harvesting structures and pastures on common lands. It was observed that out of an average 9.6, 22.0, 19.0, 22.5 and 11.0 ha of untreated available CPR land in Andhra Pradesh, Karnataka, Madhya Pradesh, Maharashtra and Uttarakhand sample watershed, 4.4, 13.7, 11.8, 14.2 and 6.0 ha respectively has been developed (Table 9). The percentage change was 45.8, 62.3, 62.1, 63.1 and 54.4 respectively indicate

positive impact. The survival rate was a range of 90 % to 55 % across the sample watersheds. The following some of the positive impact were observed due to the development of CPRs in sample watershed villages.

Table 8
Conversion of Non-arable land into Arable land(in Ha.)

Name of the State/Watershed (Average)			Programme	Existing wasteland in Pre-project period	Reduction of wasteland after project completes	% Change
Andhra Pradesh	Visakhapatnam	Pandur/ Rachapalli	IWDP	110.0	45.0	40.9
Karnataka	Chikbhallapur	Kannemanagala/ Hirekattigenahalli	DPAP	87.9	41.0	46.6
Madhya Pradesh	Chindwara	Sarungbehri/ Satnoor	DPAP	123.4	55.0	44.6
Maharashtra	Sangli	Nerli/ Sonkeri	DPAP	62.2	37.8	60.8
Uttarakhand	Dehradun	Aragad / Sarnoka Khala	NWDPRA, UDWDP	56.1	23.2	41.3

Table 9
Common Property Resource (CPR) Development (in Ha)

Name of the State/Watershed (Average)			Programme	Available un treated CPR in Pre-project Period	Development of CPR land after completion of the project		% Change
					Area	Survival (%)	
Andhra Pradesh	Visakhapatnam	Pandur/ Rachapalli	IWDP	9.6	4.4	82.0	45.8
Karnataka	Chikbhallapur	Kannemanagala/ Hirekattigenahalli	DPAP	22.0	13.7	90.0	62.3
Madhya Pradesh	Chindwara	Sarungbehri/ Satnoor	DPAP	19.0	11.8	55.0	62.1
Maharashtra	Sangli	Nerli/ Sonkeri	DPAP	22.5	14.2	65.0	63.1
Uttarakhand	Dehradun	Aragad / Sarnoka Khala	NWDPRA, UDWDP	11.0	6.0	88.0	54.4

- *Regeneration and Conservation of Minor Non-timber Forest Products (NTFPs)*: It was observed that nature of control was lacking. The main gain accrued in the sample watersheds through development of CPRs was control of soil and water erosion and siltation. The highly benefited were the forest dwellers, small and marginal farmers and livestock keepers. Employment had increased as number of days for collection of NTFPs especially in Uttarakhand and Madhya Pradesh sample watershed area beneficiaries. However, the sustaining part of the CPRs was not satisfactory due to protection mechanisms were weak and overexploitation of developed resources without harnessing mechanisms in CPR were also observed in Andhra Pradesh and Karnataka. The benefits from development of CPRs through regeneration and conservation measures were one-time and short term in nature. User groups supposed to look after the CPR development but the arrangements of property and usufructs rights were not established during implementation and after completion of the watershed projects.
- *Drainage Line Treatments, Water Harvesting Structures and Construction of Field Bunds*: The impact of development of these structures was recharge of groundwater. The benefits accrued to all the sections of the farming community. The availability of water for irrigation especially in stream flow has improved a lot. These were the reasons where additional area brought under cultivation as well as cropping pattern strengthened in almost all the sample watershed villages. One important observation was made here that owners of agriculture land and wells with the catchment of the structure area have benefited much. Enhanced availability of drinking water in case of public sources was rejuvenated in some of the sample watersheds.
 - i) Most of the CPR lands were encroached.
 - ii) Much of the watershed treatments carried out on the CPRs, the benefits confined to the collective action mechanisms followed by the villagers. It was also observed that wherever the collective action mechanisms such as rules/norms and user charges were strong the sustainable maintenance of resource was observed positive.
 - iii) Participation of communities and compensation mechanisms were strong in some of selected watersheds.
 - iv) Harvesting of rainwater as well as arrest of soil and water erosion in CPRs made some positive impact on additional area brought under cultivation, strengthening of cropping pattern and drinking water.
 - v) Development of pasture land and usage was to some extent positive during the project period and also in sustained manner.

Land Area Developed for Farming

There is an attempt here to understand how the WDPs have helped improving land use pattern and agricultural productivity across different watershed regions. In order to give a general picture of the scenario, the central government schemes of IWDP, DPAP and NWDPRA and UDWDP evaluated by the established organizations are taken into consideration for review and analysis. Better land use pattern is one of the important objectives of watershed management. With increase in surface water conservation and increase in availability of water in the watershed regions, it is expected that there will be more positive change in land use pattern.

During the development of watershed, number of soil conservation and rainwater harvesting structures were constructed. Considering the rainfall in the region and low potential for runoff the approach of *in-situ* rainwater conservation as against the runoff harvesting is very appreciable in the sample watersheds. Land development carried out in post project period, the dependency under rainfed cultivation was reduced on an average 214.0, 221.0, 142.0, 170.0 and 145.7 ha in Andhra Pradesh, Karnataka, Madhya Pradesh and Uttarakhand sample watersheds respectively for both the categories of farmers (large and small) (Table 10). On the other hand, the area under irrigation has increased tremendously in post-project period on an average 233.6, 113.8, 67.9, 119.5 and 77.4 ha respectively for the large and small farmers.

Table 10
Land Area Developed for Farming of Crop cultivation (in Ha.)

Name of the State/Watershed (Average)			Programme	Pre-project		Post project	
				Rainfed	Irrigated	Rainfed	Irrigated
Andhra Pradesh	Visakhapatnam	Pandur/ Rachapalli	IWDP	381	66.6	214	233.6
Karnataka	Chikballapur	Kannemanagala/ Hirekattigenahalli	DPAP	289	45.8	221	113.8
Madhya Pradesh	Chindwara	Sarungbehri/ Satnoor	DPAP	198	11.9	142.0	67.9
Maharashtra	Sangli	Nerli/ Sonkeri	DPAP	211.9	77.6	170.0	119.5
Uttarakhand	Dehradun	Aragad /Sarnoka Khala	NWDPRA, UDWDP	189.8	33.3	145.7	77.4

Land Area Developed for Fodder and Fuel

The land area developed for green fodder was 7.7, 7.8, 3.8, 3.4 and 3.0 ha in Andhra Pradesh, Karnataka, Madhya Pradesh, Maharashtra and Uttarakhand respectively on an average per watershed for small land holders during the post project period as against 4.5, 4.2, 2.2, 1.9 and 0.9 ha respectively during the pre-project period from the same category. However, this number changed from 6.7, 5.0, 1.5, 2.7 and 2.1 ha to 8.0, 9.2, 4.0, 5.6 and 3.9 ha during the post project period for the large farmers (Table 11). The impact is more positive for small and marginal farmers. On the other hand, the area under development of plantations on individual lands of both the small and large increased tremendously. Interestingly the benefits from plantations were accrued to large farmers much when compared to the small farmers with good land husbandry and more investment oriented measures. The change of availability of fuel has significantly increased for both small and marginal farmers as on an average per watershed. The availability of fuel in terms of less, the peoples' perception is also significantly reduced (Table 12). The scarcity months for availability of fuel are drastically reduced in post project.

Land for Horticulture and Floriculture

The increase in the area under vegetable cultivation in post project period was observed in sample watershed villages. This change was very high for small farmers. (Area increased from 4.35 ha to 11.40 ha on an average per watershed). Area under vegetables also increased from 13.90 ha to 17.11 ha for large farmers. Yield has also improved significantly for fruits and vegetable production in the sample watershed villages. Thus there is increase in area under high value agriculture in the area (Table 13).

Table 11
Land Area Developed for Fodder (in Ha.)

Name of the State/Watershed (Average)			Programme	Pre Project		Post Project	
				SMF	LMF	SMF	LMF
Andhra Pradesh	Visakhapatnam	Pandur/ Rachapalli	IWDP	4.5	6.7	7.7	8.0
Karnataka	Chikbhallapur	Kannemanagala/ Hirekattigenahalli	DPAP	4.2	5.0	7.8	9.2
Madhya Pradesh	Chindwara	Sarungbehri/ Satnoor	DPAP	2.2	1.5	3.8	4.0
Maharashtra	Sangli	Nerli/ Sonkeri	DPAP	1.9	2.7	3.4	5.6
Uttarakhand	Dehradun	Aragad / Sarnoka Khala	NWDPRA, UDWDP	0.9	2.1	3.0	3.9

Table 12
Availability of Fuel

Name of the State/Watershed (Average)			Programme	Pre-project			Post-project		
				Adequate (%)	Less (%)	Scarcity months, if any	Adequate (%)	Less (%)	Scarcity months, if any
Andhra Pradesh	Visakhapatnam	Pandur/ Rachapalli	IWDP	48.9	51.1	4	73.4	26.6	1
Karnataka	Chikbhallapur	Kannemanagala/ Hirekattigenahalli	DPAP	54.3	45.7	3	82.0	18.0	1
Madhya Pradesh	Chindwara	Sarungbehri/ Satnoor	DPAP	67.4	32.6	3	75.4	24.6	1.5
Maharashtra	Sangli	Nerli/ Sonkeri	DPAP	43.7	56.3	6	68.9	31.1	2
Uttarakhand	Dehradun	Aragad / Sarnoka Khala	NWDPRA, UDWDP	49.0	51.0	6	77.9	22.1	2

Table 13
Land for Horticulture/Floriculture/Medicinal plants per watershed
(Area in Ha/Yields in ton/ha)

Name of the State/ Watershed (Average)	Programme	Pre Project				Post Project			
		SMF		LMF		SMF		LMF	
		Area (ha)	Yield (ton/ha)	Area (ha)	Yield (ton/ha)	Area (ha)	Yield (ton/ha)	Area (ha)	Yield (ton/ha)
Pandur/ Rachapalli	IWDP	2.2	15.0	3.9	14.2	5.4	17.4	7.0	16.8
Kannemanagala/ Hirekattigenahalli	DPAP	4.5	16.8	3.3	12.6	6.6	21.3	5.0	15.7
Sarungbehri/ Satnoor	DPAP	1.1	4.7	2.5	6.9	2.8	0	4.4	0
Nerli/ Sonkeri	DPAP	2.5	5.5	3.0	5.90	5.0	0	4.8	0
Aragad / Sarnoka Khala	NWDPRA, UDWDP	3.4	6.5	4.0	7.80	5.00	0	4.9	0

Table 14
Rainwater Harvesting

(Average of 10 sample watersheds in 5 states)	Units	Financial (Rs.)
Check Weir (Nos)	8	3, 21, 706
Farm ponds (Nos)	3	1, 22, 000
Check dams (Nos)	2	1, 24, 788
Repair of nala bund (Nos)	2	99, 000
CCTs and Water absorption trench (WATs) (Nos)	67	4, 01, 765
Farm bunding, Contour bunding, Stone bunding	289	12, 45, 890

Changes in Water Bodies

The impact of investment in watershed projects evolved mainly through development of rainwater harvesting systems for both drinking as well as irrigation purposes. The effect of

rainwater harvesting intervention provisioning ecosystem services can increase crop productivity, food supply and income, increase water and fodder for livestock and poultry, increase rainfall infiltration, thus recharging shallow groundwater sources and base flow in rivers can regenerate landscapes increasing biomass, food, fodder, fibre and wood for human consumption improves productive habitats, and increases species diversity in flora and fauna. The results in our 10 sample watersheds reveals that, average water table has gone up significantly in the selected watersheds in the post watershed development programme for both the land holding categories of farmers. The average number of dug wells owned has increased in the post project period for both the small and large farmers in the district. However, the average number of bore wells owned has come down for the small farmers; though it is not quite significant. The average number of bore well has increased for the large farmers. Nevertheless the average number of functional dug wells and bore well has remained the same in the post project period in comparison to pre project period.

Table 15
Water Retention Period (in Months)

Name of the State/Watershed (Average)			Programme	Pre-project	Post-project
Andhra Pradesh	Visakhapatnam	Pandur/ Rachapalli	IWDP	4.5	7
Karnataka	Chikbhallapur	Kannemanagala/ Hirekattigenahalli	DPAP	5.5	9
Madhya Pradesh	Chindwara	Sarungbehri/ Satnoor	DPAP	4.5	7
Maharashtra	Sangli	Nerli/ Sonkeri	DPAP	5.5	9
Uttarakhand	Dehradun	Aragad / Sarnoka Khala	NWDPRA, UDWDP	5.5	7

Development of Water Bodies

For harvesting of rain water, structures created at village level were farm bunds, continuous contour trenches (CCTs), check weir, farm ponds and check dams. A total of 289 Field bunds were created with the total expense of Rs 12, 45,890 on an average per watershed. The number of CCTs and Water absorption trenches created were 67 at the total cost of Rs 4, 01,765 (Table 14). The structures were in good condition but need to be maintained properly. It was observed that the post project maintenance was also observed. Increase in surface water or stream flow is another indicator that can help establishing positive impact of watershed development programmes on physical factors. Both surface water and stream flow has increased during the post watershed development programmes in many sample watersheds. The water retention period has increased from 4.5 and 5.5 months in pre project to 7 and 9 months during the post project period (Table 15). Increase in ground water table in watershed areas is one of the important indicators of successful watershed programme. Various factors are accountable for increase in ground water. The water harvesting structures play a key role by storing water and allow sufficient time for water to percolate down to the ground. Land development activities such as contour bunding, land levelling and cultivation practices also contribute towards accumulation of ground water. It

was observed in the sample watersheds across 10 sample watersheds spreads in 5 states that the increase of groundwater table which is indication of positive impact (Table 16).

Table 16
Groundwater Recharge (in ft)

Name of the State/Watershed (Average)			Programme	Pre-project	Post-project
Andhra Pradesh	Visakhapatnam	Pandur/ Rachapalli	IWDP	39	22
Karnataka	Chikbhallapur	Kannemanagala/ Hirekattigenahalli	DPAP	56	29
Madhya Pradesh	Chindwara	Sarungbehri/ Satnoor	DPAP	65	33
Maharashtra	Sangli	Nerli/Sonkeri	DPAP	45	27
Uttarakhand	Dehradun	Aragad /Sarnoka Khala	NWDPR, UDWD	55	21

The increased water levels also render some respite in the drinking water situation in the sample villages. The availability of drinking water was adequate (100 %) for both small and large land holders during the post project period as against 43.0 and 76.8 to 88.0 and 100% (Table 17) in 10 sample watershed villages. After the intervention of the land development and bunding activities under watershed programme, the land which was earlier tough and lacking moisture becomes bit loose. Rainwater also gets harvested which helps in the retention of moisture in the soil. Further, the increase in ground water and surface water also helps for providing drinking as well as irrigation water and reduces the time to fetch drinking water (Table 18). Due to soil and water quality and quantity the availability of fodder and fuel wood also increased. Further, for women who were primarily fetching drinking water and water for all other household activities, it was observed that in the sample villages the watershed development programmes have been very instrumental in reducing work load on women. One of the positive impacts observed was bore wells and rejuvenation of traditional tanks in post project period for both small and large farmers. The best performing watersheds are those where soil erosion was reduced by more than 50 per cent and the worst performing are the ones where there is an increase in soil erosion or the implementation failed in arresting soil erosion. With regards to runoff reduction, it was observed that the programme is successful in achieving this goal. Runoff is indicating a positive impact in most of the project areas. According to the beneficiaries, this has been possible because of the contour bunding field bunding which has also helped in checking the runoff of rainwater resulting in soil moisture retention. Area was treated with activities like Continuous Contour Trenches, Farm bunds/Contour Bund, Check weirs/Gully Plug, Nalla Plug, Check Dam, and Village Ponds. These have contributed in checking soil erosion in varying degrees. These findings corroborate the observation that DPAP projects gave more stress on the area based treatments and thus astounding the results.

Soil and Moisture Conservation

The measures which were taken for soil and water conservation in 10 sample watersheds include earthen bunding, stone bunding, check weirs, check dams, farm ponds and CCT only, other measures such as SCT, bench terracing and vegetative barriers were also undertaken in the area. The total area covered with earthen bunding is around 3.5 Kms in the selected watersheds on an average

Table 17
Increase in Drinking Water availability

Name of the State/Watershed (Average)			Programme	Pre-project		Post-project	
				Adequate (%)	Scarcity months, if any	Adequate (%)	Scarcity months, if any
Andhra Pradesh	Visakhapatnam	Pandur/Rachapalli	IWDP	76.8	1.5	100	-
Karnataka	Chikbhallapur	Kannemanagala/Hirekattigenahalli	DPAP	55.6	2	100	-
Madhya Pradesh	Chindwara	Sarungbehri/Satnoor	DPAP	43.0	4	91.0	0.5
Maharashtra	Sangli	Nerli/Sonkeri	DPAP	47.5	3	100	-
Uttarakhand	Dehradun	Aragad / Sarnoka Khala	NWDPRA, UDWDP	66.6	5	88.0	1.5

per watershed (12 in-situ soil and water conservation works) with a total cost of Rs. 1, 28, 000 on an average per watershed. Most of these bunding are functional. Stone bunding was planned in 2.8 Km of area but actually got executed in only 2.5 km of area utilizing about 99% of funds allocated

Table 18
Increase in Irrigated Area (in Ha.)

Name of the State/Watershed (Average)			Programme	Pre-project	Post-project
Andhra Pradesh	Visakhapatnam	Pandur/Rachapalli	IWDP	66.6	233.6
Karnataka	Chikbhallapur	Kannemanagala/Hirekattigenahalli	DPAP	45.8	113.8
Madhya Pradesh	Chindwara	Sarungbehri/Satnoor	DPAP	11.9	67.9
Maharashtra	Sangli	Nerli/Sonkeri	DPAP	77.6	119.5
Uttarakhand	Dehradun	Aragad / Sarnoka Khala	NWDPRA, UDWDP	33.3	77.4

for this purpose (Table 19). For control of gully erosion the measures taken were CCTs, Check weirs, Check Dams. The total structures created were 29 in number with an allocation of Rs 2, 98, 432 on an average per watershed. Under the watershed programmes major emphasis is on soil and moisture conservation. To understand the impact of the project on this ground people's perception were ascertained. With respect to run off most of the small farmers were of the view that there is more than 60% reduction in the run-off, from 88 % in pre-project period. Similarly most of the large farmers were of the view that run-off has reduced by more or less 50%. On impact of soil loss also most of the farmers were of the view that it has reduced by less than 74% in case of small holders whereas it was 48% in case of large holders. On account of watershed effect in reducing drought, most of the farmers were of the view that it has impact on mitigating the drought in range of 50-55 %. This should be considered as good contribution of watershed development programme (Table 20). The percentage change in respect of reduced run-off was (-) 31.8 for small holders and (-) 34.6 for large holders. In the same way, reduction of soil loss it was (-) 19.6 in case of small holders and (-) 42.9 in case of large holders. The mitigation of drought it was (-) 41.8 for small holders and (-) 29.5 in case of large holders which indicate positive impact.

Table 19
Soil and Moisture Conservation (in no.s)

	Units	Financial (Rs.)
In-situ soil and water conservation treatment (Nos)	12	1, 28, 000
Gully control measures (Nos.)	29	2, 98, 432

Table 20
Soil loss and Run-off Reduction and Mitigation of Drought in Sample Watershed Villages

(Average of 10 sample watersheds)	Pre project		Post Project		% Change	
	Small	Large	Small	Large	Small	Large
Run-off (%)	88	76	60	50	(-)31.8	(-)34.6
Soil Loss (%)	92	84	74	48	(-)19.6	(-)42.9
Drought Mitigation (%)	86	78	50	55	(-)41.8	(-)29.5

(-) sign indicate positive impact.

Watershed Activities

Financial analysis of the sample watersheds looked at both the soil and moisture conservation measures and crop productivity enhancement investments. However, few projects valued the cost or benefits of conservation measures or their financial profitability to different community. The quality of structures are intact to some extent however, most of the cases the proper maintenance has not been done. It was observed that the major share of the available funds incurred on soil and conservation activities (Table 21) that followed the activity on water harvesting structures. Certainly, these two major investments on restoration of natural resource base have made positive impact on productivity, and the rise in income levels in 10 sample watersheds of five states. The financial and economic analysis reveals that percentage change towards yield, income,

employment, reduction in debt and migration was positive.

Kinds of Works Executed

In the guidelines provided earlier to common guidelines the Ministry of Rural Development (MoRD) set apart Rs.6000/ha covering an area of 500ha (i.e, Rs.30lakhs). The allotment of the funds for various components in the watershed was as follows :

However, the study has some limitations, where the complete financial analysis was not fulfilled

- Final evaluation has not been done in some (Uttarakhand) of the sample watersheds. Since the final instalment works were not completed, the completion of cash book, pass book, measurement book have not been submitted to the concerned and final resolutions by watershed committee/Gram Panchayat have not made.
- Another aspect was also noted that as per state government resolution in some of the sample watersheds, the leftover funds with regard to the training, administration etc. have been spent for soil and conservation activities.

Table 21
Allocation of Funds per Watershed

	Item	Rs. in Lakhs
a.	Administrative Overheads (10 per cent)	
i.	Administration & Overheads (ZP level)	
	WDT member training	3,000.00
	Miscellaneous expenditure	3,000.00
	Total per watershed	6,000.00
ii.	PIA/WDT level	
	Honorarium + TA&DA + office staff & Contingencies	1,47,000.00
iii.	Watershed level Volunteers + TA&DA + Other contingencies	1,47,000.00
	Total per watershed	3,00,000.00
b.	Community Mobilization & Training (5 per cent)	
	PIA/WDT level EPAs	1,50,000.00
c.	Watershed Treatment/Development (85 per cent)	
	Works/Activities PIA/WDT level	25,50,000.00
	Total per watershed	25,50,000.00
	The above (C) include	
	Revolving fund for SHG	1,00,000.00
	Plantation fund for SHG Plantation (CPR & Private lands) + SWC works + Drainage line treatment + WHSs + Crop demonstration + Homestead And other activities + M&E	24,50,000.00

Note: Depending on the location and the DPR this amount of Rs.24, 50,000 is distributed among the Various activities.

Entry Point Activities (EPA)

In recent past, the literature envisages that entry-point activities should be based on measures that result in tangible benefits for the community due to their participation not on subsidies. Entry-point activities should shift from subsidies to knowledge-based approaches. Though the entry point activities in the guidelines were categorically mentioned the items but it was not the case in actual implementation in sample watersheds. Some religious works were also attended under entry point activity. However, in overall the impact is positive and as it is observed that the confidence building measures established to some extent in some of the sample watersheds (Table 22). About 3 per cent of the budget was earmarked to take up any activity in the watershed, which was most appreciated by the majority of the people. It could be de-silting of a community pond, installing a hand pump for drinking water or repairing a religious structure so as to establish credentials by striking the most effective social chord. The whole idea was to create an impression of a service provider and gain confidence with villagers. The whole process was designed to mobilise community participation without any opposition, conflict or resistance. This activity proved very effective for ensuring participation of majority of the communities by building bridges of mutual trust and confidence. In all 10 sample watershed villages, the activities which were undertaken under EPA were construction of community pond and repair of hand pump for drinking water. People's perception was solicited on EPA. Most of the farmers (64.25%) were of the view that it has benefited to them. However, 31.11% farmers were of the view that it has benefited only a few and 4.64% perceived that it was satisfactory. However, 26 farmers (mostly small and marginal farmers) were of the view that they were not consulted before EPA.

Table 22

Entry Point Activity (Average per watershed)

Name of the State/Watershed (Average)	Programme	Entry Point activity Rs. In Lakh
Pandur/Rachapalli	IWDP	0.75
Kannemanagala/ Hirekattigenahalli	DPAP	1.01
Sarungbehri/Satnoor	DPAP	0.46
Nerli/Sonkeri	DPAP	0.75
Aragad /Sarnoka Khala	NWDPR, UDWD	1.99

Training, Exposure Visits and Capacity Building (Average per Watershed)

The participatory processes succeeded where there were common purposes that could interest all or most of the population, where the participatory process was flexible and provided for capacity building and genuine empowerment, and where there were income and livelihoods incentives. Where communities could see the economic benefits and were empowered, they were willing to invest in long-term conservation. This was the philosophy of any successful model of the projects. A preliminary phase was generally needed in which community capacity building and institutional development took place before participatory planning started. The interface between the decentralized delivery structure for watershed management, local government, technical agencies and community organizations needs to be carefully defined and managed, and capacity building may be needed for all stakeholders. Interestingly, the efforts toward building capacities were very strong except a few sample watersheds in our 10 sample watershed villages in five

states (Table 23). Two observations were observed in this regard. Firstly, the available funds were utilised properly and secondly, decentralised and demand-driven training and exposure visits have been made.

Table 23
Training, Exposure Visits and Capacity Building (per watershed)

Name of the State/Watershed (Average)	Programme	Training & Capacity Building Rs. In Lakh
Pandur/Rachapalli	IWDP	1.5
Kannemanagala/ Hirekattigenahalli	DPAP	1.08
Sarungbehri/Satnoor	DPAP	0.54
Nerli/Sonkeri	DPAP	1.13
Aragad /Sarnoka Khala	NWDPR, UDWD	1.12

Revolving Fund (RF)

The main purpose of revolving fund was to support the (on grant and/or loan basis) promotional activities for micro-credit. In other words, it helps promotion of SHGs of women, land-less, members of the SC/ST communities and other weaker sections of the community and other related activities in the watershed development programme. Interestingly, our sample watershed villages PIAs were made some institutional arrangements (formation of groups) for providing soft loans. The survey shows that grant from WDP is given in all the sample watershed beneficiaries (Table 24). Even soft loans from bank or watershed development programmes were given in 7 watersheds. Watershed development programmes were also facilitates in getting loan from SHG and other sources of loan. In case of user contributions, 10 per cent contribution in cash or kind for activities or investment on private land was envisaged. The rate was scaled down to 5 per cent for socially disadvantaged participants. The contribution was also 5 per cent for the activities to be taken up on open access or community owned resources and activities. The idea was to induce a thinking process in the minds of participants of evaluating the pros and cons of activities since their investments were also involved. Our field data shows that 6 watersheds were successfully sharing cost with a sense of belonging and ensured sustainability of the development process. But in the remaining watersheds this kind of cost sharing/contributions among beneficiaries was lacking. It was observed that the nature of contributions was associated with the nature of interaction between the people and the PIA. If PIA was close to the watershed committee and other user groups/beneficiaries, the understanding of the watershed concept was better and had a positive impact on contributions made by the beneficiaries. But this was not happened in some of our sample (4 watersheds) watershed villages.

Since low profile of contributions from watershed community in our sample watersheds, maintenance of the infrastructure created was a serious handicap. But villagers were maintaining the assets which were created during the project period by their contributions as well as convergence with Mahatma Gandhi National rural Employment Guarantee Act (MGNREGA) scheme. All contributions mentioned previously were kept in a separate account called Watershed Development Fund (WDF). 78% of the beneficiaries expressed that they contributed both in cash and shramdan (7 watersheds).

Table 24
Revolving Fund (Average per watershed)

Name of the State/Watershed (Average)	Programme	Revolving fund Rs. In Lakh
Pandur/Rachapalli	IWDP	2.0
Kannemanagala/ Hirekattigenahalli	DPAP	0.27
Sarungbehri/Satnoor	DPAP	0.56
Nerli/Sonkeri	DPAP	1.01
Aragad /Sarnoka Khala	NWDPR, UDWDP	0.36

Post Project Review on Finances and Assets

The effectiveness of watershed management possible not only conservation and rejuvenation of resources but also the Project Implementing Agency (PIA) has the responsibility to maintain proper accounts through book keeping, timely payment of wages along with proper release of the needed funds to the WC during the implementation phase. Besides, the PIA has to ensure proper procedures for the maintenance of the created assets. All these were discussed with FGDs and also eliciting information from the PIAs. Details are as follows.

Release of Funds

The release of funds by the PIA has to be as per the approval of the detailed project report (DPR) by the watershed association (WA)/GP. So two issues were studied as to whether the needed funds had been included in the DPR and also released with the approval of the WA/GP. In the present study, by and large the funds were released as approved by the WA/GP and also as per the DPR. However, the releases of funds were done only in 78 per cent cases as per time schedule. In the present paper, the funds were provided as per DPR in 98 per cent cases, exception being the Maharashtra and Madhya Pradesh sample watersheds where only in 90 per cent funds were spent as per DPR. There was, overall (93 per cent), approvals of WA/GP in the allotment of funds. The release of funds was good in 8 out of 10 sample watersheds in five states. It was delayed in Maharashtra and Madhya Pradesh. Book keeping and mode of payment of wages were also studied in the watersheds. Book keeping was by and large properly done in the projects. Essentially the created assets the information about the maintenance of watershed harvesting structures (WHSs) and the funding for the same were collected after discussion with FGDs. While the FGDs in semiarid Andhra Pradesh, Karnataka, Madhya Pradesh and Maharashtra have opined on this activity that there was overall agreement upto 74.6 per cent for handing over the WHSs to the UGs. In hilly humid area (Uttarakhand) has more particular that the WHSs handed over to the UGs with full financial support. These actions were reveals that the post –project sustainability was ensured (74.5%) in our sample watersheds.

SECTION V

CONCLUSION

To sum up, it is evident from the data that the major portion of investment has been made towards development of works for soil and water conservation, construction of water harvesting

structures and little amount incurred on plantations. Considerable impact was also observed in the lines of additional area under brought under cultivation, development of common property resources, ground water recharge and improvement in drinking water availability. However the following inferences were drawn in our 10 sample watersheds in five states.

- Considerable investments have been utilised properly in the lifeline activities of capacity building, common pool resource development and water bodies in the watershed.
- Decentralised and demand-driven capacity building measures were carried out in the watershed.
- Efforts were put by the PIAs to strengthen the NR based resources.
- It was also learnt that the budget is very low for capacity building and from the data, there appears the need for enhancing budgetary provisions under the training and capacity building component.

Post Project Sustainability: Issues and Options

- **The first issue that warrants attention is the assets created while implementing the project.** These include the soil conservation measures, water harvesting structures and the vegetative measures in CPRs. Adequate awareness had to be created on the importance of maintaining the assets so created during the training and capacity building programmes. If the assets were created through the participatory approach more than half of the job is achieved. While the conservation measures in farmers' fields essentially were mechanical, their sustenance would be feasible only properly vegetation such structures using multiple trees (MPTs) shrubs and grasses/fodder legumes. The community assets like water bodies and vegetated CPRs should be handed over to the user groups (UGs) for their maintenance providing some seed money towards expenses. The other way would be to impose user charges for maintenance. However the former could be a more feasible choice. The water bodies may be utilized for inland fish production, nursery or vegetable growing and/or for drinking purposes for livestock.
- **The second issue is focus on production systems (crops, livestock).** The benefits of soil and water conservation works and even the water harvesting structures would be more pronounced with time, say after 2 to 4 years of their completion. Even the enhanced biomass generation, increased livestock activities would be having a telling effect on the production systems with time. So there is a need of a hand holding approach by the PIA/WDT or line departments for 2-3 years after completion of the project to provide the needed technological assistance to the stakeholders in the project area. Once the production becomes sustainable and also diversified, the perishable commodities so produced need immediate processing and marketing (both natural and "house shopping"). It is here the producers need all assistance. It is best done through common interest groups (CIGs) – approach avoiding middlemen.
- **The third issue is the sustenance of community based organisations (CBOs) created by the PIA in the project area.** In several studies it was found that many CBOs so created were dysfunctional or partly functional. If the WHSs are handed over to user groups (UGs) for their use and maintenance and if production systems are put in place the sustenance of CBOs would be a lesser problem. But with the changing paradigms in the implementation of MGNREGS it should be possible to still provide incentives in enhancing the productivity of the farm lands. Such an approach would be providing the necessary cushion for the SHGs to be more active. As a consequence of the above the labour groups (LGs) and the common

interest groups (CIG)s could continue to be functional.

- **The fourth issue is training and capacity building.** We must realize that training and capacity building are continuous processes. Thus there is a felt need to provide infrastructure along with some seed money to clusters of completed watersheds (say 10 contiguous watersheds of 500ha each which equals to 5000ha in the present context of New Guidelines as well). Such a facility should be launched independent of PR bodies, but through cluster of village organizations facilitated by the district/block/mandal administration. In that event the created facility is to be operated (by rotation) with the help of the CBOs of the watershed clusters. They might be empowered to identify the training needs and also the trainers.
- **The fifth issue is to evolve mechanisms for maintaining and sharing the usufructs in the CPRs spread over the cluster of watersheds.** It is to be realized that vegetation in any form is useful in protecting the land and water resources. The vegetation has to be considered for the macro hydrological unit encompassing several of the watershed areas. So the stakeholders in there project even have to come together and plan for the maintenance of the vegetation avoiding 'free-riding' problem. The sharing of usufructs with a pro-poor bias and with a tacit understanding of the poor in these areas must be put in place for sustenance of such an approach.
- **The sixth issue the RF and WDF.** Together the funds must be put to proper use. Good examples are available. One is provide these funds on soft loan for enhancing productivity of crops and livestock, but loaning only to those who contributed to WDF. Second is provide for specific community assets like threshing floor or a collection centre for perishable commodities for processing and selling through CIGs.
- **The seventh issue is equity.** More after the upstream land owners remain as donors benefiting the downstream persons. Such an externality must be compensated to the 'donors' either by the beneficiaries or through project funds.
- **The last issue is the livelihood options and micro enterprises.** In the scheme of things these were not specified in the watershed guidelines till 01/04/2008. With some civil societies and in the internationally funded projects there were attempts to cover these two endeavours. It is now suggested in the completed watersheds prior to the new guidelines, a provision of 12, 00,000 (@Rs.2400 per ha of 500ha watersheds) may be made as watershed activities to benefit the poor and the disadvantaged.

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