Madhya Pradesh Watershed Case Study

Internal Report III

Low Base Flows and Livelihoods in India
(R8171)

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PREFACE

Water is pivotal in supporting and sustaining livelihoods. India shares about 16% of the global population but it has only 4% of the world's total water resource. Currently over 10% of blocks classified by the Central Ground Water Board have been identified as being over-exploited and blocks where exploitation is beyond the critical level have been increasing at a rate of 5.5% each year. Whilst moves by the GoI since 1995 have been made towards creating common guidelines in the form of a framework for watershed development, there are concerns that legislative measures in place to protect and manage India's water resources are hindered by the lack of political and local awareness in water and land resources management, and in some cases are based upon ingrained and incorrect scientific understanding of water resource management and land use.

The project 'Low Base Flows and Livelihoods in India' (LOWFLOWS) seeks to highlight the importance of taking into account both supply and demand issues in land and water policy formulation and implementation, and improving departmental co-ordination between the main policy actors by developing a framework for monitoring and evaluation. The project is focussed on the interface of forestry and watershed policies in India with particular attention to the States of Himachal Pradesh and Madhya Pradesh. This case study provides an introduction to the policy issues that need to be addressed in the State of Madhya Pradesh.

The objective of this case study is to present an initial assessment of the current land and watershed policies, strategies and related land and water problems in Madhya Pradesh. The study takes an in-depth look at watershed development in the milli-watershed area of Begumganj in the Raise district with particular attention to the perceptions about water, forest and watershed development of stakeholders at various levels. This will provide the basis for recommending changes in policy, developed through the course of the project LOWFLOWS, and strategies for policy implementation linked to watershed development and land/water resource issues by the Government of India (GoI), donor agencies and related NGOs.

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Abbreviations & Acronyms

DoA	Department of Agriculture
DoRD	Department of Rural Development
DPAP	Drought Prone Area Programme
EAS	Employment Assurance Scheme
ESA	External Support Agency
IWDP	Integrated Watershed Development Programme
JFM	Joint Forest Management
MP	Madhya Pradesh
MPHDR	Madhya Pradesh Human Development Report
NGO	Non Government Organisation
NTFP	Non Timber Forest Produce
NWDPRA	National Watershed Development Project for Rainfed Areas
PIA	Project Implementing Agency
RGWSM	Rajiv Gandhi Watershed Mission
RRL	Regional Rural Laboratory
SWRUC	State Water Resource Utilisation Committee
WUA	Water Users Association

1. LOW BASE FLOWS & LIVELIHOODS – MADHYA PRADESH CASE STUDY

1.1 Background

Realising the importance of water as pivotal in supporting and sustaining livelihoods and the fact that India shares about 16% of the global population but has only 4% of the world's total water resource, the Government of India has made moves since 1995 towards creating common guidelines in the form of a framework for watershed development. However, there are concerns that legislative measures in place to protect and manage India's water resources are hindered by the lack of political and local awareness on water and land management, and in some cases are based upon ingrained and incorrect scientific understanding of water resource management and land use.

The 'Low Flows' project focuses on improving scientific understanding of forests – water flows interactions, developing decision making tools and linking this improved understanding to policy through the development of GIS dissemination tools and direct interaction with institutions and policy makers. Two Indian states, Madhya Pradesh and Himachal Pradesh, have been identified for detailed study. Within the project framework, this report, prepared by Winrock International India, is the Madhya Pradesh component of the 'Low Flows' project' that aims to gather baseline socio-economic data and institutional perceptions from watersheds selected under this project. The analysis of this data provides key indicators for use in the GIS model being developed under this project and identifies gaps and modifications required in land and water management and in policy formulation and implementation.

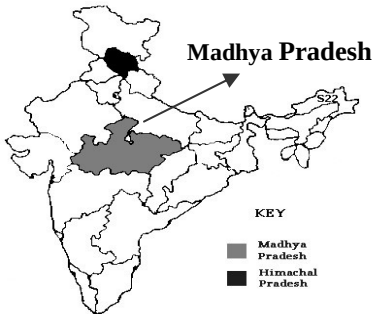


Figure 1: Location of Madhya Pradesh within India

This report has been divided into seven sections and an appendix. The first section provides the background to the study, a brief overview of the methods used for data collection and the geographic focus of the study. The second section provides an insight into watershed development in Madhya Pradesh and more specifically in the study area. The third section deals with the brief description of the villages studied for this project. The fourth section provides the analysis of the impact of the watershed interventions in the study area. Section five then provides an insight into perceptions of the different stakeholders on forests – water – watershed – livelihood linkages. Section six maps the roles and dynamics of the institutional stakeholders and the final section covers the conclusions drawn from this study and provides a list of key learning. In the appendix the methodology is discussed in detail and the instruments used for data collection are provided.

1.2 Methods & Approach

The methods and approach used for data collection in this study involved carrying out a hundred percent survey in one identified village (Dabri) located in the micro-watershed[1](Dudhi) where watershed treatment activities had been undertaken by Regional Rural Laboratory (RRL) and another sample survey in a second village (Devkani) situated in the untreated (Bewas) micro watershed nearby as a 'control village'[2]. Additionally in both these villages, the partner institute (RRL) was recording the water flow measurement for input into the broader modelling exercise of the project. While selecting the 'control village', proper attention was given to ensure that the socio-economic and geophysical characteristic of the control village (Devkani) is similar to that of the other village (Dabri). In Dabri, a semi-structured questionnaire was administered to all the households in the village, besides which, focus group discussions were held with the villagers and members of the watershed committee. Semi structured interviews were also conducted with selected villagers to gain further insights into the village level dynamics. In Devkani, semi structured questionnaire was administered to a randomly selected 30% of the households in the village. Within this broad sample, the households were divided into three distinct groups- marginal farmers, small and medium farmers and big farmers[3]. Further, within each of these categories, 30% of the households were selected for the survey. This was followed by semi-structured interviews with selected villagers and focus group discussions with the villagers. The data collection process was carried out by Winrock International India (WII) professionals. To reduce subjectivity in data collection, several precautions were taken which included; data collection by WII professionals, preparing checklists and a questionnaire that had open-ended queries and by double-checking the information collected through the questionnaires in the focus group discussions and through information collected in the semi structured interviews. Appendix 1 provides the detailed tools that were used for data collection.

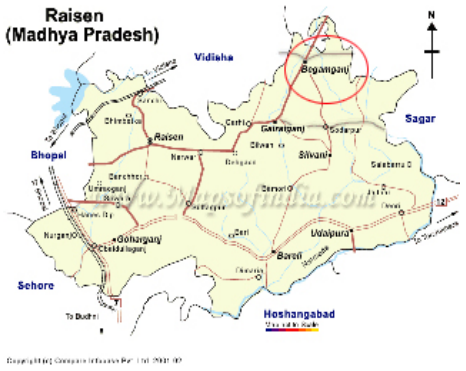


Figure 2: Location of Begumganj (milli water shed) in Raisen District

1.3 Geographic Focus

Madhya Pradesh (MP) is the second largest state in India, with an area of 308,000 Km^2. and an estimated population of about 60 million (Census 2001). The state comprises of 12 different agro-climatic zones, with varying rainfall distribution across. Topographically, MP is a state of plains and undulating landscapes, with major part of the state in the upper watershed regions and almost all the rivers in the state originating from the upland regions. The state forms a major part of the highlands of central India, including the upper catchments areas of its five principal river systems: Yamuna, Ganga, Mahanadi, Godavari and the

[1] A micro-watershed covers an area of around 500 hectares.
[2] Later a 100% survey was undertaken in the village.
[3] As there were no landless in the village, the households were divided into three groups- marginal (farmers with land holding size between 2.5-5 acres), small (farmers with landholding size between 6-9 acres) and large (farmers with landholding size more than 10 acres).

Narmada. These rivers also flow to the bordering states of Uttar Pradesh, Chhatisgarh, Maharashtra, Gujarat and Rajasthan.

With more than 35% of the total geographical area under forestland, MP has the largest area under forestland in the country. Most of the forest areas in the state are located in the upper watershed catchments, with almost all the main rivers of MP and their tributaries originating from around these forests. Recognized as one of the poor state in India[4], more than 90% of the rural population in MP is highly dependent on agriculture and agriculture labour for their livelihood. The dependence on forests for livelihood and sustenance is also very high in the state. With the highest tribal population in the country (23.7% of total state population is tribal)[5] who are dependent on the natural resources for their sustenance and livelihood, the state of MP is undergoing a tremendous pressure on the state's natural resource base.

Since the last few years, 'the issue of water scarcity' is becoming a major challenge for the state. Every year at least one part of the state invariably experiences drought. With poor irrigation infrastructure, overexploitation of ground water has become a common problem in MP. Consequently, there is a growing realization among the policy makers of the need to undertake integrated land and water management in the state

Table 1: Some important statistics for MP, Raisen and Begumganj

	Madhya Pradesh	**Raisen**	**Begumganj**
Total Population (2001)	60,385,118	1,120,159	104,000
Density of population (per sq km)(2001)	196	132	91
Urban population (% of total population)(2001)	26.67		23.08
Rural population (% of total population)(2001)	73		76
% of Scheduled tribes (1991 census)	23.27	14.4	8.27
% of Scheduled casts(1991)	14%	16.55	17.6
Total geographical area(1998) in Ha	30,745,658	848,746	89,742
%of geog area under forest(1998)	27.62	39.28	24.35
% of net sown area to geog area (1998)	49.21	50.22	62.25
% of gross cropped area to total geog area(1998)	66.62	64.97	72.01
% of net area irrigated of net area sown(98)	36.45	34.65	17.86

The study area for the purpose of socio-economic data collection is part of the Milli-watershed area of Begumganj. This milli-watershed area falls within the district of Raisen, which is centrally located within the state. With a total geographical area of about 848,746 ha, more than 39% of the total geographical area is under forest in this district.

[4] The state is one of the poorest in the country, with estimated 37% of the population below the officially accepted poverty line, against the 26% for the country as a whole (MPHDR, 2002)
[5] Of the 45 districts in MP, 14 forest rich districts have a tribal population of almost 80%.

Geographically, most of the area is plain. The land use is mostly agriculture, with large patches of forests extending in the east west direction. Two main rivers of Narmada and Betwa flow in the area. Table 1 above outlines some of the important statistics for the state of MP, Raisen district and Begumganj tehsil.

The selected milli-watershed[6] area of Begumganj is about 100 kms away from Raisen towards the north-east, and is bounded by north latitudes 23°25' to 23°35' and east longitudes 78°25' to 78°35' and lies on SOIT No. 55 I/7 & 11. The total area of the milli-watershed is about 5600 hectares. With more than 24% of the total geographical area under forestland, Begumganj has a low population density of 91 as compared to 196 of the state average. The total Schedule Caste and Schedule Tribe population is 26% of the total population. The major land use in this area is agriculture (about 72% of total geographical area is under gross cropped area), and more than 38% of land is cultivable wasteland. The irrigation infrastructure is not very well developed since only 17% of the net area sown is irrigated. The average annual rainfall in the area is about 1,030 mm. Within the milli-watershed of Begumganj, there are two micro watersheds of Dudhi (treated) and Bewas (untreated). From Dudhi, one village of Dabri was selected for the socio economic impact assessment, while from Bewas, Devkani was selected as the control village (See figure 3 below for the location of the selected villages.

Figure 3: Location of study villages

2. WATERSHED DEVELOPMENT IN MADHYA PRADESH

2.1 An Overview

Since 1960s, Madhya Pradesh is experiencing degradation and large scale deforestation as well as problems of overexploitation of groundwater and 'water scarcity' in general. The state government has taken several initiatives since independence to counter this. Like in the rest of India, various watershed development programmes such as the Drought Prone Area Programme (DPAP), Integrated Watershed Development Programme (IWDP) and National Watershed Development Project for Rain-fed Areas (NWDPRA) have been initiated in the state by the Department of Rural Development (DoRD) and the Department of Agriculture (DoA) respectively. These programmes were mainly undertaken on a piecemeal basis with very little inter-departmental coordination, with the primary objective of enhancing land productivity. These programmes mainly focused on constructing structures to arrest soil erosion, water harvesting methods, and reducing biotic pressure.

In 1994, the MP state government launched the Rajiv Gandhi Watershed Mission (RGWSM) to give fresh impetus and focus on watershed development in the state. Reflecting the state government's decision to undertake watershed intervention in a 'mission mode' to combine concerns of poverty reduction and environmental regeneration through integrated and people centred watershed management, the RGWSM pooled together all available sectoral funds under the DPAP, NWPRA, IWDP and 50% of the EAS and combined various watershed

[6] Typically a milli-watershed covers an area of around 5000 hectares. Several micro-watersheds make up a milli-watershed

development programmes that were being run separately by different line departments in MP. The primary objective of this programme is to build environmental and livelihood security in an integrated manner to improve agriculture production and rural income, with a focus on degraded and dry land areas. Further, the programme aims to maximize people's participation in planning, implementation and maintenance of soil and water conservation activities in the watershed areas, with emphasis on equitable benefit sharing mechanisms. The programme is currently operational in all districts of MP and covers nearly 3.5 million hectares and 7600 villages, making it the largest watershed management programme in the country.

Apart from RGWSM, there are other programmes like the Pani Roko Abhiyan and the Joint Forest Management (JFM) programme of the Forest Department that also focuses on promoting watershed protection initiatives in the state.

At the policy level, the state recently published the 'State Water Policy' (September 2003) that reflects and recognizes the important link between healthy ecosystems and sustainable economic development, and recommends increasing the focus on environmental and social consequences of water sector development. The policy gives priority to 'meeting quality drinking water requirements' in all types of water resource management projects. It recommends 'active participation of the beneficiary groups especially the farmers in operation and maintenance of projects to improve water planning and avoid all types of disparity in water distribution and other services'. It recommends special attention to be given to catchment area treatment and watershed management. For economical management of water in water scarce areas, it recommends special water management system with focus on programmes promoting development of grazing fields, afforestation etc. One of the most important and unique feature of the 2003 State Water Policy of MP is the recommendation on specifically using science and technology (including information technology) to improve the efficiency of water resource management. A brief review of the watershed related policies in MP reflects that though on the whole policies seem progressive and moving towards a more inter-departmental coordinated and participatory approach, yet there seems to be several lacunae as far as right implementation of these polices are concerned. Also despite the shift to participatory practices the level of awareness amongst people is still very low about the benefits of watershed development nor do they have incentives to contribute to the process.

2.2 Implementation of Watershed Project in the Dudhi Micro Watershed

Under the Rajiv Gandhi Watershed Mission project, the Regional Rural Laboratory (RRL), Bhopal, implemented the watershed management programme in the Dudhi micro watershed area in 1996 till 2000. For the broader purpose of this study, data collected on water flows will be used for modelling purpose. RRL is also collecting water flow data from the Bewas micro watershed. Accordingly, for the socio-economic impact assessment, one village (Dabri) was selected from the Dudhi (treated) micro watershed and another village (Devkani) was selected from Bewas (untreated) watershed. Box1 below provides some baseline information on the two micro watersheds selected for the study.

Box 1:Baseline information on selected micro watershed

Dudhi micro watershed

- There are eleven villages in this micro watershed
- The total number of households is about 180, with a male population of 491 and 446 females.
- The total area is 630 hectare, of which about 225 hectares is agriculture land, while the net sown area is only 30 hectare. The extent of Govt./Forest Land in this area is 405 ha.
- In each village one watershed committee have been formed under RGWSM.

Bewas micro watershed

- There are three villages in this area
- The total number of households is 323, with a male population of 690, and a female population of 604.
- The total area is about 810 hectares, of which about 351 hectare is agriculture land and only 40 ha of the total agriculture land are irrigated.

RRL, has been working in the Dudhi watershed area since 1996 till 2000. During this time, they had undertaken a series of activities under the watershed development programme. They started with a series of community mobilization exercises, which included village level mobilization, awareness generation and training exercises in the villages. Watershed committees were formed in each of the three villages in the Dudhi micro watershed area. This was followed by a three-year soil and water conservation activities in the three villages. Table 2 below provides information on the kind of activities undertaken by RRL during the three-year implementation (1997-2000) phase of the programme.

Table 2: Soil and water conservation activities implemented by RRL in Dudhi micro watershed area

Village	Trenches (Nos)	Gully(Nos)	Boulders(Nos)	Ponds(Nos)	Plantation(Nos)	Fodder development (ha)
Dabri	10,430	158	101	8	26,710	15
Paradiya Khurd	9,000	70	90	3	12,050	0
Bichua Jagir	6,050	127	80	5	14,115	8
Total	25,480	355	271	16	52,875	23

Source: RRL, Bhopal

Besides the physical activities undertaken under the watershed management programme mentioned in the above table, RRL also undertook certain sustainable employment generation programmes through allied agricultural activities like manufacturing of 'Begum Ujala' washing powder, sisal fibre handicrafts, leaf cups & plates, earthen pots and bricks, fisheries, goat farming etc. These programmes were targeted at benefiting the landless people in the entire watershed

The following sections outline the basic socio-economic characteristics of Dabri and Devkani- the two selected villages for the study. Table 3 below provides the summary description of the selected villages

3. VILLAGE CHARACTERISTICS IN THE BEGUMGANJ MILLI-WATERSHED

3.1 A Socio-economic Description of Dabri[7]

Dabri, which means *'pond*' in the local language, derived its name from the several small and big ponds that existed in the village some twenty years ago. With a surrounding dense forest and several ponds, this village once used to be rich and famous. Originally all private lands in this village belonged to a single family of the 'Patel's', with some landless villagers who worked in the 'Patel's' household mainly as agricultural labour.

With time and with increase in the number of households in the village, fragmentation of land took place at an alarming rate in the village. The increasing pressure on private lands was coupled with the increasing demand on forests and water, as a result of which at present there are only 8 ponds in the village (pre watershed intervention, there were about 3 ponds in the village, all belonging to the Patel family). The surrounding forests which once used to be very dense has also degraded at an alarming rate in the last few years.

At present, the village is distinctly divided into two sections- the 'nichapura' and the 'uparpura'. The landed (big and small landholders) live in the nichapura section and the uparpura section is mainly occupied by the landless villagers (particularly the 'Yadavs' who have migrated to this village a year and a half back, and practice livestock rearing as their primary occupation as well as work as agriculture labour in the land of the large landholders).

The main cultivable kharif crops in Dabri are paddy and wheat, which are mainly rainfed, while the main rabi crops are peas, pulses (masoor) and wheat, out of which some crops (mainly pulses and peas) are irrigated crops. More than 40% of the total area of the village is cropped area. Agriculture is the major occupation for majority of the villagers, and is mainly subsistence in nature. Only a few large landlords earn cash income[8] from sale of agriculture produce. About 60% of the households (mainly landless and marginal farmers) earn their living through wage labour from within the village as well as working as agriculture labour from outside the village. The average annual income per households is around Rs 9,594, which is less than the poverty line figure of Rs 11,000 (average annual income) as per the Planning Commission of India estimates.

At present the main sources of irrigation in the village are the two ponds and the private dugwells constructed through the watershed programme (out of the 8 ponds in the village, water out of 2 ponds are used for irrigation purposes, and the water out of the rest 6 ponds are used for bathing and for providing drinking water to the livestock). The village also has a sizeable livestock composition (see Table 3 for more details), most of which are grazed in the forests and use the nullahs and the ponds in the village for domestic drinking purposes, the villagers use handpumps and wells.

RRL initiated the watershed management programme in this village in 1997 as part of the RGWM project. A watershed management committee was formed in the village comprising of 11 members (incidentally all members of the committee are from nichupura). A JFM committee was also formed in 2001. In this village no other government department has undertaken any watershed related work. There is a primary school run by the Panchayat in the village.

[7] Based on information collected through the focus group discussion and key informant interview
[8] 27% of the households reported agriculture as their primary occupation, while the rest reported practising agriculture as a secondary occupation.

3.2 Socio-economic Description of Devkani

Devkani is about 5 kms away from Dabri and falls in the Bewas micro watershed area. It shares the same topographical features as Dabri. The total area of the village is around 200 hectares, comprising of 53 households, majority of whom belong to the tribal (*Adivasi*) community. The village belongs to the Tingarah panchayat. There is a primary school and a pre nursery school run by a Christian NGO. The village is accessible though motorable roads since the last three years, and all houses in the village have access to electricity.

Only 15-20% of the total cultivated land is irrigated, the rest is all rainfed. Paddy is the main kharif crop in the village. The rabi crops are wheat, pulses (masoor) and grams. Some large farmers also grow vegetables as cash crops. Agriculture is the primary occupation in the village, and is mainly for subsistence, though some large farmers earn significant income from the sale of agriculture produce. The average household income is around Rs 8000 (below the poverty line).

The main sources of water in the village are the 3 handpumps and some 19- 20 small wells. In 2000, a JFM committee was formed in the village. Since then, only two to three meetings of the committee have been held.

Table 3: Summarised socio-economic descriptions of studied villages

Village	***Dabri***	***Devkani***
Micro watershed	***Dudhi***	***Bewas***
Status	Treated	Untreated
Nos. of Households (HH)	46	52
Caste Composition	Adivasi and OBC	Adivasi and OBCs
Livelihood profile		
Agriculture	Primary:11 HH (27.5%) Secondary: 11 HH (27.5%)	Primary: 1 HH(1%) Secondary: 3 HH(18%)
Wage labour	Primary: 24 HH (60%) Secondary: 3HH (8%)	Primary: 13 households (77%) earning on an average about Rs 3000/yr about 53% migrate (not permanent)
Livestock rearing	Primary 5% *	Secondary occupation. Average income earned from livestock is about Rs 3000/-
Service	Primary: 5 HH (12.5%)	None
Land Ownership		
Landless	17 HH (40%)	None (since all landless villagers got about 2.5 acre as patta land from the government)
Marginal farmers (0-3 acres)	11 HH (28%)	24%
Small and Medium farmers (3.1-7 acres)	7 HH(18%)	43%
Large farmers)>7.1 acres)	6 HH(15%)	43%
Livestock ownership		
Composition	66 cow/calves, 39 bulls, 14 buffaloes and 21 goats, all of which are grazed	41 cows, 33 bulls, 8 buffaloes and 22 goats. Almost all are grazed in the nearby forests and in some cases in own field
Cropping pattern		
Kharif crops	Paddy (total area 69 acres), mainly for subsistence and only 3 households are earning cash. Some households are cultivating grass	Paddy mainly for subsistence , also maize and jowar
Rabi crops	Chickpeas (14 acres on an average 1.5 acre/HH) for subsistence and also cash needs. Masoor and other pulses like arhaar dal	Wheat, grams, pulses and vegetables
Irrigated crops	Chickpeas, wheat, pulses	All kharif crops
Sources of water		
Domestic use	Main source is handpump (31 households) and dugwells (16 HHs) and 2 HHs use pond, average time spend during November - February is 1 hr, in March-July- around 2 hrs, and in August-October around 1.5 hrs	Main source handpump and well and on an average spends about 1 hr in Nov-Feb, 1.5 hrs in March-June and half an hour in Aug-Oct
Livelihood purposes	Private dugwell and ponds (increased water available)	Main source is nullah and in some cases the well
Agriculture	Rainfed and dugwells	Hand pumps

*As this survey was more to get the perception and impact of the watershed intervention, only 40 households were surveyed of total 56 households in the village. Of the remaining 16 households, 2 were out of the village during the survey period and the rest 14 households belonged to the Yadav communities who had migrated to the village a year back and for whom livestock rearing was the primary occupation. So in reality about 16 households in the village practiced livestock as their primary occupation (35% of the households).

4. IMPACT OF WATERSHED DEVELOPMENT

In this section, we present an analysis of the impact of watershed implementation programme undertaken by RRL, Bhopal in Dabri. The impact will be assessed at the following levels- on land use (mainly agriculture), water availability (in terms of water available for agriculture, domestic purposes and for use by livestock), and livelihood and income. The pre-post implementation impact analysis has been done at two levels- comparison of scenarios pre (five years before the implementation phase) and post watershed intervention in Dabri, and comparison between post implementation scenario in Dabri with the existing scenario in Devkani (control village).

4.1 Impact on Land Use

. Table 4 below summarises the main findings that emerged regarding impact of the watershed intervention in terms of land use changes in Dabri pre and post interventions.

Post implementation, the gross cropped area in the village has increased by about 16%. Area cropped during kharif season reported a high increase by about 73% when compared to the pre implementation phase. In the 'control' village of Devkani, due to low water availability, only about 23% of gross cropped area is currently cultivated during kharif season as compared to 55% of gross cropped area being cultivated in Dabri during kharif season. In Dabri the villagers contributed the increase in gross crop area during kharif season to the watershed management programme that was undertaken in the village and the good monsoon spells experienced last year. In Dabri almost all the landed households are able to cultivate at least one kharif crop at present, which they say was not possible five years back. In the 'control' village of Devkani only few big farmers are able to cultivate during kharif season, and majority of the marginal farmers are unable to get any kharif crop from their cultivable land.

The gross cropped area during rabi season however does not show much difference (only 9% increase) when compared to the pre implementation phase. However, when compared to Devkani (control village), it is interesting to note that while only 49% of the gross cropped area in Devkani is cultivated during rabi, in Dabri about 77% of gross cropped area is cultivated during the same season. This change can be contributed to the increased water availability in the soil and also increased irrigation facilities available after the watershed intervention in the village.

In terms of cropping pattern, no dramatic change has taken place as far as kharif crops are concerned as even post implementation phase paddy is still reported as the main kharif crop in Dabri along with maize (similar to Devkani). The only difference being that the big landholders in Dabri are not only now able to sufficiently meet the subsistence need but also earns an average income of about Rs 8000/year from the sale of kharif crops. While in the case of rabi crops, almost all landed households in Dabri reported multiple cropping- i.e. along with wheat, they are now also growing peas and pulses as cash crops[9]. In Devkani, wheat was reported as the main rabi crop, while only very few households (mainly the big farmers) reported multiple cropping mainly cash crops.

[9] Except for the marginal farmers, who grow it more for subsistence need.

One of the most positive impacts of the watershed programme reported was in terms of increased moisture in soil, due to which post implementation most of the private wastelands were leased out to landless households for subsistence cultivation in Dabri.

Table 4: Impact on land use and cropping pattern in Dabri

	Pre watershed	**Post watershed**	**% Change**
Total cropped area (in acres)	186	215	16%
Kharif	69	119	73%
Rabi	82	89	9%
Total irrigated area (in acres)	40 (22%)	78 (36%)	14%
Main crops	**Kharif**: mainly Paddy and Maize **Rabi:** Wheat and peas (only for subsistence need)	**Kharif:** Paddy and Maize **Rabi**: Wheat, peas, and pulses (masoor dal) oilseeds (Very few HHs)	

4.2 Impact on Water Availability

To understand the impact of the watershed intervention in terms of change in water availability, the analysis has been done from three different perspectives; from the angle of the water available for agriculture purposes, water available for domestic purposes, and water available for use by the village livestock.

In Dabri, the irrigated area (as a ratio of total cropped area) has increased from 22% (in pre implementation phase) to 36% (in the post implementation phase), though very few farmers are actually using irrigation facilities in the kharif season[10]. Most of the kharif crops are still rainfed. For the rabi crops, though majority of the farmers still depend on rain, the big landed farmers who can afford pump sets mentioned that they are able to wet the crops twice a day as compared to singe wetting in the past. In the pre implementation phase, agriculture was mainly rainfed in nature. In Devkani, on the other hand, agriculture is mainly rainfed in nature, since for the past few years, the water table has gone down and there is hardly any water retention in the agriculture land.

For domestic water purposes, the villagers in Dabri are mainly dependent on the handpumps constructed as part of the watershed management programme. Overall the number of hours spent on collecting water for domestic purposes was reported to have gone down in the village post implementation to an average of half an hour during winter season to forty-five minutes in a day during peak summer time. Earlier, the villagers reported to have spent two to three hours a day during the summer months. Almost all the households in Dabri reported an increase in the water table (and therefore water flow). In the control village of Devkani, the villagers mentioned that they faced water scarcity

[10] Improved irrigation facilities like pumpsets etc are being used only by the big landlords.

particularly during the summer months and had to wait for hours (as long as five hours a day). The villagers in Devkani also pointed out that though the numbers of dugwells in the village are more as compared to Dabri, the water quality is very bad and they do not use this water even for their livestock.

For livestock use, the nullahs in the forest are the main source in both the villages. The farm ponds constructed as part of the watershed management programme are also being used by the livestock in Dabri.

During our discussions it also came across very clearly that water availability in general has improved in Dabri, when compared to the pre implementation phase. This view was also reiterated by the villagers of Devkani.

4.3 Impact on Livelihoods and Income

One of the most obvious impacts of the watershed intervention in Dabri has been in terms of setting in a process that promises to provide a secure and sustainable livelihood to the villagers. If we define improved livelihood to also include 'improved subsistence economy', one can rightfully conclude that the watershed management programme has been able to secure the subsistence need of the villagers in Dabri. Post implementation, even the marginal farmers in Dabri are reportedly cultivating their agriculture land, (which pre implementation phases were left as wastelands) and are able to meet their subsistence need suitably. In fact, due to the increase in water retention in the land, some of the landless farmers reported to have leased in land from the big landlords for cultivation purposes. However, how much of it can be contributed to the watershed project can be questioned, since the state also experienced very good monsoon last year.

In terms of the impact of the watershed intervention on occupation pattern, what comes out very clearly is the fact the percentage share of agriculture in the total income has increased from 42% (pre implementation phase) to 51%. Post implementation phase, migration to outside village for wage labour has decreased by about 12%. In the post implementation phase, it can be concluded that livelihood security has somewhat improved within the village as the villagers dependence for income on outside village source is reducing, since income earned from activities within the village (income earned from wage labour inside village and agriculture) has increased to 69% as compared to 59% in the pre implementation phase.

Post implementation, migration from Dabri is mainly to nearby villages. It was also reported that migration to other districts from the village have reduced since the last three years In fact, an increasing trend of immigration to Dabri for agriculture work was reported post implementation. In Devkani on the other hand, migration is very high and so is the dependence on migration as a major source of income. Table 5 below reflects that while 75% of the marginal farmers in Devkani migrate for labour, compared to 55% in Dabri. Also only 42% of the small and medium farmers and 16% of large farmers migrate in Dabri, as compared to 67% of small and medium farmers and 50% of large farmers in Devkani.

Table 5: Landholding wise Migration in Dabri and Devkani

	Dabri (post implementation)	**Devkani**
Landless	65 %	*
Marginal Farmers (0-3 acres)	55%	75%
Small and Medium farmers (3.1-7 acres)	67%	42%
Large farmers (>7.1 acres)	50%	16%

Table 6 below outlines the various estimates of income in Dabri, pre and post implementation phase[11]. The average annual income in the village has increased from Rs. 6372 to Rs 9594 (increased by 50%).

Table 6: Income from various sources in Dabri (In Rs)

Source	**Agriculture**	**Wage labour inside village**	**Wage labour outside village**	**Total wage labor**	**Others (includes mainly service)**	**Total income***
Pre implementation						
Minimum income	1,000	200	800	675	900	
Maximum income	50,000	7,200	14,400	15,000	3,600	
Average	11,778	1,773	4,347	4,977	1,140	
Mode	3,000	800	1,500	2,300	NA	
Total Income	106,000	44,325	100,000	144,325	4,560	399,210
Per capita income						9,980
Post Implementation						
Minimum income	5,000 (3,736)	400 (317)	100 (79)	300(237)	500(396)	
Maximum income	100,000 (75,725)	14,400 (11,406)	14,400 (11,406)	22,500(17,822)	7,200 (5,703)	
Average	17,909 (13,383)	2,454 (1,944)	4,350 (3,445)	5,884 (4,660)	4,025 (3,188)	

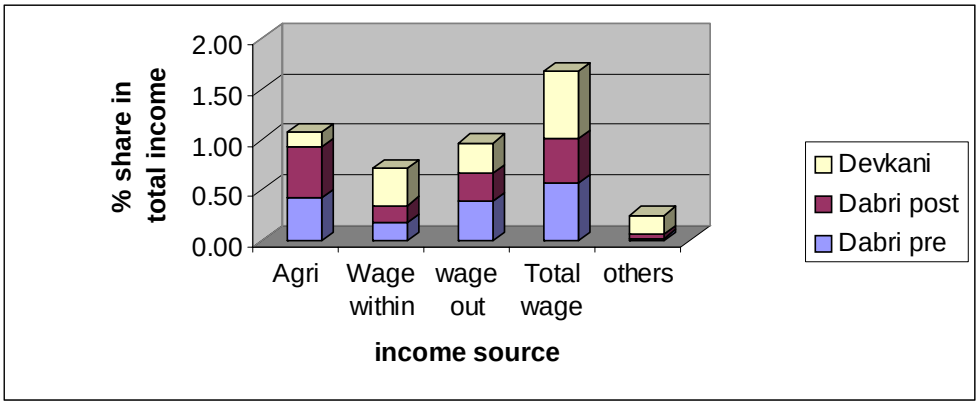
[11] The figures in bracket are the inflation-adjusted estimates, however they are not used while analysing the change pre and post since during data collection the team noted that the pre implementation income estimates quoted by the interviewee were reflective estimates representing the present value of the estimates.

Mode	15,000 (11,208)	800 (633)	1,500 (1,188)	2,300 (1,821)	NA	
Total Income	197,000 (147,209)	66,260 (52,484)	104,400 (82,694)	170,660 (135,178)	16,100 (12,752)	554,420 (439,152)
Per capita income						13,861 (10,979)

* The figures in brackets are inflation-adjusted estimates

Figure 3 below shows the percentage share of total income from various sources, pre and post implementation in Dabri and also in the control village of Devkani. From the figure it comes across that while the share of agriculture in total income has increased from 42% to 51% in Dabri, in Devkani very few farmers are primarily dependent on agriculture as their main source of earning, and the nature of agriculture is mainly subsistence (income from agriculture is only 14% of total income). In Devkani, while 67% of the total income comes from wage labour, the share of wage labour to total income in Dabri has somewhat decreased from 57% (pre implementation) to 44% (post implementation). What is further more interesting is that in Devkani, about 67% of the total households are currently dependent on wage labour as their primary source of income, as compared to only 44% in Dabri

Figure 3: Percentage Share of Total Income in Selected Villages (Pre and Post Implementation)



4.4 Project Management and People's Participation

Based on the information gathered during the focus group discussions in Dabri on the outset it seemed that the planning and project management process of the watershed management programme was participative in principle, since as mentioned in the watershed guidelines, planning meetings were held in the village, where everybody participated, a watershed committee was also formed comprising of an eleven member executive committee, which also included a woman member. The villagers also mentioned regular meetings and consultations particularly during the implementation phase.

However, if one examines the planning/implementation process, it clearly comes across that it is only the large landholders (the 'Patel' family in Dabri) in the village who played a

pivotal role in the project planning and management and even dominated the membership of the executive committee. What also came across further in our discussions with the villagers was the fact that though all the villagers attended the meetings, they were there as mere observers as these few landed households took almost all major decisions. In fact, few women members also expressed that only a selected households could actually access the 'loan for livestock' facility that was disbursed under the watershed programme, and few of them even mentioned that they were not even aware of this facility.

5. STAKEHOLDER PERCEPTIONS

In the section below we put across the perceptions on forest-water and watershed development of some of the important stakeholders involved in watershed management in the state. This includes perceptions of the villagers in Dabri, and Devkani (control village), of some key persons from RGWM (state level), of a local NGO (a Christian NGO working on watershed implementation projects with donor fund) and of the state level Forest Department officials[12].

5.1 Perceptions on 'Forests – Water Linkages

In Dabri, dependence on forests is mainly for fuelwood and for grazing purposes. Almost all the households extract fuelwood from forests for cooking purposes. Average annual consumption of fuelwood in the village is around 1800 Kgs. Other forest products like Mahua, Chironjee are also collected from the forests but mainly for personal consumption. Some income from collection and sale of Tendu leaves was also reported. Landless households reported an increase in income from collection of tendu as compared to the landed households.

The perception of the villagers on the role of forests is limited to extraction use only. Figure 4 below shows that in Dabri while 42% of the households felt that forest has a positive impact on water availability, another 30% felt that there is no relation between

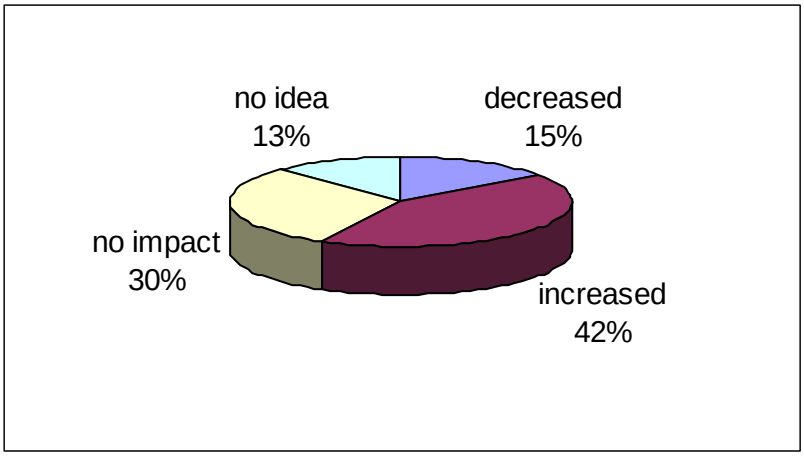


Figure 4: Perception of Villagers on Impact of Forest on Water Availability in Dabri

water availability and forest cover. More than 50% of those who feel that the positive link between forest cover and water availability exists, attribute it to the fact that increasing forest cover attracts more rainfall, and therefore leads to increased water availability. While the rest attribute increasing forest cover to reduction in water run off and less soil erosion. Interestingly, those that felt that forest cover has a decreasing effect on water availability could not attribute any reason as to why they feel so. Almost all the households felt that there is no negative impact of forest. In Devkani almost all the

[12] Since most of the district level and local level government department officials were on election duty, they could not be contacted by the team.

villagers expressed a positive relationship between forest and water, since forest attracts rain.

Regarding the perception on whether there has been some change in forest cover, while majority of the villagers did not have any idea regarding this, only 8% of the villagers felt that the forest cover has increased since the last five years, and 37% felt that it has decreased.

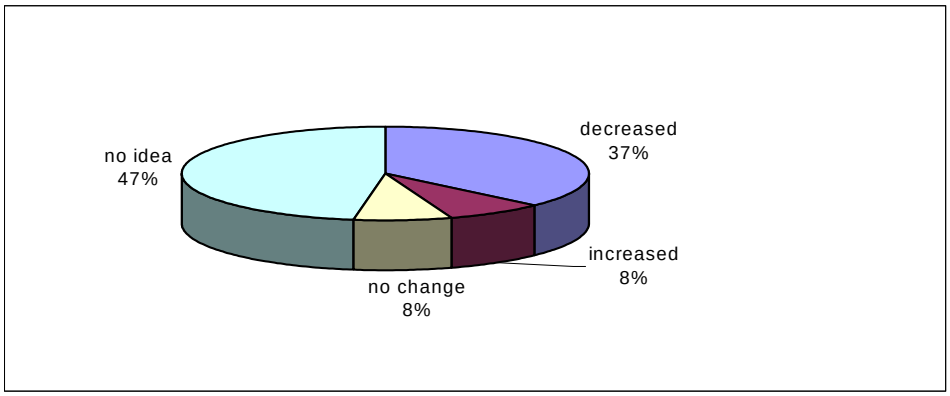


Figure 5: Perception on Change in Forest Cover in Dabri

The RGWM officials at the state level perceive a direct impact of increasing land under vegetative cover (including forests). Though they agree that a direct and positive correlation exists between increasing forest cover and water-flow, they also feel that this impact is limited if taken as a standalone effort, since further technical inputs for improved soil and water conservation efforts are also required simultaneously for a more effective and sustained impact. Their perceptions are mainly based on their experience of several years of implementation of watershed management projects in the state. They also mentioned that majority of the impact assessment studies of their projects have revealed that regeneration definitely leads to increase in ground water availability, as well as surface water availability, and also in many increases the number of functional wells.

On the other hand, the perception of the forest department at the state level is very distinctly in favour of a positive link between forest and water. The Forest Department feel that in general and particularly in the state of MP, forests play a significant role in maintaining the water table and in reducing runoff. They also feel that the type of land use is an important factor that determines the overall flow of water both at the surface and at the ground water level.

In our discussion with a local NGO who is also implementing a watershed management programme in nearby villagers (donor funded), an interesting perception came across. In general, they feel increasing the forest cover reduces the water flow, since most of the trees (depending on species) that are planted (or is originally there in the forests like Teak) absorbs water to a great degree, as a result sometimes in densely forested areas, the water flow in the river is sometimes observed to be less. However, in the recent past, since forests are being degraded (and cut), the water flow in the river has increased. Secondly, they feel that the cropping pattern also plays an important role in the status of water availability. In the past, since most crops were rainfed, the dependence on water from ground was less, however, the recent cultivated crops are water intensive and therefore has a reducing effect on water availability in general.

5.2 Perceptions on Watershed Development and its impact

At the local level, awareness on the benefits of watershed development was found to vary based on the benefits that each stakeholder has so far reaped from the programme. For most of the villagers, the most important benefit of the project seems to be the wage labour that was generated during the implementation phase. For the landless households, the main impact of the watershed programme has been the increased wage labour generated during the implementation phase. Post implementation they feel that they are able to get agriculture wage labour within the village mainly during the harvest season, which was hardly available during pre implementation period.

The marginal, small and medium farmers on the other hand feel that post watershed implementation, there has been a marked improvement in terms of meeting their subsistence needs. In some cases (particularly the small and medium landholders) felt that they were able to also earn considerable income from agriculture post implementation. All the villagers expressed that post implementation, since the agriculture economy in the village has improved considerably, migration for work to outside districts have also considerably reduced. It is also commonly expressed that most of the benefits of the watershed programme have been reaped in by the large landholders, as almost all the physical interventions (ponds, tube wells etc) undertaken under the programme are on the private lands of these large landholders.

The perception of the large landholders however differs slightly from rest of the households. Almost all the large landholders felt that watershed development programme has a positive impact on the availability of water in the village, since water available both for agriculture as well as domestic purposes has increased since implementation of the watershed programme in the village. They also feel that activities undertaken under the watershed development activities have reduced runoff, and have lead to better soil and water conservation.

To summarise, the villagers perceive watershed development projects as ‘an intervention for improved water availability’, which can have an indirect impact on their livelihoods mainly through better agriculture and improved drinking water supply. But most of all they perceive these projects as short tem employment generation schemes. However, no understanding on the overall philosophy of watershed development i.e. better ecological security through improved natural resource base (better conservation practices) and secure livelihoods, seemed to exist at the village level.

It is also interesting, that though the philosophy behind the RGWM seems to be guided by the conservation and livelihood link in the watershed project, the officials feel that in principle, separate and sometimes conflicting policies between different departments makes it all the more complex and difficult to practice the guiding principles behind watershed development. For example, the practice of restricted grazing or restriction on felling as emphasised upon by Joint Forest Management programme of the Forest Department often affects livelihood of a large section of the local communities. Similarly, in watershed projects, the case of demarcation of land for plantation results in similar confusion, which on ground leads to adverse effects, and if proper attention is not paid to alternatives, it may have negative impacts on livelihood. Therefore, they feel that in watershed projects, the basic focus should be on meeting the subsistence and livelihood needs of the rural poor and that conservation issues should accordingly be addressed.

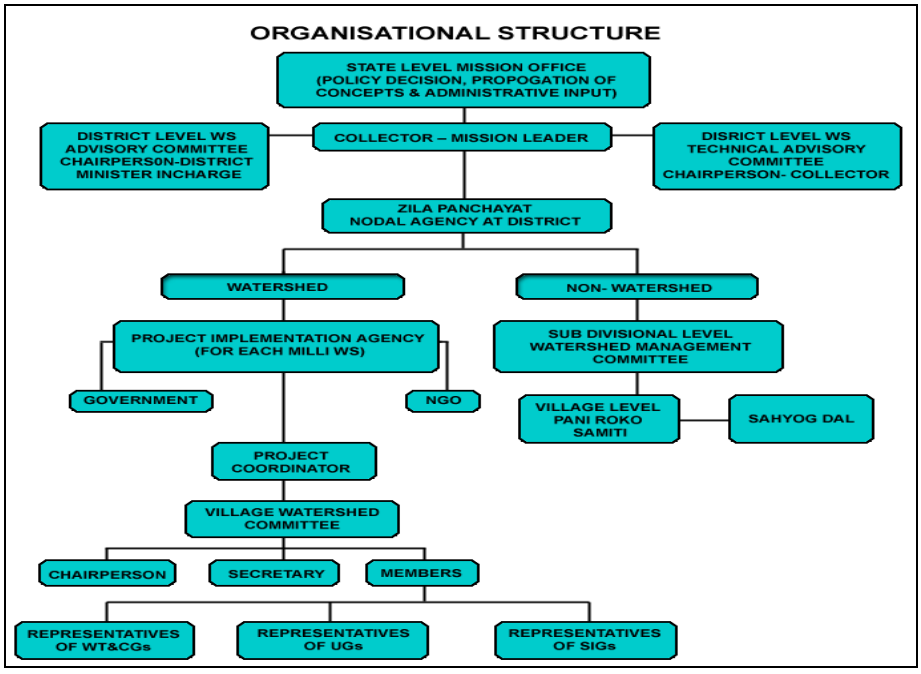
6. MAPPING INSTITUTIONAL STAKEHOLDERS

6.1 The Major Stakeholders

The main stakeholders involved in implementation of watershed development activities in Madhya Pradesh include state institutions and departments, users and user groups, down stream riparian states, civil society and External Support Agencies (ESA).

Figure 6 below presents the institutional mapping of stakeholders in MP. At the implementing/funding level, the Department of Rural Development acts as the nodal agency in watershed development project and implements all watershed projects through the Rajiv Gandhi Watershed Mission. Initially, RGWM was housed within the Panchayat and Rural Development Department. This apex body was created in 1994, with a mission mode to combine poverty reduction and environmental regeneration through integrated people centred watershed management. Under this, all sectoral funds under the DPAP, NWPRA, IWDP and other watershed schemes run by other line departments are operated together. In 1998, RGWM was registered as a society under the MP Societies Registration Act 1973. The Chief Minister heads the General Body of the Watershed Mission. The Empowered committee and the Technical Advisory Committee play the role of Coordination among government departments that had been envisaged as the function of the State Watershed Programme Implementation and Review Committee in the 1994 Guidelines. The RGWM is currently operational in all districts of MP and with covers nearly 35 lakh hectares and 7600 villages, making it one of the largest watershed development projects in India. Figure 4 below outlines the organisational structure of RGWM.

Figure 6: Institutional Structure of RGWM



6.1.1 Institutional structure of RGWSM

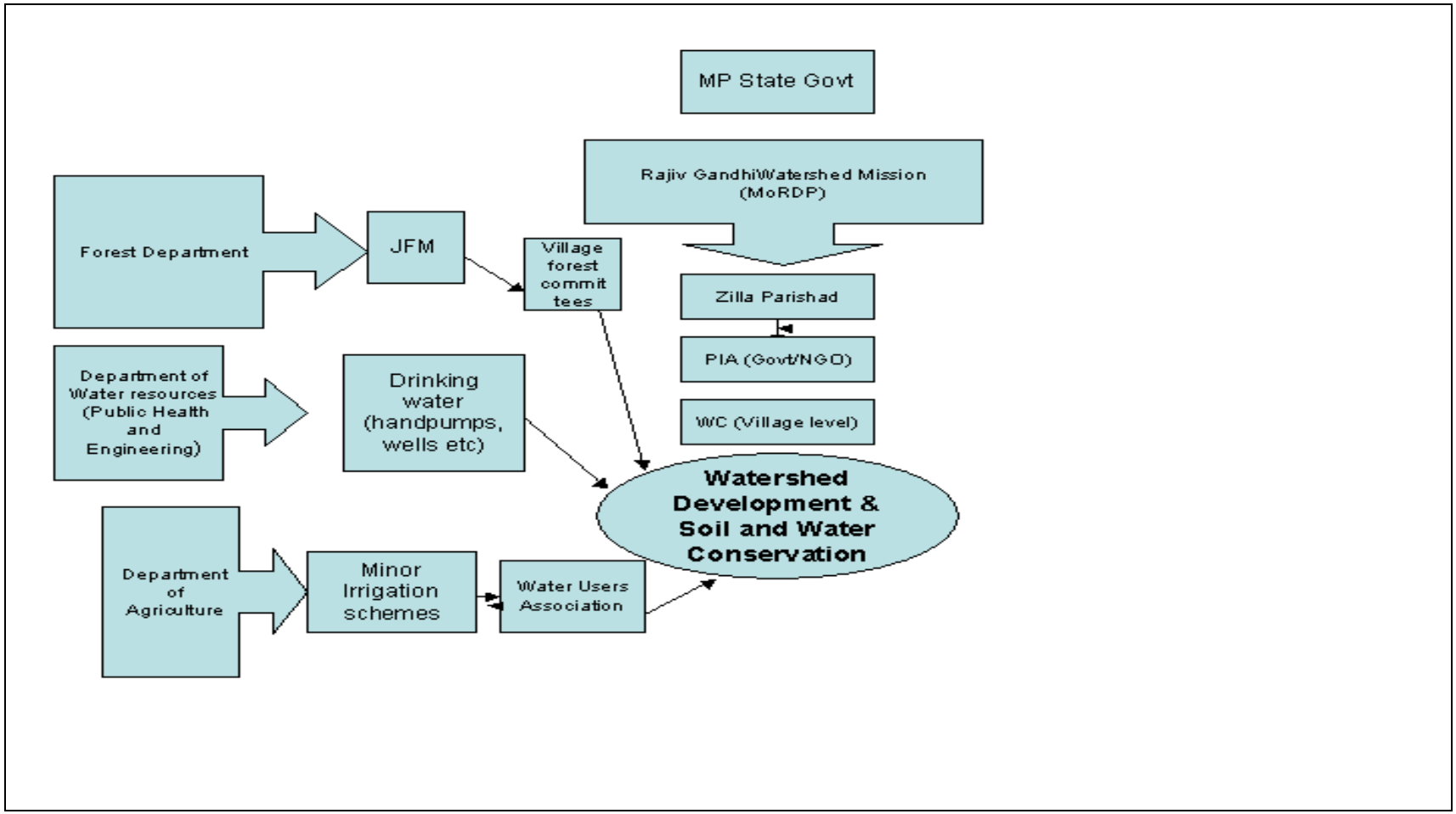
At the state level, there is a mission office (in Bhopal) involved in policymaking and overall supervision of the programme. The empowered committee at the state level

functions under the direct supervision of the Chief Minister to oversee and guide the mission activities. The mission is headed by a full time director, who is assisted through technical assistance from a range of departments. At the district level, the district collector basically coordinates as the mission leader, with an advisory committee (technical and administrative). The main nodal agency through which all funds are further allocated is the Zila Panchayat. Further, all villages are divided into watershed villages and non-watershed villages. At the village level, a project-implementing agency is selected (can be government or non government). At the village level, watershed committee is formed comprising of a chairperson, a secretary and members. In the non-watershed villages, a programme 'pani roko abhiyan' has been initiated, which is implemented through a village level 'sahyog dal'.

Besides RGWM, and the Pani Roko Abhiyan, there are other watershed management initiatives like the Joint Forest Management programme of the Forest Department. As part of this programme, some soil and water conservation treatment are also undertaken in forestland.

The Water Resources Department through the Public Health and Engineering department provides drinking water to rural and urban areas in the state. In the rural areas since drinking water is available only through local supply, they undertake infrastructural development like construction of handpumps, shallow wells etc. The Department of Agriculture and Irrigation also undertakes interventions at the village level for improved irrigation and agriculture. Madhya Pradesh has passed the Participatory Irrigation Management Act (1999), under which Water Users Associations will be established, who will eventually be responsible for the management, operations and maintenance of the irrigation system. Some 1470 WUAs have been established in Madhya Pradesh, covering all irrigation schemes in the state. Over and above all there is the Apex body of the State Water Resources Utilisation Committee (SWRUC), which is the nodal government department (Water Resources Department) with members from other concerned government departments, such as Agriculture, Industry, Public Health Engineering, Forestry, Fisheries, M.P. Electricity Board, Training Institutions (e.g.WALMI), District Water Resources Utilisation Committees, Inter-state tribunals. The Chief Secretary heads the SWRUC and members include the Secretaries Industry, Revenue, PHED and Major Projects Control Board, and the Chief Engineers of the WRD and of the major projects. The Committee examines requests for allocations of bulk water supplies from a/o industries, the power sector, municipalities, the irrigation sector, cooperatives, and housing projects.

Figure 7: Institutional Mapping of Stakeholders in Watershed Development in MP



7. KEY FINDINGS

Based on the village-level surveys and interactions with some key stakeholders, the following key and relevant findings were made:

1. At the village level, the perception of role of forests is influenced mainly by the extractive use of the forest at the village level: Forest still continues to be a source of subsistence for the rural communities, though the degree of dependence varies, based mainly on the landholding size. For example, the landless and the poor still earn a substantial part of their income from sale of non timber forest produce (NTFPs), while the rest of the rural communities are dependent on forests mainly for fuelwood, fodder and grazing. Accordingly, at the village level, the role of forests is perceived mainly for meeting subsistence need and in some cases (in the case of landless and the poor), is also perceived as the only source of livelihood. On the other hand, those at the programme implementation and policy making level, assign a broader role to forests, like that of 'ensuring ecological security' and thereby having an 'impact on ensuring better livelihood' for the local communities.
2. Regarding the perception on forest water linkages, at the village level, though majority of the villagers feel that a positive link exists between forests and water, a considerable number of villagers also expressed that there is no link between forest and water. The main reason for the positive link is attributed to the fact that forests bring rainfall and thereby increases water availability as a whole, while a few of them also feel that forests lead to reduction in runoff and less soil erosion. On the other hand those that felt that there is no positive link between the two could not attribute any reason as such for their perception. Meanwhile, those at the implementation and policy level, unanimously agree that forest has a positive impact on water-flow in general. While they also point out, that increased forest cover in itself will have limited impact on water availability, unless coupled with other technological and scientific interventions (like better soil and water conservation measure, appropriate land use practices etc).
3. Regarding the function and benefits of watershed management, an interesting range of perception comes across. At the village level, it mainly varied based on the landholding size; for the landless, watershed projects are mainly 'wage labour generating scheme' that also helps in reducing migration to outside districts (a view reflected by all the villagers), while the landed mainly perceive watershed projects as 'intervention for improved agriculture' and in few cases noted that it leads to improved supply of drinking water, and better subsistence economy. However, there seems to be no understanding as such on the larger hydrological role and functioning of watersheds at the village level. At the programme implementation and policy level, though, the perception on watershed development reflected a broader understanding of the larger hydro ecological role and functioning of watersheds, yet there seemed to be obvious conflicting and contradictory views on the basic objectives and focus of watershed management. For example, some stakeholders felt that increasing focus on conservation efforts can adversely affect livelihood, if appropriate livelihood alternatives are not provided. Also basic interdepartmental contradictions in priorities were also found to exists- for example while some implementing agency feel that water conservation will help in improving livelihood base and therefore strategises accordingly, the other department orients its activities based on the presumption that

'water conservation should improve the health of the forests'. This lack of a comprehensive and common (and agreed) understanding of the philosophy of the programme leads to ineffective implementation.

4. Watershed management project has a positive impact mainly on agriculture, through mainly increase in water table and increased moisture in the soil (principally benefiting the landed). As a result of this, not only does the cropped area increase, but villagers also start multiple cropping in most cases. However, it was also observed that unless the watershed intervention is followed up by appropriate supporting programmes (training from agriculture experts regarding improved crops and practices, efficient modes of irrigation) in very few cases, does the cropping pattern change and farmers are not able to adequately capitalize on the assets (e.g. water resources) generated through the intervention. The later view was also reiterated by the implementing agencies.
5. Better livelihood opportunities provided (through improved subsistence economy and in some cases through increased income) reduces 'stress' migration. However, the emphasis of the watershed projects are at present more on 'agriculture' as a result, the issue of promoting alternative (mainly off farm) income generating activities does not seem to have really caught on. A lot more focus and debate is required on this issue, for example, if livelihood can be secured through 'improved subsistence economy' should then the focus of these programmes be on off farm activities, and if yes, are efforts taken to promote sustainable and appropriate alternatives[13].
6. The issue of 'equitable benefit flow' has to be more effectively addressed at both the implementing and the policy level. For example, if the implementing agency does not make concerted efforts at ensuring equitable participation and benefit flow, mostly the powerful and landed few dominate the entire programme to their own benefit. At the policy level, unless explicit provisions are built in to address social justice concerns, implementation tends to gloss over and tilt benefits to the well off.
7. The nature of financial investments and the resultant benefit from the project (social, economic and financial) that accrues is hardly monitored and evaluated at the project level. Most of the evaluations done are mainly scientific in nature, and do not involve the local people at any level. This basically inhibits the broader understanding of the project, and does not promote ownership. Though efforts have been initiated in some parts of the state on community based monitoring and evaluation, it is still on a piecemeal basis and needs to be replicated widely
8. In most cases it has been found that as soon as the implementing agencies withdraw from the field, the local institutions created (water user association/water users committee) collapse and are not able to maintain the continuity. This is observed more in those cases, where the investment on social capital (in terms of capacity building and empowerment of village level institutions) is poor.
9. The recent importance given to Panchayat and the role it is envisaged to play at the village level is questionable at all level- at the village level, panchayats are completely

[13] Though this line of argument stands more for marginal and small and medium farmers, there is another line of thinking that particularly in the case of the landless, often migration can actually be seen as a good alternative livelihood option to be promoted.

bypassed in the implementation of watershed development programmes and project-specific institutions – Watershed Associations, Watershed Committees – are set up at the micro-watershed level. In fact in most cases, each considers the other as a parallel and competitive body. No synergies exist between the various committees (JFM committee, watershed committee, or panchayat), though in some cases the kind of activities they are engaged in are same. Villagers perceive that the governments vision of 'decentralising (and merging all village level local bodies) and functioning through Panchayat', will add to their woes, since Panchayat as it is currently functioning cannot do justice to village level concerns, and are dominated by the powerful and elite. On the other hand, the panchayat members still does not seem to have understood the 'state government vision' of decentralizing and is currently functional more as political bodies.

APPENDIX

1. Fieldwork Personnel, Schedule & Methodology

The fieldwork for this study was conducted between the 3rd to the 12th of November 2003.and was preceded by a two-day pilot survey in July 2003. The Regional Rural Laboratory, Bhopal, assisted Winrock International India professionals in the selection of the villages with the logistics of the fieldwork. The team members involved in the pilot survey were:

Winrock International India:
Vinay Tandon, Program Manager, Natural Resource Management Unit
Mamta Borgoyary, Program Officer, Natural Resource Management
Neeraj I Peters, Programme Officer, Natural Resource Management

Regional Rural Laboratory, Bhopal:
Dr. Raghuvanshi Ram

The team that carried out the main fieldwork in November consisted of:

Winrock International India:
Mamta Borgoyary, Programme Officer, Natural Resource Management
Sunandan Tiwari, Programme Officer, Natural Resource Management
Neeraj I Peters, Programme Officer, Natural Resource Management

RRL was the project-implementing agency (PIA) in the selected micro watersheds. Since the staff of RRL had established rapport with the villagers in the two selected villages, they assisted in establishing the initial contacts in the selected villages. WII professionals collected household data through questionnaires and conducted the focus group discussions and semi-structured interviews. The questionnaire and the checklists for the focus group discussions and semi-structured interviews were prepared by WII.

Due to the ongoing elections during the field visit period, the team could not meet with most of the officials at the state level and also at the line department level. A separate visit to cover this is to be undertaken later.

At the state level, the following persons were met:

1. Rajiv Gandhi Watershed Mission (Project Director, program officers)
2. State Forest Department (PCCF, CCF, Ex PCCF)
3. Eklavya
4. Water Aid

2. Survey Tools

Given below are the various tools that were utilised for data collection from the village level.

2.1 FGDs checklists

Note: All the points to be covered in all the FGDs as listed below should get a picture of change over time, making it important to keep the pre-intervention / post – intervention context in mind.

Farmers (Large / medium / small & marginal):

- Cropping patterns – changes in the cropping pattern over time, water requirements of different crops etc.
- Pesticide and fertilizer / manure use – general trend
- Changes in irrigation sources, modes, patterns
- Perceived benefits of the watershed development programme
- Contribution made towards the watershed development programme
- Dependence on forests
- Access to forests and other common property resources, current management practices
- Issues pertaining to encroachment of common lands
- Traditional management practices and history (related to forests, water and common lands)
- Rules for distribution and sharing of water and other resources / usufructs
- Changes in livestock population, composition, sources of fodder over time
- Currently operational local institutions (role, membership etc.) and linkages with Panchayati Raj Institutions (PRIs)

Landless:

- Main sources of livelihood
- Perceived benefits of watershed development programme
- Contribution made / involvement in watershed development programme
- Changes in migration patterns
- Access to common lands and forests
- Management practices and rules governing resources from forests and other usufructs
- Changes in livestock population, composition, sources of fodder over time
- Issues pertaining to encroachment
- Currently operational local institutions (role, membership etc.) and linkages with Panchayati Raj Institutions (PRIs)

Graziers / Nomadic communities:

- Changes in livelihood over time
- Population and composition of livestock holdings – changes over time, reasons for changes

- Migration patterns – routes (local and long distance), changes in composition of migrating unit over time
- Involvement and perception of benefits of the watershed development programme
- Access to forests and common lands

Watershed Committee:

- History (Year of constitutions, method of selection)
- Main roles / functions & responsibilities
- Sources of revenue
- History of the watershed development intervention – process, benefits, lacunae
- Systems in place for operation & maintenance of watershed development intervention
- Conflicts over water & conflict resolution
- Current practices / rules / regulations for both demand and supply side management of water
- Linkages with PRIs

Women's groups / Self – help groups:

- Perceived benefits of watershed development intervention
- Changes in drinking water, domestic water, fuelwood and fodder availability (sources, time spent in collection etc.)
- Changes in cropping patterns, agricultural practices, sources and modes of irrigation
- Access to forests and common lands
- Current and traditional management practices pertaining to water, forests and common lands
- Changes in literacy and health profile

JFM committee:

- JFM institutions working, their activities
- Type of forests managed
- RF/PF etc
- Traditional management systems, management system after JFM
  Major forest products derived, major uses and value of the NTFPs for the household, annual income
- Other occupations undertaken
- Land under possession/ encroachment issues
- Benefits derived from watershed activities, status of availability of water for different purposes pre and post watershed development/ activities undertaken in the protected patches e.g. check dams
- Membership of different groups
- Livestock rearing/grazing-when, where

2.2 Household Survey Questionnaire (Madhya Pradesh)

1. Name of village:
2. Name of respondent:
3. Caste:
4. Occupational profile:

Sources of Income	Primary / Secondary Source (P/S)	Annual Income			Change in income attributed to
		Current year	Last year	Pre wtshed	
Agriculture					
Wage labour in the village					
Wage labour outside the village					
Livestock rearing					
Service (specify)					
Business (specify)					
Village artisan (specify)					
Other					

5. Land ownership:

Landholding Categories	Pre Watershed Intervention	Post Watershed Intervention
Total area (acres)		
Irrigated area (acres)		
Rainfed area (acres)		
Land leased in (acres)		
Land leased out (acres)		

6. Cropping pattern:

	Pre Watershed Intervention			Post Watershed Intervention		
Crops	Area (acres	Subsistence / Cash	Income per year	Area (acres	Subsistence / Cash	Income per year
Kharif:						
Rabi:						
Zaid:						

7. Irrigated crops:

Crops	Total nos. of wettings required	Pre Watershed Intervention			Post Watershed Intervention		
		Area irrigated (acres)	Mode of irrigation	Nos. of wettings made	Area irrigated (acres)	Mode of irrigation	Nos. of wettings made
Kharif:							
Rabi:							
Zaid:							

8. (a) Domestic water:

Use	Pre Watershed Intervention				Post Watershed Intervention			
	Source	Time taken in collection / day			Source	Time taken in collection / day		
		Nov-Feb	March-July	Aug.-Oct.		Nov.-Feb	March-July	Aug.-Oct.
Domestic purposes								
Livestock								

(b) Do you buy water?

Pre Watershed Intervention: (Y / N)

Purpose:

Amount spent / year (in Rs.):

Post Watershed Intervention: (Y / N)

Purpose:

Amount spent / year (in Rs):

(c) Do you sell water?

Pre Watershed Intervention: (Y / N)

Purpose:

Amount earned / year (in Rs.):

Post Watershed Intervention: (Y / N)

Purpose:

Amount earned / year (in Rs):

9. Livestock:

Livestock Composition	Nos.	Grazed Live-stock	Season	Avg daily Time spent	Grazed Where?	Condition: Adequate/ Inadequate	Change in grazed livestock in last 5 years
			Summer				
			Rains				
			Autumn				
			Winter				

10. Forests:

	Pre Watershed Intervention				Post Watershed Intervention			
Forest Products	Qty. extracted / yr.	Use/ Product	Subsistence/cash	Annual Income	Qty. extracted / yr.	Use/ Product	Subsistence/cash	Annual Income

11. (a) List the uses made of the land on which plantation activities have been carried out

Sl. No.	Pre Plantation	Post Plantation

(b) Have been positively or negatively impacted by the plantation? How?
(Note: Encourage the respondent to consider all benefits and losses)

12. (a) Has there been a major change in the forest cover? (Increased / Decreased / No change)
(Note: Use a major event that affected the forests around the village as appoint of reference)

(b) Has the change in the condition of the forest affected water availability? How?

13. Have the plantation activities increased water availability?

14. Which of your needs has the watershed management programme met and which are the ones it has not met?