Study No. - 163

STUDY ON IMPACT EVALUATION OF NATIONAL WATERSHED DEVELOPMENT FOR RAINFED AREAS ENVISAGED AS WARSA JAN SAHBHAGITA DURING TENTH PLAN (2002-2007) (Consolidated Report)

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VOLUME I

Preface

In the millennium century, increased population necessitates greater demand for water, timber, livestock, agriculture crops and environmental amenities. This is manifested in degrading natural resources and environment. Hence, efficient, equitable and sustainable use and management of natural resources in dry land environment are necessary for economic development of region and more so in the agrarian country like India. Development, promotion and management of appropriate watershed technologies in dry land regions have been viewed as major priorities to ameliorate the problem of natural resource degradation. This results in multiple benefits such as ensuring food security, enhancing viability of farming and restoring ecological balance. The present strategy of watershed development programme is to protect and sustain the livelihoods of resource poor farmers who are experiencing production constraints in addition to problems created by soil erosion and moisture stress. Watershed development is to ensure the availability of drinking water, fuel wood, fodder and helps in raising income and employment for farmers and landless labourers through improvement in agricultural productivity and production.

In the light of the above background and consideration, the present study entitled "Study on Impact Evaluation of National Watershed Development for Rainfed Areas Envisaged as Warsa Jan Sahbhagita During Tenth Plan (2002-2007)" has been undertaken as common study involving several Centres at the instance of the Directorate of Economics and Statistics, Ministry of Agriculture, Government of India, with a view to studying the impact of National Watershed Development for Rainfed Areas.

The study has been carried out by Dr. Debashis Sarkar and the undersigned. The secretarial assistance has been received from Mr. D. Mondal, Mr. P. Das, Mr. N. Maji, Mr. Munsi A. Khaleque, Mr. P. Hazra and Mr. S. Sadhu. The duplicating of the report has been done by Mr. A. Patra.

On behalf of the Centre, the undersigned likes to take the opportunity to thank the research personnel and officials of the AERC, V.V.Nagar, Gujarat; AERC, T.M. Bhagalpur University, Bhagalpur, Bihar and AERC, Gokhale Institute of Politics and Economics, Pune, Maharashtra for their cooperation in conducting the study in their respective state.

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I
INTRODUCTION

1.1 Preamble

In the millennium century, increased population necessitates greater demand for water, timber, livestock, agriculture crops and environmental amenities. This is manifested in degrading natural resources and environment. Rainfed agriculture forms 70 per cent of cultivable land in India. Dry land regions have been victims of neglect of the policy front. This is due to concentration of public resources through irrigation development and green revolution technologies in the well-endowed regions for meeting the food requirements. While productivity level in well-endowed regions has reached the potential, further increase in area under irrigation is not only limited but also expensive. Hence, efficient, equitable and sustainable use and management of natural resources in dry land environment are necessary for economic development of region and more so in the agrarian country like India.

Development, promotion and management of appropriate watershed technologies in dry land regions have been viewed as major priorities to ameliorate the problem of natural resource degradation. This results in multiple benefits such as ensuring food security, enhancing viability of farming and restoring ecological balance (Reddy, 2000). The present strategy of watershed development programme is to protect and sustain the livelihoods of resource poor farmers who are experiencing production constraints in addition to problems created by soil erosion and moisture stress. Watershed development is to ensure the availability of drinking water, fuel wood, fodder and helps in raising income and employment for farmers and landless labourers through improvement in agricultural productivity and production (Rao, 2000).

1.2 Watershed Development Programme in India

The origin of scientific and planned programme for natural resource (soil and water) conservation on watershed basis was first initiated in early fifties at the Central Soil Water Conservation Research & Training Institute, Dehradun. In 1974, four operation Research Projects (ORP's) were taken up at Sukho Majri and Bunga (Haryana-Shivalik), Fakot (Uttar Pradesh Garhwal), Siha and Bajar Ganiyar (Haryana Aravalli Hills), G.R.Hlli (Karnataka-Chitradurga Hills), Sheetalpur in Bundelkhand Region and Etmadpur at Agra, Uttar Pradesh (Dhruvanarayana, 1987). Ministry of Rural Development initiated Drought Prone Area Programme (DPAP), Desert Development Programme (DDP) and the Wasteland Development Programme for the conservation of land and water resources. The National Afforestation and Ecological Development Board initiated a programme for restoring degraded forestlands. Agencies such as Central Research Institute for Dry land Agriculture (CRIDA), World Bank, Danish Development Agency (DANIDA), and Swiss Development Corporation also designed programme for the conservation of natural resources by launching a number of watershed development projects. The Government of India launched the National Watershed Development Programme for Rainfed Agriculture (NWDPRA) in the Seventh Plan. By 1984-85 the work was launched in 4,400 micro watersheds covering an area of 4.3 m ha in the country.

Due to encouraging results from watershed development programmes, Government of India constituted a technical committee headed by Professor C.H. Hanumantha Rao in 1993 to review and recommend suitable measures for improvement of DPAP and DDP. The committee observed that despite being in operation since two decades these programmes had not created substantial impact. Drought conditions increased ecological degradation in the DPAP and DDP areas.

Keeping in view the knowledge gained from successes and failures, and after consultations with Non-Government Organisations (NGOs), state

governments, professionals and research institutions the Ministry of Rural Development, Government of India in 1994 prepared and adopted 'Guidelines for Watershed Development'. The NWDPRA brought out its own guidelines in 1995.

Government of India, during the eighth five-year plan made every effort to incorporate wasteland development in NWDPRA, DPAP, DDP and IWDP. Several committees studied the problems in depth in consultation with various stakeholders and made recommendations. These recommendations are being implemented vigorously.

The NWDPRA was further restructured in November, 2000 by retaining technical strengths of the other programme and incorporating lessons learnt from the successful projects, especially on community participation. The watershed development programme was planned, implemented, monitored and maintained by the watershed communities. To bring about uniformity in programmes, being implemented by various agencies, the 'WARASA-Jan Sahbhagita' guidelines were issued in conformity with the 'Common Approach/Principles for Watershed Development' agreed upon by the Ministries of Agriculture and Rural Development. The salient features of the restructured project are (1) participatory approach in implementation of Watershed Community projects through Watershed Committee (WC), Watershed Associations (WA), User Groups (UG)/Self Help Group (SHG) etc., (2) planning through Participatory Rural Appraisal (PRA) mechanism, (3) revision of cost norms from Rs. 3500 to Rs. 4500 per hectare (<8% slope) and from Rs. 5000 to Rs. 6000 per hectare (>8% slope), (4) revision of component-wise allocation of resources, (5) flexibility of choice of activity and technology, (6) sustainable watershed development through different Project Implementing Agencies (PIAs), (7) role of PIAs as facilitator, (8) broad basing of Watershed Development Team (WDT) for better community mobilization, (9) thrust of Transfer of Technology and innovativeness for utilisation of research funds earmarked for watershed technology through Indian Council of Agricultural

Research (ICAR), Krishi Vigyan Kendras (KVKs), State Agricultural Universities (SAUs) etc., (10) development and management of Common Property Resources (CRPs) and forest lands, (11) convergence of programmes, (12) enlarging role of NGOs and Panchayats, (13) project benefit and cost sharing by beneficiaries, (14) improvement of Monitoring and Evaluation (M&E) System, (15) impact assessment through development of realistic quantifiable indicators, (16) capacity building through training and orientation and (17) extension support through line departments.

In view of the considerable restructuring of the programme with greater decentralisation and community participation, higher degree of flexibility of choice of technology and suitable institutional arrangements for ensuring long-term sustainability had been adopted. Through the programme was being monitored regularly through quarterly, half yearly and annual progress reports and field visit by the officers, yet the need for an independent evaluation through outside agency was felt necessary for assigning the impact of the programme.

Considering the peoples' participation in watershed areas and bottom-up rather than top-down approach, the Ministry of Agriculture had revised its guidelines for the National Watershed Development Project for Rainfed Areas (NWDPRA) again in 2001. In these new guidelines it was mandatory for the 'Watershed Development' to be planned, implemented, monitored and maintained by the Watershed communities themselves. Moreover, to bring about uniformity in approach among the Watershed-based programmes being implemented by various agencies, the WARASA (Watershed Areas' Rainfed Agricultural System Approach) JANSAHBHAGITA guidelines were framed.

Again in 2003, a committee headed by Hariyali has recommended strengthening of Panchayat Raj Institutions (PRIs) and making accountable for planning, implementation, monitoring and management of watersheds at one or two village level (Anonymous, 2003).

Table 1.1 : Area proposed and estimated cost for watershed treatment for next 25 years in India

Plan	Area proposed for treatment (M ha)	Per hectare cost (Rs.)	Total cost of treatment (billion Rs.)
IX	10.0	5,000	5.0
X	12.0	7,500	9.0
XI	15.0	11,000	16.5
XII	15.0	15,000	22.5
XIII	11.4	20,000	22.8

Source: Report of working group on Soil and Water Conservation for the formulation of Ninth-FYP, Department of Agriculture and Co-operation, Ministry of Agriculture, 30 April ,1996

In India an area of 172.2 million hectare was planned to be treated through Watershed Development Programme, of which 29.2 per cent had already been treated. For providing watershed based resource conservation treatment for the remaining 122 million hectare area, an investment of Rs. 297.37 billion was required at 1996 prices based on per hectare cost of watershed treatment, which varied from Rs. 1240 in West Bengal to Rs. 7776 in Union Territories. It was planned to treat 12, 15, 15 and 11.4 million hectare during the tenth, eleventh, twelfth and thirteenth five year plans (FYP) (Table- 1.1). Projected investment for watershed treatment varies from Rs. 5,000 in ninth FYP to Rs. 20,000 per hectare in the thirteenth FYP. Up to the end of the X-Plan, a total area of 9402823 hectare has been developed by incurring an expenditure of Rs. 3033.32 crore. During X^{th} Plan the NWDPRA was implemented in 6315 Watersheds and an area of 2413333 hectare have been developed with an expenditure of Rs. 1156.92 crore.

1.3 Watershed Development Programme in 10^{th} Five Year Plan

Prof. C. Hanumantha Rao committee was appointed in 1993 to appraise the impact of the work done under NWDPRA, DPAP and DDP projects. The committee reported various shortcomings in the ongoing NWDPRA project. The committee observed that the programmes have been implemented in a fragmented

manner by different departments through rigid guidelines without well-designed plans prepared on watershed basis by involving inhabitants. Except in few places, in most of the areas achievements were far below the expectation. Ecological degradation has been found proceeding unabated with reduced forest cover. Keeping in view the above mentioned shortcomings of NWDPRA and to make this programme more participatery, sustainable and equitable, Prof.Hanumanth Rao committee prepared new guidelines of X plan NWDPRA in 2001, and named it as "WARASA (Watershed Areas Rainfed Agricultural System Approach) JAN SAHBHAGITA" This new guideline of NWDPRA retained all technical strengths of the older NWDPRA and incorporated lessons learnt from the successful watershed and community participation projects. For bringing uniformity in approach among various agencies implementing watershed based programme/ NWDPRA, Ministry of Agriculture (MOA) and Ministry of Rural Development (MORD) adopted jointly formulated guidelines "WARASA JAN SAHBHAGITA (WJ)". As per new guidelines, the Watershed Development Programme is now planned, implemented, monitored and maintained by watershed communities themselves. In guidelines, there has been a radical shift of "Top down management approach" to "Bottom-up management approach" in organising the watershed programme. This Xth plan NWDPRA aims to bring about desired dynamism in rainfed areas, enhancing productivity on a sustainable basis, through enduring people's movement for watershed development. It also aims to create alternate employment and income generation options for rural community including landless and thereby reduce inequality between irrigated and rainfed areas. The sequence of activities and their operational modalities would vary according to local situation. Hence, the new guideline is flexible so that desired modification could be effected at different levels. The other important elements of new guidelines are democratic decentralisation in decision making, transparency in approach to empower the community, building upon indigenous innovations, convergence of activities/schemes of government and NGO and shifting from

Table 1.2 : Degraded lands developed in India under various watershed development programmes since inception up to the tenth Five Year Plan

(Area in lakh ha and expenditure in Rs crore)

Sr. No.	Ministry/Scheme and year of Start	Progress since inception up to Ninth Plan		Progress in Tenth Plan* (2002-07)		Total since inception up to Tenth Plan*	
		Area	Expr.	Area	Expr.	Area	Expr.
(A)	**Ministry of Agriculture (Department of Agriculture and Co-operation), Govt. of India**						
	NWDPRA (1990-91)	69.79	1877.74	23.30	1147.82	93.09	3025.56
	RVP and FPR (1962 and 1981)	54.88	1516.26	9.98	727.98	64.86	2244.24
	WDPSCA (1974-75)	2.58	166.27	1.35	129.31	3.93	295.58
	RAS (1985-86)	5.81	76.39	1.30	45.35	7.11	121.74
	WDF (1999-2000)	0.00	0.00	0.59	26.02	0.59	26.02
	EAPs	13.35	2039.81	4.80	1927.54	18.15	3967.35
Sub Total (A)		146.41	5676.47	41.32	4004.02	187.73	9680.49
(B)	**Ministry of Rural Development (Department of Land Resources), Govt. of India**						
	DPAP (1973-74)	68.95	3284.74	68.32	1557.76	137.27	4842.50
	DDP (1977-78)	33.56	797.38	45.17	1152.50	78.73	1949.88
	IWDP (1988-89)	37.34	616.51	62.22	1821.64	99.56	2438.15
	EAPs	1.40	18.39	3.60	274.28	5.00	292.67
Sub Total (B)		141.25	4717.02	179.31	4806.18	320.56	9523.20
(C)	**Ministry of Environment and Forests, Govt. of India**						
	NAEP (1989-90)	0.70	47.53	0.00	0.00	0.70	47.53
Total (A+B+C)		288.36	10441.02	220.63	8810.20	508.99	19251.22

Note: *Includes tentative achievement of 2006-07

Source: Report of the Working Group on Natural Resources Management for the Eleventh Five Year Plan (2007-12), Planning Commission, Government of India (February,2007)

subsidy oriented development to self reliant development etc. The broad objectives of X Plan NWDPRA were as follows:

1. Conservation, development utilisation and sustainable management of natural resources like land, water, plant, animal and human resources.
2. Enhancement of agricultural productivity and production in a sustainable manner.
3. Restoration of ecological balance in the degraded and fragile rainfed eco-systems by greening these areas through appropriate mix of trees, shrubs and grasses.
4. Reduction in regional disparity between irrigated and rainfed areas.

5. In addition to food, fodder and fuel to create sustained employment opportunities for the rural community including the landless and enhancement of activities for livelihood support, particularly for under privileged sections.

During Xth five year plan, the revised NWDPRA was implemented in the country in 6315 watersheds covering area of 23.30 lakh hectares by spending about Rs. 1148 crores (See table 1.1). Upto the end of Xth five year plan, total area of 93.09 lakh hacters have been developed under NWDPRA by spending of Rs. 3025.56 crores.In India, upto the end of Tenth plan, under various watershed development programmes of MOA, MORD and MOEF, total area of 508.99 lakh hecters have been developed by spending Rs. 19251. 22 Crores. (Table -1.2).

1.4 Need for Impact Assessment of Watershed Development Programme

A study on watershed by Deshpande and Narayanmoorthy (1996) identified four groups of studies in dealing with different aspects of watershed management. The first group dealt with analysis of rainfed farming in India focussing on enlisting constraints, in management and utilisation of soil moisture under rainfed farming. Second group of studies concentrated on impact assessment of watershed development by incorporating individual components of management. Third group included studies covering the entire watershed where impact parameters include agricultural and environmental sectors. The last group comprised of the work by hydro-geologists analysing the changes in the groundwater. Considerable number of studies has reported the impact of watershed on agriculture productivity, afforestation, groundwater recharge, income, and employment and livelihood security. However, only a few studies analysed the direct use benefits and listed the direct non-use benefits (Chopra, 1999). Therefore, there is a need to estimate the direct non-use benefits and indirect non-use benefits from watershed in addition to direct use benefits.

Many services provided by watershed are positive externalities. The flood control benefits, water infiltration services, and species sustaining services offered by watersheds are usually external to farmers. As a result, habitats that support complex ecosystems are valued cheaply. Since watershed development programmes are public funded ones, it is important to consider the social benefits for public attention. Therefore, valuation of external benefits of watershed is important to provide support for reasonable public policies to protect habitats. This makes it all the more important to determine the values of watershed services.

In recent years both central and state governments have drawn up programmes on watershed development with internal and external assistance. Given the complexity of activities in the watershed development programmes and their linkages, economic evaluation of discerning tangible and intangible benefits is essential to justify investment of scarce financial resources. This will add for better formulation, modification and implementation of watershed development projects with appropriate institutions for sustainable management of watersheds.

In view of the above, this study has been undertaken to assess the long-term economic impact on agriculture productivity, land use and cover, groundwater recharge watershed system and sustenance of watershed technologies/practices in West Bengal.

1.6 Issues Addressed in the Study

The study has been conducted in four states viz., West Bengal, Rajasthan, Bihar and Maharashtra. The main objective of the study is to evaluate the changes which happened due to the interventions of the programmes in the selected watersheds. This means that whether the changes have to be clearly and objectively attributed to NWDPRA programme have been assessed in detail. The issues addressed in the study are (1) analysis of efficiency and equity implications

of watershed development, (2) costs and benefits of different watersheds, (3) social mapping of farmers and watershed treatments to analyse the potential to water resource benefits through watershed development programme, (4) estimation of land value augmentation due to watershed development and (5) assessment of overall benefits and costs of watershed development programmes.

Keeping the above objectives in mind, the present study has been conducted to have full understanding of the programme. The study has been conducted keeping in mind the WARASA-JAANSAHABHAGITA guidelines for NWDPRA and tried to evaluate implementation status of guidelines in the Watershed Projects. The broad perspective of aspects which have been covered in the report are (1) community organisation and institutional aspects, (2) planning aspects, (3) implementation aspects, (4) environmental aspects, (5) social aspects, (6) economic aspects, (7) institutional aspects, (8) indirect benefit, (9) overall impacts and sustainability and (10) people's reaction.

1.6 Scheme of the Chapters

The entire report has been subdivided into two parts i.e. Volume-I and Volume-II. Volume-I of the report contains five chapters. The first chapter introduces the genesis of watershed development programme as restructured and implemented in India as well as in other states. Research methodology has been discussed in Chapter-II. Description of selected watersheds as per the prescribed guidelines has been discussed in Chapter-III. The issues like performance indicator, technical impacts, environmental impacts, social impacts, economic impacts indirect benefits and overall impact on sustainability have been discussed in Chapter-IV. The Volume-I ends with summary and conclusions with appropriate recommendations in Chapter-V. All supporting facts and detailed documents have been presented in Volume-II.

II
RESEARCH METHODOLOGY

2.1 Research Design

Either descriptive or explanatory research it is necessary to have a frame of reference within which to interpret the results i.e. a frame of reference that enables us to do more than simply report the results. The present study has been conducted based on descriptive questions as well as causal processes. So the need for a frame of reference was fairly obvious to conduct this study. The study has been conducted based on classic experimental design. In its simplest form the experimental design has two groups: a beneficiary group (experimental group) and non-beneficiary group (control group). It has also been extended over time so that data has been collected at two points of time (before and after) at least. Between Time-I (before) and Time-II (after) the experimental group has been exposed to an experimental intervention. The non-beneficiary group has been kept alone. At both Time-I and Time-II the experimental and control groups have been measured in relation to the key dependent variables that is of interest in the study.

2.2 Selection of Watersheds in Different States in India

According to the latest estimate, 18 districts in West Bengal and 21,91,300 hectare of non-forest area of these eighteen districts have been affected by land degradation problems. Firstly, these districts have been sub-divided into two groups on the basis of occurrence of land degradation i.e. below and above the average land degradation of West Bengal. Thus, among these districts twelve districts fall under below and rest six districts under above groups. Four districts (two from each group) i.e. Cooch Behar and Birbhum (from below) and 24-Parganas (North) and 24-Parganas (South) (from above) have been selected randomly. There are six sub-watersheds in Cooch Behar, four in Birbhum, two in

24-Parganas (N) and twelve in 24-Parganas (S) (Table 2.1). In the second stage, one watershed from each selected district has been selected randomly. Phulbari Watershed (Block : Dinhata-I) from Cooch Behar; Kanduri Watershed (Block : Rampurhat-I) from Birbhum; Hizta (Part-II) Watershed (Block : Hasnabad) from 24-Parganas (North) and Masjidbati Watershed (Block : Basanti) from 24-Parganas (South) have finally been selected for in-depth study.

Table 2.1: Distribution of the sample area and respondents in West Bengal

Sl. No.	Districts	Block	Name of the sample watershed	No. of beneficiaries households	No. of non-beneficiaries households	Total
I	Cooch Behar	Dinhata-I	Phulbari	40	40	80
II	Birbhum	Rampurhat-I	Kanduri	40	40	80
III	24-Parganas(N)	Hasnabad	Hizta part-II	40	40	80
IV	24-Parganas (S)	Basanti	Masjidbati	40	40	80
Total				160	160	320

At the first stage, the list of villages along with households of each selected watershed has been collected. Then all the households have been pooled and stratified into two groups i.e. beneficiary and non-beneficiary. In the second stage all the households in each group have been sub-divided into five categories according to the size of holdings. In the next stage, 80 households (40 from beneficiary and 40 from non-beneficiary) from each watershed have been selected by employing the methods of probability proportional to size and random sampling. Thus, in all a total of 320 households (160 beneficiaries and 160 non-beneficiaries) of different size groups have been selected as the ultimate sample unit of the study.

In Rajasthan in consultation with the state nodal agency, four districts falling in distinct agro-climatic zones were selected. From each selected district, one watershed under 10^{th} plan NWDPRA was selected.

Table 2.2: Distribution of the sample area and respondents in Rajasthan

Sl. No.	Districts	Block	Name of the sample watershed	No. of beneficiaries households	No. of non-beneficiaries households	Total
I	Ajmer	Masuda	Kirap	40	40	80
II	Chittogarh	Chotti Sadari	Sakariya Sandikheda	40	40	80
III	Kota	Kherabad	Dhuniya Nimana	40	40	80
IV	Udaipur	Badgaon	Dhar Badanga	40	40	80
Total				160	160	320

All the villages falling under the catchment areas of selected watersheds were selected for the study. For selection of non-beneficiary households, nearby non-watershed villages were selected for each selected watershed. From each selected watershed, 40 beneficiary households were selected randomly. By following same procedure, for each selected watershed, 40 non-beneficiary households from non-watershed villages were selected randomly. Thus, in all total 320 households (80 from each watershed) were selected as per table given above. Through well structured schedules, the field data were collected from sample households for pre-project year 2001-02 and project ending year 2006-07. The difference between post-project and pre-project parameters shows combined impact of NWDPRA plus non-NWDPRA factors. The change in parameters for non-beneficiary households shows impact of only non-NWDPRA factors. Therefore, to ascertain realistic impact of NWDPRA, the changes observed for beneficiary households are compared with changes observed for non-beneficiary households.

In Bihar, the study has been conducted based on both secondary and primary data. As far as secondary data is concerned the study has used the data collected from the nodal department of the programme at the state level i.e., Directorate of Soil Conservation, Dept. of Agriculture, Government of Bihar and

Table 2.3: Distribution of the sample area and respondents in Bihar

Sl. No.	Districts	Block	Name of the sample watershed	No. of beneficiaries households	No. of non-beneficiaries households	Total
I	Nawada	Roh	Nala Nala M/W-B	40	40	80
II	Kaimur	Adhore	Khamkala M/W-K-5	40	40	80
III	Aurangabad	Madanpur	Narkapi Machani M/W-K-8	40	40	80
IV	Rohtas	Nauhatta	Jayantipur M/W Sone-2-1	40	40	80
Total				160	160	320

district offices and other published and unpublished data of the Government, 11th Plan document and various other sources. The primary data was collected from various units through canvassing structured schedules viz., village schedule and household's schedule. The village schedule was administered in micro watersheds village schedules' and the household schedule. The village schedule was administered in micro watersheds villages and the household schedule amongst the beneficiaries and non-beneficiaries of the programme. A sample of 320 village households was selected for the purpose of study. The sample was drawn on the basis of a multistage stratified sampling method. In the first stage four districts were selected on the basis of larger physical and financial achievements under the projects/ schemes. These districts are Nawada, Kaimur, Aurangabad and Rohtas. In the second stage one micro watershed from each of the selected districts was selected on the basis of the same criteria as adopted in case of selection of the districts. Thereafter lists of beneficiaries and non-beneficiaries from each of the selected watershed areas/ villages were prepared and classified in 5 categories of households viz., landless, marginal (1ha), small (1-2 ha), medium (2-4 ha) and large (4 ha and above). A total of 40 households each from beneficiary and non-beneficiary groups in each selected watershed areas were randomly selected without replacement for in-depth enquiry. Thus, 80 households from the size of sample in each district, taking together into account 320 households form the size of the sample for the study. In order to have a comparison in the changes of situational study variables, 'Before and After' approach of evaluation has been

followed. For this purpose, information have been gathered/ collection for two different time periods coinciding before and after the introduction of WARSA JAN SAHBHAGITA. Thus, there are two different reference periods viz., 2001-02 and 2006-07 respectively for the purpose of the study.

In Maharashtra, both secondary and primary information have been collected for fulfilling various specific objectives. The secondary data have been collected from literature, published statistical materials as well as from different nodal offices at the state, district and block levels. The project implementing agency (PIA), the Watershed Association (WA) and Watershed Committee (WC) have been consulted for this purpose. In order to have a comparison in the changes of situational study variables, "Before and after" approach of evaluation have been followed. For this purpose, information has been generated for two different time's periods coinciding before and after the introduction of WARASA JAN SAHABHAGITA thus, the two different reference time periods will be 2001-2002 and 2006-2007 respectively.

Table 2.4: Distribution of the sample area and respondents in Maharashtra

Sl. No.	Districts	Block	Name of the sample watershed	No. of beneficiaries households	No. of non-beneficiaries households	Total
I	Kolhapur	Gadhinglaj	Basarge Hasursasgiri	40	40	80
II	Nagpur	Kuhi	Mandhal Navegoan-devi	40	40	80
III	Raigarh	Murud	Walke-Shirgoan Chorde	40	40	80
IV	Nanded	Himayatnagar	Takarala Parwa	40	40	80
Total				160	160	320

For the present study, four districts of Maharashtra namely, Kolhapur from the north, Nagpur in the Vidarbha region in the east, Raigarh from the Konkan region in the west and Nanded in the Marathawada region having a watershed

where NWDPRA is in operation were selected. Gadhinglaj block from Kolhapur district, Kuhi block from Nagpur District, Himayatnagar block from Nanded district and Murud block from Raigarh district have been selected.

Households being the unit of enquiry for the study, 80 households, 40 from beneficiaries and 40 from non- beneficiaries groups, have been selected following the technique of stratified random sampling without replacement. Thus finally a sample of 320 households has been selected for the purpose of the study.

III
CHARACTERISTICS OF THE SELECTED WATERSHEDS

3.1 Watershed Development and Management

Watershed is a topographically delineated area draining water to a channel. It is a geo-hydrological unit draining water through a common point by a system of streams. In the natural resource economics context, watershed is a geographical area in which groundwater, surface water, soil moisture, soil erosion, forestry, biodiversity and ecosystem are conserved as a whole to be managed and used on an efficient, equitable and sustainable basis. In the social science context, watershed is a logical unit for planning and development. However, watershed is a unit, which operates largely on the side of production and not on the side of consumption. It is a concept of economic dynamics. Watershed development is a broader concept that denotes development of land and water resources and their relationship with forests, fish, wildlife, environment quality and ecological balance, while watershed management is defined as a social process of planning, organizing, actuating and generating maximum prosperity and happiness of stakeholders, user groups, other people and the government by controlling through a cooperative group actions for securing maximum benefits from natural resources viz., land, water, vegetation, animals and human with a minimum efforts for welfare of human kind (Yadav and Bhushan, 2000). It may be noted that watershed is a programme designed to develop and improve the management of land and water resources in small watersheds through project approach which envisages joint action by local community, government, non-governmental organisations and stakeholders with their full understanding and support. Thus, watershed project signifies a set of activities embracing protection, development and management of land, forest and water resources to maximize the net economic return, consistent with those tangible objectives and values such as ecological,

environmental and social which cannot be estimated with conventional economic measures in a given geographical area.

The study has been undertaken in Fulbari Watershed (Block : Dinhata-I) in Cooch Behar district; Kanduri Watershed (Block : Rampurhat-I) in Birbhum district; Hizta (Part-II) Watershed (Block : Hasnabad) in 24-Parganas (North) district and Masjidbati Watershed (Block : Basanti) in 24-Parganas (South) district located in the Terai, Rarh & Eastern Plateau and Coastal agro-climatic zones, respectively of West Bengal. These are the watersheds implemented and sanctioned up to 2005-06. In these projects most of the components of watershed development programme have been covered. Hence it is an opportunity to assess the long-term impact of watershed programme *inter alia* on agriculture, horticulture, forestry, environment and groundwater recharge as well as socio-economic development in the catchments area.

3.2 Background of the Selected Watersheds in Different States in India

3.2.1 State: West Bengal

The district Cooch Behar where the Fulbari micro watershed falls geographically forms part of the Himalayan Terai of West Bengal. The district lies between $25^0 27' 40''$ to $26^0 32' 20''$ North Latitude and $88^0 97' 60''$ - $89^0 54' 35''$ East Longitude covering an area of 3386 sq. kms, with reduced level/altitudes being 43.67 metre. It is bounded by Assam state in the East, Jalpaiguri district of West Bengal state in the West and Jayanti hills in the North and Bangaldesh in the South. It experiences tropical humus monsoon climate with annual rainfall ranging from 3130 mm to 3350 mm with 103-110 days. The soil of the district is formed by alluvial deposition having large admixture of light textured sands porous and acidic in natural causing poor water holding capacity with deficiencies of Bo, Mo, Zn etc. CEC is los. General depth of soil ranges from 015 m to 1.0 m and is super

imposed on deep sand. Topographically the district is plain gentle slope towards North Easterly to South-Westerly direction. A large net work of hilly rivers namely Tista, Torsa, Mansai, Kaljani, Gadadhar, Ghargharia, Raidak, Sankosh etc. and other rivulets traverse the district resulting occurrence of regular flood, stream bank erosion and sand deposition in agricultural crop fields. The district attracts people for its unique characters having pleasant climate, forest beauty temples, number of rivers, tourism spots, air-filed, military barracks, decent and innocent culture-character of local *koch* people and above all gigantic place of *koch* Maharajas (similar to Buckingham Palace).

The Fulbari watershed lies between $26^{0}07$ to $16^{0}11^{/}$ North latitude and $89^{0}19^{/}$ to $89^{0}23^{/}$ East longitude. It is situated in the Fulbari mouza under Dinhata-I Development Block. Dinhata-I block comprises of 16 Gram Panchayats with 146 mouzas.

On 1st March 1986, the erstwhile district of 24-Parganas which was the population wise largest district in India was bifurcated into two separate districts of 24-Parganas (North) and 24-Parganas (South). The district of 24-Parganas (North) where the Hizla micro watershed falls has its administrative Head Quarter at Barasat comprises of five sub-divisions viz., Bongaon, Basirhat, Barasat, Barrackpore and Bidhan Nagar. The district is bounded by Nadia district in the North, 24-Parganas (South) in the South, Hooghly district, Bhagarathi river and Kolkata in the West and Bangladesh in the East. It lies between $21^{0}39^{/}$ to $80^{0}12^{/}$ North Latitude and between $80^{0}52^{/}$ to $89^{0}06^{/}$ East Longitude. The total geographical area is 4094 sq. km. while the projected population as per 1991 Census was 72,81,881 with a population density of 1778 persons/sq. km. A long part of the industrial belt of West Bengal is located here providing employment of large section of people. Even, then, this district occupies a high position in the agricultural map of West Bengal and farming is the main occupation of the rural masses on a large scale and rapid growth of industry. As per major classification

this district falls within the Gangetic Alluvium Zone, considered to be the most fertile for crop production. Soil type varies from sandy to clay loam, sandy loam being pre-dominant. Ratio of high:medium:low land is 17:44:39. Soil group is WB-76 to WB-80. The coastal part of this district mainly Basirhat sub-division falls into the soil group of WB-79 and WB-80. The soil is coastal salaine marshy soil consisting of very deep, poorly deep, poorly drain, fine soils occurring on nearly level upper delta with inter-distributory sediments with clayey surface, severe flooding and moderate saline occurs. Normal rainfall of the district is 1,525 mm with some deviation in some years resulting in considerable crop loss. The temperature varies between 10^0 C in January to 41^0 C in May while the relative humidity varies between 60 per cent to 99 per cent.

The Hizla watershed lies between $88^0 54^/$ to $88^0 57^/$ East latitude and $22^0 30^/$ to $22^0 31^/$ North longitude. It is situated in the Hizla mouza under Hasnabad Development Block. Hasnabad block comprises of 16 Gram Panchayats with 146 mouzas.

The district 24-Parganas (South) where the Masjidbari micro watershed falls having the famous Sundarbans, the largest, mangrove forest on earth spreading over thirteen of the thirty agricultural blocks of the district. This district has indeed a peculiar geographical location stretching from the metropolitan Kolkata to the remote riverine villages on the mouth of Bay of Bengal. About 84 per cent of the total population of the district live in the rural areas where agriculture is the mainstay of survival. In spite of lack of transport and communication facilities, poor drainage system, lack of irrigation facilities, problems of soil salinity and ingression of saline water, the farmers of the district are struggling hard to match up with these critical constraints. Irrespective of land holding size, they are mostly enterprising which when added to the modern farming technology, would easily be conducive for increasing the productivity as well as the total agricultural production of the district significantly.

The Masidbari watershed lies between $21^0 29^/$ to $22^0 33^/ 45^/$ North latitude and $88^0 3^/ 45^{//}$ to $89^0 4^/ 50^{//}$ East longitude. It is situated in Masjidbari mouza under Basanti Development Block. Basanti block comprises of 13 Gram Panchayats with 67 mouzas.

The Kanduri micro watershed is located in Birbhum district. The Kanduri watershed lies between $24^0 08^/ 25^{//}$ to $24^0 10^/ 55^{//}$ North latitude and $87^0 48^/ 00^{///}$ to $87^0 44^/ 20^{///}$ East longitude. It is situated in the Bhatina mouza under Banhat Panchayet of Rampurhat-I Development Block. It comprises of seven villages viz., Bhatina, Harinathpur, Matimahal, Tentul bandhi, Radipur, Moubuni and Kulbuni.

3.2.2 State: Rajasthan

The treatment areas of the Sakariya watershed is spread over 3 small villages whereas each one of the remaining 3 selected watersheds namely Kirap (Masuda/Ajmer), Modak-VI (Khairabad/Kota) and Dhar (Budgaon/Udaipur) covers the area of only one village. The four selected watersheds are falling in the four different agro-climatic zones of the state. All the villages covered by selected watersheds are well connected by road.

All the 4 selected watersheds are not very far from their block headquarter and only 8 to 20 kms away from the block headquarter (See Map).The longitude and latitude of all the selected watersheds has been given in Table 3.1. The Dhar (Udaipur) watershed is close to famous tourist city Udaipur.On account of natural beautification; Udaipur is attracting heavy traffic of domestic and international tourist. Therefore, during off agricultural season, sections of the unemployed people of Dhar watershed are visiting Udaipur for earning their living through unskilled labour. The climate of these 4 watersheds is by and large semi-arid characterised by 3 well defined seasons viz., monsoon, winter and summer. The maximum temperature in summer in 4 selected watersheds ranged from 44ºC

(Dhar) to 48ºC (Modak-VI). In selected watersheds, minimum temperature in winter ranged from 2ºC (Sakariya) to 7ºC (Dhar).

In all the 4 selected watersheds, recharge level of wells, the net sown area, gross cropped area and crop-productivity is highly dependent on the rainfall level and pattern. Rainfall in all the 4 watersheds is highly variable, usually scanty, scattered and erratic which has adverse impact on growth & yields of crops. Generally, monsoon has not more than 20-22 rainy days. The success of any watershed programme is highly associated with the rainfall behaviour. It ranged from 305 mm. in Kirap watershed to 980 mm. in Modak-VI watershed. The rainfall in selected watersheds during the study year 2006-07 was far better and somewhat in excess as compared to normal. Therefore, the impact of NWDPRA observed in this study in respect of water recharging in wells, cropping intensity, crop-productivity, farm income etc. may be found a little better than actual impact level in the normal year.

Except Modak-VI watershed, the total population in each watershed ranged between 938 and 999. The overall male female ratio in selected villages worked out as 1: 0.94. In selected village of Dhar watershed, there were 896 females per 1000 males. In Modak-VI watershed village, there were 988 females per 1000 males.

The community-wise examination of data shows absence of minority population in villages of the selected watersheds. The Sakariya and Dhar watersheds are predominantly tribal with ST population more than 94 percent. However, not a single household of ST was reported in Kirap village watershed. In Kirap, 67 percent households were of general communities and remaining 33 percent belonged to schedule caste (SC). In Modak-VI watershed, majority households were of SC and ST. Thus, except Kirap, predominance of SC and ST communities was observed in the villages of selected watersheds.

It reveals that in each watershed at least 62 percent villagers were illiterate. Among literate population, majority had education up to primary standard IV. The percentage of villagers having graduate/under-graduate level education was very low and below 2 percent in selected watersheds. Thus, literacy level of the villagers of selected watersheds was very poor. The low level of literacy level is one of the many reasons for slow and very low adoption of new agriculture technology. In selected watersheds, as compared to males, the literacy level of women was found very low mainly due to prevailing social customs and traditions.

Out of the total area under project treatment, 67.70, 75.00, 81.08 percent was arable land in Kirap, Sakariya and Modak-VI watershed respectively. However, Dhar watershed had only 10.40 percent arable land. Except Dhar, the percentage of irrigated arable land was very low in remaining 3 watersheds, and it ranged between 11 to 17 percent only. In Dhar watershed, of the total sanctioned watershed area of 500 Ha, 89.6 percent (448 ha.) was non-arable with high rate of soil-erosion. Out of this 448 ha non-arable land, 303 ha was private land. In Kirap, Sakariya and Modak-VI watersheds, the percentage of non-arable land varied from 19 to 33. In non-arable land in these 3 watersheds, majority portion of land belonged to panchayat. Except Dhar watershed, no forest land was reported in remaining 3 selected watersheds. In each selected watershed, except Modak-VI, out of the total geographical area of watershed, area available for intervention treatments under NWDPRA was 500 Ha. In Modak-VI watershed, it was 370 Ha. Out of these 4 watersheds, except Modak-VI, total project cost sanctioned for each watershed was Rs. 22.50 lacs (Rs. 4500 per Ha.).

The data on soil type, soil depth and general slope are given for each selected watersheds in Table 3.1. The soil of the Kirap watershed is predominantly clay loam and stony. Whereas, it is black alluvial clay loam in Modak-VI, sandy loam in Dhar and clay and clay loam in Sakariya watershed. Generally soil depth in Kirap watershed is above 50 cm. whereas it is below 50 cm. in Sakariya,

Modak-VI and Dhar watersheds. The soil slopes in Kirap, Sakariya and Modak-VI watersheds ranged between 1 to 3 percent and facing problem of soil-erosion. In Dhar watershed, soil slope of majority areas (400 Ha.) is steep and between 3 to 10 percent. Hence, it is highly prone to soil-erosion. In Dhar, the soil is largely characterized by rocky and hilly terrain. The soil erosion occurs through both wind and water and as a result, productive capacity of soil is declining to some extent. To prevent soil- erosion and conserve moisture "in situ," contour 'V' ditches, vegetative barrier, contour vegetative barrier, soil- stone bunds, vegetative bunds, construction/ installation of water harvesting structures (WHs), systematic drainage system, dug-out ponds, nala-plugging, planting of dry land horticulture crops and agro forestry trees etc. were recommended under the project in the selected watersheds. The soils in all the four watersheds have generally poor productivity. In selected watersheds, majority soil is low in organic carbon and nitrogen, medium in phosphorus and rich in potash. In majority areas of all the 4 selected watersheds, the soil is poorly drained and the capacity of soil to infiltrate and recharge water is poor. The water table in upper and middle reaches is low in comparison to lower reaches.

In pre-project period, in Kirap watershed, Maize, Bajra and Jowar were the main cereal crops whereas, Udad was the main pulse crop. Wheat and Gram were the main rabi crops. In Sakariya watershed, main kharif crops were Soyabean, Maize, Groundnut and Udad, whereas, Rapeseed, Gram and Wheat were the main rabi crops. In Modak-VI watershed, Soyabean, Maize, Jowar and Udad were main kharif crops, whereas Coriander (Dhanaya), Rapeseed, Gram and Wheat were the main rabi crops. The Khairabad (Modak-VI) block is also famous for producing spice crop coriander. In Dhar watershed, Maize, Udad were main kharif crops while Wheat, Gram and Rapeseed were main rabi crops. The sowing of summer (Jayad) crops was negligible or nil in all the four selected watersheds. In non-arable land of the selected watersheds, generally natural vegetative tree species

like deshi babul, khakhra, neem, mahua, sisam, khejri etc. were found. The grass species like dhaman, stylohemato, dharo etc. were found on public land. The energy consumption needs of the poor families of selected watersheds are fulfilled from fuel wood available from non-arable/ forest land. In all 4 selected watersheds, farmers are generally adopting mono-cropping system as major cultivable area is rainfed with very limited irrigation facilities. There is no system of devoting specific compact area to orchard or horticultural plantation. In selected watersheds, agriculture is characterized by frequent drought, sloppy land and dominance of low value crops. The agricultural lands of these watersheds have poor productivity. The seed replacement ratio (SRR) is very low and use of improved agricultural technology is meagre. Generally farmers are following traditional cultivation. Examinations of the post project crop-pattern suggests some diversification in crop- pattern in favour of high value crops, improvement in crop-productivity and cropping intensity.

The data on irrigation sources and source-wise irrigation during 2001-02 (pre-project) and 2006-07 (Post-project) shows that private open wells are the main source of irrigation in all the selected watersheds. In Modak-VI and Sakariya watersheds, majority of tube wells and few wells became either non-functional or dry due to depletion of water and other reasons. Of the total irrigated area in 2001-02, the area irrigated by wells, tube wells was 93 % for Kirap, 65 % for Sakariya, 71 % for Modak-VI and 89 % for Dhar. In Kirap, majority wells were either dry or non-functional. During 2001-02, of the gross cropped area, irrigated area was 16. 72 % in Kirap, 21.82 % in Sakariya, 18.97 % in Modak-VI and 15.62 % in Dhar.

3.2.3 State: Bihar

In Bihar the study has been conducted in four districts viz., Nawada, Kaimur, Aurangabad and Rohtas. The details of demographic and some other important features of the four sample districts show that the total geographical area

of the district ranging between 2.65 per cent to 4.09 per cent of the total area of the state. The population in the districts is 1.55 per cent to 2.95 per cent to the total population of the state. A very low number of the population is urban. The percentage of SC in all the four sample districts is higher than the state's average (15.7%). The literacy rate is also higher compared to the state's figures in the selected districts except a bit lower in Nawada district. The work participation rate in the districts is around 30 to 37 per cent. About 90 per cent of the workers are engaged in agricultural operations. The rainfall data indicate that all the four districts receive an average annual rainfall of about 1000 mm. The per capita gross domestic products of the districts at 1999-2000 prices in 2004-05 are lower to the state's figure (Rs. 7168/-).

The total geographical area of the sample districts are 250 to 400 thousand ha. Forest areas are almost non-existent in Aurangabad district and in remaining three districts it is 17 per cent to 34 per cent of the total area. Net sown areas as percentage to total geographical areas are significantly higher in two districts viz., Aurangabad (60.30%) and Rohtas (64.96%) as compared to Nawada (44.98%) and Kaimur (44.37%) districts. The cropping intensity is slightly higher in two districts than the state's average (138.98%) i.e. Aurangabad (143.72%) and Rohtas (140.55%) whereas it is lower in Nawada (135.71%) and Kaimur (120.92%).

3.2.4 State: Maharashtra

As has been mentioned earlier, four districts of Maharashtra have been selected for the present study. These districts are Kolhapur from the north, Nagpur in the Vidarbha region in the east, Raigarh from the Konkan region in the west and Nanded in the Marathawada region having a watershed where NWDPRA is in operation. Gadhinglaj block from Kolhapur district, Kuhi block from Nagpur district, Himayatnagar block from Nanded district and Murud block from Raigarh district have been selected. Finally, one beneficiary village and another non-

beneficiary village, thus, an aggregate of two villages from each block have been selected for the purpose of the present study. The beneficiary villages are Baserge, Mandhal, Takarala and Walk-Shirgoan from the block Gandhinglaj, Kuhi, Himayatnagar and Murud respectively. The non-beneficiary villages selected for the study are Hasursasgiri, Navegoan Devi, Parwa, and Chorde from the respective blocks.

The state of Maharashtra is known as a state with large share of rain-fed area with a major production of area under irrigation land. Large share of available irrigation water are begin used mainly for water consuming crops (GOM, 1979; Rath and Mitra, 1984). The cultivated area under irrigation in the state as estimated by the Department of Agriculture, Government of Maharashtra is above 23 lakh hectares (Average of 1978-88 to 1984-90). The irrigation needs of the state are however, very high due to the larger area being covered under the drought – prone zone. In the light of the above backdrop, it is imperative to have a glance at the profile of the study area.

The district Kolhapur is one of the oldest cities in the country. It derives it importance from its past political association and its position as a great commercial historical religious and education centre. As a religious centre Kolhapur derives its appellation of Kashi of the south from the imposing ancient temple of Mahalakshmi also known as Ambabai. It is said to have been built by King Karnadeva of chalukya Kingdom around 550 AD to 660 AD and embellished by the Silahara rulers of Kolhapur in the 9^{th} century which represents the best Hindu architectural model of the kind.

Kolhapur situated on the banks of river Panchganga is a city in the south west corner of Maharashtra, India. The population of Kolhapur is around 419,000. The main language of the people is Marathi. The city also lends its name to many popular terms like Kolhapuri Chappal, Kolhapuri lavangi mirchi, Kolhapuri gur and Kolhapuri cuisine.

Kolhapur is located at 16.7°N 74.22°E16.7; 74.22 and has an average elevation of 545 metres (1788 ft). As per census of 2001, Kolhapur and a population of 485,183 of which the males constitute 52% of the population and females 48%. Kolhapur has an average literacy rate of 80%, higher than the national average of 59.5%, male literacy is 84%, and female literacy is 75%. Kolhapur's climate is a blend of coastal and inland climate of Maharashtra. The temperature has a relatively narrow range between 12°C to 35°C. In Kolhapur summer is experienced comparatively cooler, but much more humid, compared to neighbouring inland cities. Maximum temperatures rarely exceed 38°C and typically range between 33° to 35°C. Lows during this season are around 24°C to 26°C. Through temperatures are rarely as high as in inland Maharashtra, high humidity often makes the weather muggy and unpleasant. The city receives abundant rainfall from June to September due to its proximity to the Western Ghats. The heavy rains often lead to severe flooding in these months. Temperatures are relatively low in the rainy season and range between 23°C to 30°C. Kolhapur experiences winter from November to February.

Gandhinglaj is a taluka city and a municipal council in Kolhapur districts. Gadhinglaj is located at 16.23°N 74.35°E 16.23; 74.35. It has an average elevation of 623 meters (2043 feet). The town Gadhinglaj, in Kolhapur district, is widely noted as 'a great one' situated beside Hiranyakeshi River originated from the Great Amboli Ghats. It does not have the clamorous buzz of any industry; nor has it any notable government MIDC area. Even then, the town has its own distinct profile and personally. As a commercial centre, it has its own identity and popularity. Culturally, politically and educationally it is a very vigilant and alert Taluka place. The worth seeing, charming places in Gadhinglaj region are as; Kalbhairav Temple, Mahalaxmi Temple, Samangarh (the hillfort), river Hiranyakeshi, Kasturba garden, Tilak garden and Shendri lake. This town is

located exactly at the border of Maharashtra & Karnataka by the language spoken hare is mainly Kannada & Marathi.

As of 2001 India census, Gadhinglaj had a population of 25,356. Males constitute 51% of the population and females 49%. Gadhinglaj has an average literacy rate of 78%, higher than the national average of 59.5%: male literacy is 84%, and female literacy is 72%. In Gadhinglaj, 11% of the population is under 6 years of age.

Nagpur is situated in 18th century by the Gond king Bakhta Buland. The region around Nagpur was flourishing in the early centuries of the Christian era, but the name of Nagpur was noticed for the first time in records of the tenth century A.D. After freedom, and reorganization of State in 1956 Nagapur along with the other districts of Vidarbha region became a part of the bilingual state of Bombay. In 1960 the State of Maharashtra came into existence of which Nagpur district forms a part. In 1991 Census Nagpur district had 14 tahsils and 1878 villages and 23 towns. In 2001 Census, the number of tahsils remained same with 1869 villages and 29 towns. In 2001 Census 2 new villages are created, 7 villages received the status of census Town.

Nagpur lies on the Deccan plateau of the Indian Peninsula. The underlying rock strata are covered with alluvial deposits resulting from the flood plain of the Kanhan River. In some places these give rise to granular sandy soil. However, in low lying areas which are poorly drained, the soil is alluvial clay with poor permeability characteristics. In eastern part of city crystalline metamorphic rocks such as gneiss, schist and granites are found. In the Northern part of the city, yellowish sand stones and clays of the lower Gondwana formations are found. Nagpur city is dotted with many natural and man made lakes with Ambazari Lake being the largest of all. Other natural lakes include Futala Lake, Gorewada and Telangkhedi Lake. Sonegaon Lake along with Gandhisagar Lake is man-made

likes created by cities historical rulers. Nag River, Pilli nadi along with various nallas form the natural drainage pattern for city.

Nagpur has a mean altitude of 310 meters above sea level. Nagpur has a tropical wet and dry climate, with dry conditions prevailing for most of the year as it is located at centre of Indian peninsula far from Bay of Bengal and Arabian Sea. Nagpur city received an annual rainfall of 1,205 mm (47.44 in) from monsoon rains during June to September. The highest recorded rainfall was 304 mm on July 14, 1994. Summers are extremely hot lasting from March to June, with maximum temperatures in May. Winter lasts from November to January with temperatures dropping 10°C (50°F). The highest recorded temperature in the city was 48.6°C (119.5°F) on 1954-05-26, while the lowest was 3°C.

The district Nagpur is headquarter of Nagpur district and Nagpur division and is third largest city by population of Maharashtra. Nagpur urban area population 2,420,000; is 13th largest urban conglomeration in India and 114th largest city in world. It ranks as 143rd largest urban area in world in terms of population. It is the seat of annual winter session of Maharashtra Vidhan Sabha. The city is the commercial and political centre of the state's eastern Vidarbha region. Nagpur lies in central India with Zero mile markers, (indicating the geographical centre of India) located here. City was founded by Gond people but latter became part of Maratha Empire under the Bhonsles. British East India Company took over the city in 19th century and made it the capital of Central Provinces and Behar. After first state recognition, it lost the capital status but was made second capital of Maharashtra. Nagpur is an important location for Dalit Buddhist movement as it is situated at the cross-roads of India's North-South and East- West routes by road, rail and air.

Marathi, official language of Maharashtra is most widely-spoken language in Nagpur. Varhadi dialect of Marathi is spoken in and around Nagpur city. Hindi is also widely spoken in Nagpur. Due to its central location Nagpur has become a

cosmopolitan in nature with large amount of residents from neighbouring states of Madhya Pradesh, Chattisgarh and Andhra Pradesh. In 2001, the urban population was 2,129,500, and there were around 410,000 households in the city. 7, 26,664 people lived in slums making Nagpur second most slum populated city in Maharashtra after Mumbai. Scheduled Castes and Scheduled Tribes accounted for around 25% of the population. The sex ratio was 936 females per 1000 males. Around 99.4% of the population was engaged in non-agricultural activities, attesting to the overwhelmingly urban character of Nagpur city. The city's main jail is the Nagpur Central Jail. According to 2006 survey of National Crime Record Bureau Nagpur has the highest crime rate of 470.6 in Maharashtra as compared to other mega-cities of the state. The number of migrants to Nagpur from outside Maharashtra as during the 1991-2001 decade was 2.1 lakh making Nagpur 4th most favoured destination in state.

The name Nanded is derived from its Sanskrit form Nanditat, which was so called probably because it comprised the territory on both the sides of the river Nandi. There are several explanations offered from the origin of the name Nanded given to the headquarters of the district. The bank of the Godavari where Nandi, the vahan of Lord Shiva is said to have performed penance come to be called the Nandi tat which latter changed into Nanded. It is also said that nine rishis known as Nand performed penance on the bank of the Godavari and hence the name Nand tat. A third explanation is that it formed the boundary of tat of the nine Nanda rulers of Maghadha Empire. In ancient period, the district was included in Vidarbha region along with the modern districts of Amravati, Akola, Buldana, Yavatmal and Parbhani. Nanded district presently has 13 towns and villages spread over 16 tahsils.

Nanded is the second largest city in Marathwada region of Maharashtra state of India. Nanded is also district headquarter of Nanded District in Marathwada region or Aurangabad revenue division. It is known as an important

holy place for the Sikh faith. Area of Nanded is 1006.81 km, longitude 77.7 to 78.15, east latitude is 18.15 to 19.55 north. The state of Andhra Pradesh lies to the east and Karnataka state to the south.

Nanded is a typical mid sized city in Maharashtra. However due in part to its location and history, it is more diverse than its peers. Majority of the people speak Marathi. About 35% of its population is Muslim and speaks a Deccan version of Urdu. Another 5 to 10% IS Punjabi/Hindi speaking Sikhs. Also there is substantial amount of Telugu speakers. Nanded is home to various communities migrated from all over India. Most of the businesses are run by Marwari (Rajasthani) community. In addition it has Gujrati (Hindu ad Bohra-Muslim), Sindhi, Punjabi, Tamil, Kannada and South Indian Christian minorities.

Raigarh District, also known as Raigarh District, is a district in the Indian state of Maharashtra. It is located in the Konkan region. The district was renamed after Raigad, the fort and former capital of the Maratha leader Shivaji, which is located in the interior forests of the district, on a west- facing spur of the western Ghats or Sahyadri range. The district had a population of 2,207,929 of which 24.22% were urban as of 2001. The District is bounded by Mumbai Harbour to the northwest, Thane District to the north, Pune District to the east, Ratnagiri District to the south, and the Arabian Sea to the west. It includes the large natural harbor of Pen-Mandwa, which is immediately south of Mumbai harbour, and forming a single landform with it. Part of the district is included in the planned metropolis of Navi Mumbai, and its port, the Jawaharlal Nehru Port. The district includes Kashid and Kihim beaches, besides the towns of Kaopoli, Khalapur, Uran, Patalganga, Rasayani, Nagothana, Pen. The largest cities include Panvel, Alibag, Karjat, and Mahad. The biggest city both in area and population is Panvel. The district also includes the isle of Gharapuri or Elephanta, located in urban tehasil which has ancient Hindu and Buddhist caves.

Murud block is located at 17.77°N 73.12°E17.77; 73.12. It has an average elevation of 159 meters (521 feet). As of 2001 India census Murud had a population of 12,551. Males constitute 48% of the population and females 525. Murud has an average literacy rate of 78%, higher than the national average of 59.5% : male literacy is 84%, and female literacy is 74%. In Murud, 11% of the population is under 6 years of age. The present Raigarh district owns its name from the historical fort of Raigarh and is the erstwhile Kolaba district of Maharashtra State. Raigarh district is included in Konkan division. Thus for 2001 census the State has 35 districts spread over 6 divisions in Maharashtra. Raigarh district presently consist of 26 towns, 15 tahsils and 1919 vilages.

IV

RESULTS AND FINDINGS

4.1 Results and Findings

Watershed Development Programme (WDP) is an approach to address the rural development problems with a primary focus of natural resource conservation thereby sustaining rural livelihoods. Since its inception (1979) WDP has undergone changes in contents and approach broadening its scope. However, Total Economic Valuation (TEV) is crucial to consider benefit cost analysis to justify public investment on watershed.

In recent years, the major agenda in agriculture is to improve agriculture productivity and equity in the rainfed regions with limited land and water resources. These are reflected in the common guidelines (1995) and revised guidelines (2001) issued by the Government of India in watershed development programmes. In the following discussion, the impact of selected watershed is analysed on the system of production approach.

4.2 State: West Bengal

It is evident that there is no uniformity in family size in between the selected watersheds. The literacy rate is higher among males (82.29 per cent) than females (64.47 per cent). In non-watershed (NWP) area literacy rate is lower for both male and female at 71.41 per cent and 55.38 per cent, respectively. The size of land holding is 1.02 hectares and 0.77 hectares in WP and NWP, respectively. It has been found that the farmers in NWP are somehow well equipped with tractor and sprayer than WP.

The average size of holdings in WP is 1.02 hectares comprising of cultivated (operational), cultivable fallow, permanent fallow, home stead, irrigated and non-irrigated area. In NWP, the average size of holding is 0.77 hectares. It indicates that the size of holdings is lower in WP than NWP. Total cultivated area of the sample farms in watershed area is 100.96 hectares, out of which 22.14 per cent is under pond irrigation followed by 1.88 per cent under canal irrigation, 8.40 per cent under STW, 1.23 per cent under other wells and 3.41 per cent under other sources. The non-irrigated area in WP is 62.95 per cent. In NWP, the total cultivated area is 87.42 hectares of which 26.66 per cent of area is irrigated under different irrigational sources followed by 73.34 per cent under non-irrigation. It indicates that the WP area is well irrigated in comparison to NWP area. This could be attributed to impact of watershed on groundwater augmentation in watershed area.

It has been observed that there is no difference in adoption of other recommended technologies in between WP and NWP farmers. It has been worked out that the overall adoption ratio of recommended watershed/agronomic technologies by WP and NWP farmers are 32.95 per cent and 27.68, respectively. It is evident that the quality of land available in WP area is suitable for agro-forestry and perennials and farmers are relatively more responsive to adoption agro-forestry and perennials.

The contribution of watershed as reflected in gross returns from rainfed crops was considered as the dependent variables, since the watershed impact is direct and implicit. Accordingly, gross returns from rainfed field crops in 2007 was regressed on dry land cropped area in hectares (X_1), human labour (X_2), bullock labour (X_3), seeds in Rs. (X_4) and fertiliser in Rs. (X_5). The adjusted R^2 for the watershed and non-watershed area was 87 per cent and 94 per cent which indicate adequacy of fit of the model.

The regression coefficients are the estimates of the elasticity of production with respect to the independent variables. In WP, elasticity coefficient for human labour, bullock labour and fertiliser are0.02, -0.01 and -0.03, respectively, and are statistically significant at 5 per cent. For land, the elasticity coefficient is 1.01 and significant at 5 per cent. The coefficient for seed is -0.03 and is not significant.

In NWP, variables land and seed are significant and their elasticities are 0.93and 0.07. For human labour, bullock labour and fertiliser, the elasticity coefficients are 0.06, -0.03 and 0.01, respectively and significant at 5 per cent. The returns to scale are 1.01 and 1.04 in WP and NWP areas, implying constant returns to scale. This shows that the production technology used in watershed and non-watershed is scale neutral.

The geometric mean levels of gross returns for WP and NWP sample farms are Rs. 11500.83/- and Rs. 11764.65/-, respectively. The geometric level of inputs land, human labour and bullock, seed, fertilisers are computed both watershed and non-watershed sample farms as 0.49, Rs. 2300.87/-, Rs. 413.75/-, Rs. 172.43/- Rs. 612.60 and 0.48, Rs. 2302.69/-, Rs. 418.49/-, Rs. 163.07/- and Rs. 617.26/-, respectively in that order.

In watershed area, the major source of irrigation is groundwater from tank/ponds. All tanks were excavated before watershed development programme. The impact of WDP is assessed based on number of irrigation ponds. Another measure of impact of WDP is the increased water yield in the ponds. However, the average yield of ponds is not available. Out of the 65 total ponds in the selected watersheds, only 4 ponds are non-functional, whereas in NWP area 3 ponds are non-functional out of the 29 ponds. Average water area of the pond in WP area is 0.12 hectare, whereas it is 0.17 hectare in NWP area. The average command area and average depth of the tank in WP area is higher than that of NWP area.

Average age of pond is 38.75 and 45.75 years in case of WP and NWP area, respectively. The shorter life of pond in WP could be attributed to water

harvesting structures. The impact of WDP on groundwater recharge enabled farmers to take advantage of the increased life and age in the selected watershed areas to extract higher volume of groundwater. This may result in reduced investment on additional irrigation structures and the associated investment in irrigation.

Most of the soil and water conservation measures serve the purpose of conserving rain or runoff water and it is difficult to separate them and analyse their contribution to groundwater recharge. However, we can broadly divided them into (1) measures that increase in-situ water availability and (2) measures that increase availability of applied water stored off-farm or below the ground. The ubiquitous check dams and nala bunds, diversion channels and all their variants store water on surface or enhance subsurface storage. However, the use of farm ponds is for protective irrigation. The total investment on soil and water conservation structures in the selected watersheds is Rs. 35,52,403/- . The increased availability of groundwater due to WDP manifests in decreased irrigation cost. The net returns per farm has been observed to be Rs. 189.68/-, Rs. 518.48/- and Rs. 1057.91/- for marginal, small and medium farms, respectively. It has been observed that the cropping intensity decreases with the increase in size of holdings. This may be due to less irrigated area in higher holdings. It has been observed that the decrease in cost of irrigation and corresponding increase in net returns in WP is due to impact of WDP.

A large number of farmers in WP are rearing livestock on a small scale after the WDP. Farmers expressed during the discussion that due to availability of fodder on farm and common lands, the number of bullocks, cows, buffaloes, sheep, goat has increased. The net return from livestock per farm and per acre are Rs. 24.12/- and Rs. 38.22/-, respectively in WP area and Rs. 21.42/- and Rs. 5.15/- in NWP area.

The equity in the distribution of income among different categories of farmers due to WDP has been analysed using Gini coefficients. Gini coefficients are computed for marginal, small and medium farms. Gini coefficients for WP and NWP areas are 0.44 and 0.41 for all farms, respectively. This indicates a fairly equitable distribution of income in WP area than that of NWP area.

4.3 State: Rajasthan

As per the operational land holding is concerned it is found that **t**he overall size of operational land holding of beneficiary households for 2006-07 worked out to 2.42 Ha. in Kirap, 2.29 Ha. in Sakariya, 2.55 Ha. in Modak-VI and only 1.45 Ha. in Dhar watershed. For non-beneficiary households, it worked out to 2.08 Ha. in Kirap, 2.45 Ha. in Sakariya, 3.26 Ha. in Modak-VI and 1.45 Ha. in Dhar. In each selected watershed, category-wise average size of land holding of sample households in pre-project year 2001-02 and in year 2006-07 remained almost same.

In Kirap and Modak VI watershed, the proportion of net cropped area to size of land holding was 97 percent or more for both beneficiary and non-beneficiary households. In Dhar, on account of sloppy and hilly soil, nearly 30 % operational land of beneficiary households and 40% of non-beneficiary households turned as permanent fallow. As a result, net cropped area was reduced significantly for beneficiary and non-beneficiary households.

In 2006-07, compared to base year 2001-02, beneficiary as well as non-beneficiary households recorded marginal increase in respect of area under Kharif crops and area allocation to different crops in Kirap watershed. The area under rabi crops increased by 3.08 ha for beneficiary households and 3.56 ha for non-beneficiary households. Similarly, beneficiary registered increase in GCA by 3.72 ha. and non-beneficiary by 3.56 ha. The beneficiary households increased the

irrigation area by 2.59 ha. as against 3.43 ha. by non-beneficiary households. This gives clear indication of no role of NWDPRA in expanding irrigation area in this watershed.

Compared to base year, beneficiary households increased the area allocation to more remunerative and higher moisture/ water demanding crops such as soyabean and groundnut in 2006-07 in Sakariya watershed. Whereas, in case of non-beneficiary, it remained nearly stable for soyabean and declined to a few extent for groundnut. In 2006-07, beneficiary households increased area under rabi crops and GCA by about 9 percent. The increase in rabi area and GCA for non-beneficiary households was meagre. Beneficiary households were able to put additional area under irrigated wheat and rapeseed in 2006-07. This clearly indicates that NWDPRA intervention impacted positively on shifting of crop-pattern and crop-diversification.

In crop-pattern, soyabean and maize among Kharif crops and coriander and wheat among rabi crops occupied the dominant position in Modak-VI watershed. As compared to 2001-02, for beneficiary households, increase in area under rabi crops and GCA was by 13.60 ha and 18.60 ha, respectively. Whereas, for non-beneficiary households, it was only 3.24 ha for rabi crops and 3.56 ha. for GCA. The beneficiary households recorded 91 percent increase in area under irrigation, whereas, it was only 22.04 percent for non-beneficiary households. Compared to non-beneficiary households, higher quantum of incremental area under irrigation and GCA for beneficiaries clearly demonstrates positive impact of NWDPR activities on irrigation and crop-pattern.

As compared to pre-project year, beneficiary households increased area under rabi crops by 5.26 ha. in 2006-07 as against 1.51 ha by non-beneficiary households in Dhar watershed. A similar trend was witnessed in respect of GCA. In 2006-07, 20.13 percent of Kharif crop area was irrigated by beneficiary (B)

households as against only 3.03 percent by non-beneficiary households. This indicate positive impact of NWDPRA intervention on irrigation and cropped area.

In all 4 watersheds, compared to base year 2001-02, cropping intensity recorded notable increase in 2006-07 for beneficiary as well as non-beneficiary households. However, this increase in percentage and absolute term was much higher for beneficiary households. The NWDPRA intervention improved the ground water aquifers and soil-moisture which subsequently helped beneficiary households to increase double cropped areas and supplemental irrigation. This helped beneficiary households in enhancing cropping intensity.

As compared to 2001-02, the overall average cost of cultivation per hectare in 2006-07 for beneficiary shows an increase of 58.80 percent in Kirap, 43.56 percent in Sakariya, 48.29 percent in Modak-VI and 81.97 percent in Dhar watershed. For non-beneficiary, it ranged between 43.25 percent for Kirap and 86.10 percent for Dhar. The increase in cost of cultivation was mainly due to higher use of costly inputs such as HYV seeds, fertilizers, higher rate of application of inputs and increase in input prices. Thus, watershed treatments brought changes in use pattern of inputs and also enhanced cost of cultivation. In total cost of cultivation, most important items were human labour, bullock labour and machine labour.

In all the 4 watersheds, compared to base year, beneficiary and non-beneficiary farmers achieved higher yield for all crops (barring few cases) in 2006-07. In Sakariya, the incremental yields achieved by beneficiary farmers varied from 35.96 percent for gram to 188.46 percent for Isabgul. And for non-beneficiary, it varied from 3.98 percent for gram to 100 percent for Isabgul. In Kirap, for beneficiary farmers, it varied from 23.07 percent for Bajra to 58.18 percent for Udad. And for non-beneficiary, it varied from -22.50 percent for gram to 38.74 percent for Jowar. In Modak-VI, yield increment for beneficiary households varied from 15.01 percent for Soyabean to 90.02 percent for Jowar. In

Dhar also, increment in yields of different crops (except gram) obtained by beneficiary households were far superior as compared to same for non-beneficiary. Thus, in all 4 watersheds, NWDPRA had noticeable positive impact on crop-yields. However, scale of impact varied across watersheds due to variation in soil-climatic conditions, soil-moisture level, terrain, rainfall, inputs of pattern etc.

In all 4 selected watersheds, as compared to base year, value of gross produce per hectare of cropped area shoot up sharply for both, beneficiary and non-beneficiary households. Overall, for beneficiary farmers, it went up by 73.45 percent in Kirap, 111.21 percent in Sakariya, 175.62 percent in Modak-VI and 63.92 percent in Dhar watershed. For non-beneficiary households, it ranged from 51.92 percent in Kirap to 117.76 percent in Modak-VI. The significant upsurge in the value of gross produce was mainly due to higher farm harvest prices and higher yield achievement.

In all 4 sample watersheds, net farm income per hectare of GCA and output-input ratio (except Dhar) for beneficiary and non-beneficiary households in 2006-07 were found much higher than those in 2001-02. Further, net farm income and output input ratio for beneficiary households was found substantially higher than those for non-beneficiary households. This suggests quite positive impact of NWDPRA on net return from farm enterprise.

In selected watersheds, as compared to 2001-02, the average annual net income per household from various sources recorded impressive upsurge in 2006-07, for both, beneficiary and non-beneficiary households. For beneficiary, increase was Rs. 25427 in Kirap, Rs. 16068 in Sakariya, Rs. 37270 in Modak-VI and Rs. 13819 in Dhar. The corresponding numbers for non-beneficiary were Rs. 14489, Rs. 11144, Rs. 25745 and Rs. 10196 respectively. The sharp increase in the net annual income per beneficiary households shows positive impact of NWDPRA on livelihood security of different stakeholders of the watersheds.

As compared to non-beneficiary, assets investment per beneficiary household during 2001-02 to 2006-07 was found higher by Rs. 27260 in Kirap, Rs. 12638 in Sakariya, Rs. 18281 in Modak-VI and Rs. 20035 in Dhar watershed.

As compared to base year 2001-02, the average rise in water level in wells during Kharif-2006-07 recorded by beneficiary households ranged from 7.03 feet in Dhar watershed to 8.55 feet in Kirap watershed. During summer, it ranged from 1.88 feet in Dhar to 2.66 feet in Sakariya watershed. As compared to non-beneficiary, net increase in water table for beneficiary households was more than 4.43 feet in Kharif, 1.88 feet in rabi and 0.62 feet in summer season. This clearly indicates that water conservation technology adopted under NWDPRA is effective. This improvement in water table situation eased the drinking water problems of watershed community to some extent.

Mango, Lemon and Amala (Anola) were main horticulture plants and Ratanjyot, Neem, Bamboo were important agro-forestry trees. The survival rate of horticulture plants was found below 50 percent in Dhar, Sakariya and Kirap. For Neem, Bamboo survival rate was found 47 percent or less.

In all 4 selected watersheds, as compared to base year, the proportion of beneficiaries as well as non-beneficiaries who adopted various improved farming practices is found higher in 2006-07. As compared to non-beneficiary households, the adoption rate was found moderately higher for beneficiary households which indicates positive impact of NWDPRA on adoption of improved farm technology.

As expected, in all selected watersheds, number of milch animals and total number of livestock increased moderately in 2006-07. The NWDPRA activities such as development of pasture land, common land resources and measures for enhancing fodder production improved fodder availability to some extent. And, it encouraged beneficiary households to own more milch animals for meeting domestic milk requirement and cash resources. The average number of stall feeding days of cattle for beneficiary households increased to some extent in 2006-

07. In each selected watershed, the percentage of beneficiary households reporting increase in total milk production and productivity of milch animals in 2006-07 has been found moderately higher than non-beneficiary households. This indicates positive contribution of NWDPRA in enhancing livestock numbers, fodder availability and milk yield.

In selected watersheds, requirement of human labour for farming sector shows noticeable upsurge in 2006-07. Compared to 2001-02, beneficiary households in 2006-07 generated per ha./annum additional farm employment of 42 mandays in Kirap and Sakariya, 36 mandays in Modak-VI and 56 mandays in Dhar watershed. Additional farm employment generation was observed relatively very low for non-beneficiary households.

In majority cases, the out-migration was of short duration. In selected watersheds, average period of out-migration in 2006-07 was somewhat lower for beneficiary as compared to non-beneficiary households.

The perceptions of beneficiaries indicates that most of the indicators determining the quality of life are showing positive changes in all the selected watersheds. Beneficiaries reported moderate improvement in transportation, communication, educational facilities. They also reported moderate to high positive changes in respect of farming aspects, irrigation and household income. The impact has been found positive but somewhat below the expectation in respect of out-migration, availability of drinking water etc.

In selected watersheds, bunding activities, soil-conservation measures on farm, creation of structures for run off management, water storage and harvesting and drainage line, testing and demonstration of new technology, livestock management, planting of horticulture/agro forestry trees etc. were considered as most relevant and sustainable activities by more than 85 percent of sample beneficiaries. Further, all watershed farmers found bunding activities on arable land as most effective in increasing soil-moisture and recharge of water, reducing

soil-erosion and conservation of rain-water. However, due to average / poor quality of structures, 30 to 40 percent beneficiaries feared that created structures will be less effective in the years to come. Therefore, proper financial and administrative arrangement for timely repair and maintenance of these structures is most important. With regards to different activities of the NWDPRA, 35-50 percent beneficiaries were found lacking awareness on some of the components of the programme. Majority farmers believes that role of UGs is not so effective. All beneficiaries participated/ contributed by way of "Shramdan" in project activities and avoided financial contribution. Majority of beneficiaries did not get the chance of participating in training programme, subject tours etc.Nearly 26 percent beneficiaries believed that selection of participants for training programme, subject tours, visit to KVK, Krishi Mela etc. is not free from personal favour and bias. Allmost all sample beneficiaries/ non-beneficiaries believed that NWDPRA is a most effective multi sectoral programme for developing rainfed areas and after effecting suitable corrections it should be replicated on a larger scale in other untreated rainfed areas too.

Using 10 percent discount rate, BCR, IRR and NPV have been worked out for 10 and 20 years time horizon. For 10 years horizon, Benefit Cost Ratio (BCR) was 3.50 for Kirap, 3.82 for Sakariya, 9.02 for Modak-VI and 1.17 for Dhar watershed. And the Net Present Value (NPV) was Rs. 51.78 lakhs for Kirap, 60.05 lakhs for Sakariya, 83.11 lakhs for Modak-VI and 16.17 lakhs for Dhar watershed. The Internal Rate of Return (IRR) was 9 % for Kirap, 62% for Sakariya, 144% for Modak-VI and 23 % for Dhar. BCR, IRR and NPV worked out for 20 years horizon are higher than 10 years time horizon. For each selected watershed, IRR are greater than opportunity cost of capital and BCR are greater than one which clearly indicates that investment on NWDPRA is economically very attractive and viable. A positive and high NPV for each sample watershed implies positive worth of project in generating returns in excess of all costs.

4.4 State: Bihar

In Bihar, the work activities commenced in 2002-03 and completed in 2006-07. Land and water resource development activities constitute the primary areas of intervention. The expenditure on management constitutes about 18.38 per cent whereas 81.62 per cent incurred on development components, which includes resource management (51.64%), farm production system for land owning families (20.58%) and livelihood support system for landless families (9.10%). The impact of the project on various items may be briefly seen as below:

In WS-I, the area under private wasteland decreased by 16.67 per cent indicating development of waste lands by way of plantation, etc. the benefits from which would also be available to the non-landholders. Similarly in WS-II, the area under govt. wasteland and private wasteland decreased by 15.00 per cent and 22.00 per cent respectively, which reveals that community as well as private waste land by 21.92 per cent and 21.43 per cent and 31.44 per cent respectively have been found, clearly indicating increase in community and private plantations.

The change in irrigational status of agricultural land in 2006-07 over 2001-02 of the watershed indicate marginal increase in irrigated area in all the selected watersheds and almost in all the crop seasons, which may be due to increase in number of water harvesting structures (tanks, check dams, ponds, etc.). The increase was mainly found to big farms, which showed that perceived benefits are concentrated on large farms. Of course it is not a new concern. In fact, it needs group owned water harvesting structures in real sense rather jointly owned by own relatives/ neighbours or raiyets. The approach to sharing the benefits of water harvesting structure among the resource poor farmers is to develop well, which has been found important sources of irrigation.

The land development and creation of new water harvesting structures in all the watershed areas have not much effectively brought some additional areas under the important crops both in kharif and rabi. The data indicate that there is increase in the area under paddy crops from 0.64 per cent to 4.37 per cent, maize 0.65 per cent to 3.37 per cent, pulses 0.99 per cent to 2.08 per cent and oilseeds up to 1.85 per cent. Of course, there is increase in area of important crops but it is not much appreciable. It is worth to mention here that almost similar increase has been indicated by the non-beneficiary respondents.

In regard to production, it increased from 1.11 per cent to 4.87 per cent in case of paddy, 1.25 per cent to 6.97 per cent in case of wheat, 2.28 per cent to 6.61 per cent in case of maize, 1.24 per cent to 3.97 per cent in case of pulses and oilseeds witnessed negative growth. The findings indicate that the production increase is higher in rabi season for wheat, pulses and oilseeds across all the watersheds and this indicates the overall effectiveness of the watershed activities. Similarly change was also indicated in case of non-beneficiary respondents, which related that benefits were not centered on the beneficiaries rather shared with non-beneficiaries also.

It is generally presumed that if the facilities are extended to farmers, the cost of the production of the crops will come down provided the prices of the inputs are constant. But things are different. Neither the cost fallen nor is the prices of any inputs constant. Among the beneficiary farmers, it rose at the overall level to 8.16 per cent in WS-I, 5.54 per cent in WS-II, 4.38 per cent in WS-III and 13.08 per cent in WS-IV. Among the non-beneficiary farmers, it increased to 8.53 per cent in WS-I, 12.36 per cent in WS-II, 12.39 per cent in WS-III and 5.16 per cent in WS-IV. The reason for increase in cost of cultivation is mainly due to increase in prices of the inputs like fertilizer, irrigation, seeds, etc. The watershed development programme could not slash to the cost of production. The reason is obvious lesser the impact of the programme.

The disposal for all the crops level in WS-I is lower among the beneficiary households. However it is a bit higher among the non- beneficiary households. The reason behind low disposal may be lower production. Among the beneficiary households, the percentage of disposal is comparatively higher across all the three watersheds viz., 34.47 per cent in WS-II, 18.82 per cent in WS-III and 19.86 per cent in WS-IV. It is by 0.39 per cent in WS-I, 6.46 per cent in WS-II, 17.15 in WS-III and 21.93 per cent in WS-IV among the non- beneficiaries households. It revealed that the volume of disposal has increased, which may be due to distribution of benefits amongst the households or villagers.

The total average income of beneficiary group has increased in all the sample watersheds but it recorded higher in WS-III (25.24 per cent) followed by WS-II (19.22 per cent), WS-IV (11.30 per cent) and WS-I (0.31 per cent). Almost similar is the case of non- beneficiary group. It increased by 23.18 per cent in WS-IV followed by 14.72 per cent in WS-I, 5.13 per cent in WS-II and 2.56 per cent in WS-III.

The data suggest in all watersheds milk and meat generating animals/ birds are kept by a large number of families to supplement their food items and cash resources, while cows and buffaloes are kept for sourcing domestic milk consumption of children and course for generating income. In all the selected watersheds the total number of livestock increased. It increased as much as 73.00 per cent in WS-I, 30.74 per cent in WS-IV, 21.32 per cent in WS-III and 10.78 per cent in WS-II. It reveals that the project has facilitated in keeping larger number of livestock. But in absence of clear and agreed livestock holding and grazing practices there can not be favorable long term impact on conservation of common land resources.

The perception of beneficiary farmers indicate that positive changes have taken place in recharging of groundwater level and qualitative aspects of

livelihoods by about 15.00 to 20.00 per cent across the watersheds. Irrigation, afforestation and availability of irrigation have changed positively to the tune of 17.50 per cent, absorption of women in various activities (7.50 to 15.00%), production (10.00 to 15.00%), cropping intensity (7.50 to 10.00%) etc. Non-beneficiary farmers also indicated positive change of the programme on improvement in groundwater conditions (7.50 to 15.00%), qualitative aspect of livelihood (5.00 to 12.50%), production (2.50 to 7.50), availability of irrigation (5.00 to 15.00%). The analysis reveals that there is a general improvement in quality of life but in overall sense, the impact of the programme in these watersheds has been somewhat lower.

In the initial years of the programme no UGs/SHGs could be formed in any of the sample districts, which may be due to delay in launching of the programme. These could be formed after 2003-04. SHGs formed by landless and women particularly of SCs received sewing machines, she-goats, leaf plate making machine, dhankutti machine, etc. for undertaking non-farm group activities. 3 to 4 training programmes relating to know-how of the programme and land management practices are organized across all the watersheds. But due to poor knowledge, skill and now level of maintenance of the assets substantial support to the livelihood has not been found.

The overall approaches of all the PIAs have been to implement the plan/activities within the prescribed budget limit with almost no planning for user groups. The WDT is not effective in the area of community organization. However, they all have performed well in terms of level of achievements of physical (93% and above in number and 83% and above in overage) and financial (98% and above).

In fact, there is no single indicator of successful watershed development, so the most feasible approach is to compare the performance of a variety of indicators, which also reflect the diversity of project objectives. It is noteworthy

that the cost per hectare is helpful in assessing their cost effectiveness. It is calculated at Rs. 8213/ha in WS-I, Rs. 8144/ha in WS-II, Rs. 7103/ha in WS-IV and Rs. 6561/ha in WS-III. The programme has significant positive impact on creation of employment opportunities. It has been created about 7142 man days in Ws-I to the highest of 8915 of man days in WS-III. The internal rate of return calculated on the basis of the additional income over and above the pre-project income from agriculture, micro-enterprises, wages etc. within the village, varies from 187.00 per cent to 202.00 per cent (average of 4^{th} &5^{th} year) across the sample watersheds. The cost and benefit ratio also varies from 1: 1.87 to 1: 202. The average employment generation per hectare works out to 12.75 man days in WS-I, 14.80 man days in WS-IV, 16.31mandays in WS-II and 17.58 man days in WS-III. The quantitative impact on productivity of the crops indicates that expect pulses (-2.55%) in WS-III, the productivity of major crops have noted positive change but in case of cereals, pulses (-) 2.55% to 10.44%, oilseeds from 0.59% to 6.78% and vegetables and others form 0.19% to 2.40% across the watersheds. The cropping intensity has fallen by 4.72 per cent in WS-I. No change has been found in WS-IV. As regards the income benefit it has increased from 8.22 per cent to 13.28 per cent per hectare per annum. Similarly annual per hectare family income has also increased from 5.45 per cent to 10.49 per cent across the sample watersheds. However, its equity depends on the magnitude of the households of the area. Positive change has also been found in case level of groundwater and coverage of green/ biomass in the villages.

4.5 State: Maharashtra

In Maharashtra, watershed changed the status of the rain fed agricultural land in to irrigated land and thus, paved the way for enhanced agricultural productivity, employment and income of the farmers in the villages covered the selected watershed. Enhanced irrigation potentiality has been created due to

watershed and visible increase in the area of cultivation has taken place in all the watersheds. Watershed has positive impact in the beneficiary villages as it ensures assured sources of drinking water facilities to the stakeholders.

Among the four selected watershed, watershed-I (Kolhapur) manifest a remarkable progress do far as various live stock position is covered during the period 2001-02 to 2006-07, increase of cow calf is by 94.84% followed by Buffalo (74.43%), Goat (71.67%) and Sheep (70.83%). In the watershed-II (Nagpur) the increase of Goat in 138.23% followed by Buffalo calf (115.62%). In watershed-III (Raigarh) during the period 2001-02 to 2006-07, the increase of cow calf is by 100% followed by buffalo calf (50%). Similarly, in watershed –IV (Nanded) the number of cows has increased by 33.33% followed by bullock (25%).

Though the basic facilities of medical services and post offices are found in all most all beneficiary villages but it is deplorable that expect the watershed-1 (Kolhapur), we find that in all most all other watersheds there is conspicuous absence of latrines facilities.

It reveals from the observations that the watershed beneficiary villages have recorded impressive growth in terms of crop production recorded impressive growth in terms of cost of cultivation. In the watershed beneficiary villages the marginal farmers have impressive growth of marketable surplus during 2001-02 to 2006-07.

With regard to percentage change in the annual income in the ‘before’ the operation of watershed and ‘after’ its operation, it reveals that the highest percentage of (146.92%) increased in the annual income has occurred during the period 2001-02 to 2006-07 in the watershed–IV (Nanded) followed by the watershed-II (Nagpur) with 139.48%. The watershed-III (Raigarh) demonstrates a record increase of 192.06% in the annual income during the period 2001-02 to 2006-07, followed by the watershed-II (Nagpur) with 67.24%.

As per the performance indicator of the selected watershed in Maharashtra, it reveals that the highest area has been developed in the watershed-II (Nagpur) (91.01%), followed by the watershed-IV (Nanded) (77.44%). In all the watersheds there has been encouraging number of man days employment generated, the highest position in occupies by the watershed-I (Kolhapur) with 46765 man days, followed by the watershed-IV (Nanded) with 36907 man days. The additional area brought under cultivation also indicates a growing trend the highest position occupied by the watershed-IV (Nanded) with 65 ha., followed by the watershed-III (Raigarh) with 49 ha. There are also positive performance indicates with regard to additional area brought under supplemental irrigation. The watershed-I (Kolhapur) has 142.50 ha, the watershed–III (Raigarh) has 64 ha., and the watershed-IV (Nanded) has 34 ha. of additional area brought under supplemental irrigation. On the contrary, due to lack benefits accruing to the non-beneficiary big farmers, the productivity in agriculture, crop intensity, irrigation, quality of land, recharging of water, availability of irrigation, absorption of women in various activities, change forestry, literacy level and quality aspects of livelihood all remained standstill.

With regard to crops like cereals, pulses and oil seeds there has been positive co relationship so far as irrigated land and its productivity of these crops are concerned (x denote quantity of irrigated land (in hectare) cultivated, ‘y’ is the production in quintals). The crop-wise co relation shows positive correlation. Since fruits and sugar cane are in the category of cash crops, we have subtracted the figures and also found a positive correlation.

The foregone analysis in assessing the impact of NWDPRA on the rural agricultural economy of Maharashtra has concluded that watershed developments have greater potential to generate employment opportunities to the rural people. This is due to the increased availability of water resources, diversified cropping pattern including cultivation of labor-intensive vegetable crops and other horticultural crops. This additional employment generation from a watershed

program varies across regions depending on the cropping intensity, and the labor-intensity crops grown in that region. This additional employment generation in the villages led to minimizing migration of landless and other labor. Thus, watershed programs also contributed towards checking migration of rural people to the urban areas. This migration has greater concern for planning and devising rural development strategies. Water shed approach has captured development as a strategy for raising agricultural productivity has been indispensable particularly in dry land areas- one that integrates sectors and provides the foundation for subsequent development. Thus, the impact evaluation has demonstrated that watershed development programme to large extent able to regenerate natural resources including land, forest and water and play a crucial role in augmenting agricultural growth, productivity, cropping intensity and cropping pattern.

V
SUMMARY AND CONCLUSIONS

5.1 Introduction

Challenges to meet the needs of growing population in a sustainable way require comprehensive insight to ecologically sound agriculture in resources-poor countries. This problem is severe in developing countries with a low growth rate of 1.7 per cent. It is estimated that population in South Asia will be 1.9 billion in 2020 and of this 1.4 billion will be in India. Hence, there is need to increase the production with limited land and water resources. More than 60 per cent of the cultivated area in India is rainfed. It supports 40 per cent population and contributes 44 per cent to food basket. It contributes 90 per cent of coarse cereals, 90 per cent of pulses, 80 per cent of oilseeds and 65 per cent of cotton in the country. By 2020, about 600 million people would depend on dry land agriculture for livelihood.

Development, promotion and management of appropriate watershed technologies in dry land regions have been viewed as major priorities to ameliorate the problem of natural resource degradation. This results in multiple benefits such as ensuring food security, enhancing viability of farming and restoring ecological balance (Reddy, 2000). The present strategy of watershed development programme is to protect and sustain the livelihoods of resource poor farmers who are experiencing production constraints in addition to problems created by soil erosion and moisture stress. Watershed development is to ensure the availability of drinking water, fuel wood, fodder and helps in raising income and employment for farmers and landless labourers through improvement in agricultural productivity and production (Rao, 2000).

In view of the above, this study has been undertaken to assess the long-term economic impact on agriculture productivity, land use and cover, groundwater

recharge watershed system and sustenance of watershed technologies/practices of different states in India. The broad perspective of aspects which have been covered in the report are (1) community organisation and institutional aspects, (2) planning aspects, (3) implementation aspects, (4) environmental aspects, (5) social aspects, (6) economic aspects, (7) institutional aspects, (8) indirect benefit, (9) overall impacts and sustainability and (10) people's reaction.

5.2 Data Base and Research Methodology

According to the latest estimate, 18 districts in West Bengal and 21,91,300 hectare of non-forest area of these eighteen districts have been affected by land degradation problems. Firstly, all districts have been sub-divided into two groups on the basis of occurrence of land degradation i.e. below and above the average land degradation of West Bengal. Among all, 12 districts fall under below and rest 6 districts under above groups. Four districts (two from each group) i.e. Cooch Behar and Birbhum (from below) and 24-Parganas (North) and 24-Parganas (South) (from above) have been selected randomly. There are 6 sub-watersheds in Cooch Behar, 4 in Birbhum, 2 in 24-Parganas (N) and 12 in 24-Parganas (S). In the second stage, one watershed from each selected district has been selected randomly. Phulbari Watershed (Block : Dinhata-I) from Cooch Behar; Kanduri Watershed (Block : Rampurhat-I) from Birbhum; Hizta (Part-II) Watershed (Block : Hasnabad) from 24-Parganas (North) and Masjidbati Watershed (Block : Basanti) from 24-Parganas (South) have finally been selected for in-depth study.

In Rajasthan, four districts falling in distinct agro-climatic zones of Rajasthan were selected in consultation with the state nodal agency. From each selected district, one watershed under 10^{th} plan NWDPRA was selected. All the villages falling under the catchment areas of selected watersheds were selected for the study. For selection of non-beneficiary households, nearby non-watershed villages were selected for each selected watershed. From each selected watershed,

40 beneficiary(B) households comprising 8 marginal (<1 ha.), 8 small (1-<2 Ha.), 8 medium (2-<4 Ha.), 8 big (above 4 Ha.) and 8 landless were selected randomly. By following same procedure, for each selected watershed, 40 non-beneficiary (B) households from non-watershed villages were selected randomly. Thus, in all total 320 households (80 from each watershed) were selected. Through well structured schedules, the field data were collected from sample households for pre-project year 2001-02 and project ending year 2006-07. The difference between post-project and pre-project parameters shows combined impact of NWDPRA plus non-NWDPRA factors. The changes in parameters for non-beneficiary households show impact of only non-NWDPRA factors. Therefore, to ascertain realistic impact of NWDPRA, the changes observed for beneficiary households are compared with changes observed for non-beneficiary households.

In Bihar, the study has been conducted based on both secondary and primary data. As far as secondary data is concerned the study has used the data collected from the nodal departments A sample of 320 village households was selected for the purpose of study. The sample was drawn on the basis of a multistage stratified sampling method. In the first stage four districts were selected on the basis of larger physical and financial achievements under the projects/ schemes. These districts are Nawada, Kaimur, Aurangabad and Rohtas. In the second stage one micro watershed from each of the selected districts was selected on the basis of the same criteria as adopted in case of selection of the districts. Thereafter lists of beneficiaries and non-beneficiaries from each of the selected watershed areas/villages were prepared and classified in 5 categories of households viz., landless, marginal (1ha), small (1-2 ha), medium (2-4 ha) and large (4 ha and above). A total of 40 households each from beneficiary and non-beneficiary groups in each selected watershed areas were randomly selected without replacement for in-depth enquiry. There are two different reference periods viz., 2001-02 and 2006-07 respectively for the purpose of the study.

In Maharashtra, both secondary and primary information have been collected for fulfilling various specific objectives. The secondary data have been collected from literature, published statistical materials. In order to have a comparison in the changes of situational study variables, "Before and after" approach of evaluation have been followed. For this purpose, information has been generated for two different time's periods coinciding before and after the introduction of WARASA JAN SAHABHAGITA thus, the two different reference time periods will be 2001-2002 and 2006-2007 respectively.

For the present study, four districts of Maharashtra namely, Kolhapur from the north, Nagpur in the Vidarbha region in the east, Raigarh from the Konkan region in the west and Nanded in the Marathawada region having a watershed where NWDPRA is in operation were selected. Gadhinglaj block from Kolhapur district, Kuhi block from Nagpur District, Himayatnagar block from Nanded district and Murud block from Raigarh district have been selected. Households being the unit of enquiry for the study, 80 households, 40 from beneficiaries and 40 from non- beneficiaries groups, have been selected following the technique of stratified random sampling without replacement. Thus finally a sample of 320 households has been selected for the purpose of the study.

5.3 Main Findings

5.3.1 West Bengal

It is evident that there is no uniformity in family size in between the selected watersheds. The literacy rate is higher among males (82.29 per cent) than females (64.47 per cent). In non-watershed (NWP) area literacy rate is lower for both male and female at 71.41 per cent and 55.38 per cent, respectively. The size of land holding is 1.02 hectares and 0.77 hectares in WP and NWP, respectively. It

has been found that the farmers in NWP are somehow well equipped with tractor and sprayer than WP.

The average size of holdings in WP is 1.02 hectares comprising of cultivated (operational), cultivable fallow, permanent fallow, home stead, irrigated and non-irrigated area. In NWP, the average size of holding is 0.77 hectares. It indicates that the size of holdings is lower in WP than NWP. Total cultivated area of the sample farms in watershed area is 100.96 hectares, out of which 22.14 per cent is under pond irrigation followed by 1.88 per cent under canal irrigation, 8.40 per cent under STW, 1.23 per cent under other wells and 3.41 per cent under other sources. The non-irrigated area in WP is 62.95 per cent. In NWP, the total cultivated area is 87.42 hectares of which 26.66 per cent of area is irrigated under different irrigational sources followed by 73.34 per cent under non-irrigation. It indicates that the WP area is well irrigated in comparison to NWP area. This could be attributed to impact of watershed on groundwater augmentation in watershed area.

It has been observed that there is no difference in adoption of other recommended technologies in between WP and NWP farmers. It has been worked out that the overall adoption ratio of recommended watershed/agronomic technologies by WP and NWP farmers are 32.95 per cent and 27.68, respectively. It is evident that the quality of land available in WP area is suitable for agro-forestry and perennials and farmers are relatively more responsive to adoption agro-forestry and perennials.

The contribution of watershed as reflected in gross returns from rainfed crops was considered as the dependent variables, since the watershed impact is direct and implicit. Accordingly, gross returns from rainfed field crops in 2007 was regressed on dry land cropped area in hectares (X_1), human labour (X_2), bullock labour (X_3), seeds in Rs. (X_4) and fertiliser in Rs. (X_5). The adjusted R^2 for

the watershed and non-watershed area was 87 per cent and 94 per cent which indicate adequacy of fit of the model.

The regression coefficients are the estimates of the elasticity of production with respect to the independent variables. In WP, elasticity coefficient for human labour, bullock labour and fertiliser are 0.02, -0.01 and -0.03, respectively, and are statistically significant at 5 per cent. For land, the elasticity coefficient is 1.01 and significant at 5 per cent. The coefficient for seed is -0.03 and is not significant.

In NWP, variables land and seed are significant and their elasticities are 0.93and 0.07. For human labour, bullock labour and fertiliser, the elasticity coefficients are 0.06, -0.03 and 0.01, respectively and significant at 5 per cent. The returns to scale are 1.01 and 1.04 in WP and NWP areas, implying constant returns to scale. This shows that the production technology used in watershed and non-watershed is scale neutral.

The geometric mean levels of gross returns for WP and NWP sample farms are Rs. 11500.83/- and Rs. 11764.65/-, respectively. The geometric level of inputs land, human labour and bullock, seed, fertilisers are computed both watershed and non-watershed sample farms as 0.49, Rs. 2300.87/-, Rs. 413.75/-, Rs. 172.43/- Rs. 612.60 and 0.48, Rs. 2302.69/-, Rs. 418.49/-, Rs. 163.07/- and Rs. 617.26/-, respectively in that order.

In watershed area, the major source of irrigation is groundwater from tank/ponds. All tanks were excavated before watershed development programme. The impact of WDP is assessed based on number of irrigation ponds. Another measure of impact of WDP is the increased water yield in the ponds. However, the average yield of ponds is not available. Out of the 65 total ponds in the selected watersheds, only 4 ponds are non-functional, whereas in NWP area 3 ponds are non-functional out of the 29 ponds. Average water area of the pond in WP area is 0.12 hectare, whereas it is 0.17 hectare in NWP area. The average command area and average depth of the tank in WP area is higher than that of NWP area.

Average age of pond is 38.75 and 45.75 years in case of WP and NWP area, respectively. The shorter life of pond in WP could be attributed to water harvesting structures. The impact of WDP on groundwater recharge enabled farmers to take advantage of the increased life and age in the selected watershed areas to extract higher volume of groundwater. This may result in reduced investment on additional irrigation structures and the associated investment in irrigation.

Most of the soil and water conservation measures serve the purpose of conserving rain or runoff water and it is difficult to separate them and analyse their contribution to groundwater recharge. However, we can broadly divided them into (1) measures that increase in-situ water availability and (2) measures that increase availability of applied water stored off-farm or below the ground. The ubiquitous check dams and nala bunds, diversion channels and all their variants store water on surface or enhance subsurface storage. However, the use of farm ponds is for protective irrigation. The total investment on soil and water conservation structures in the selected watersheds is Rs. 35,52,403/- . The increased availability of groundwater due to WDP manifests in decreased irrigation cost. The net returns per farm has been observed to be Rs. 189.68/-, Rs. 518.48/- and Rs. 1057.91/- for marginal, small and medium farms, respectively. It has been observed that the cropping intensity decreases with the increase in size of holdings. This may be due to less irrigated area in higher holdings. It has been observed that the decrease in cost of irrigation and corresponding increase in net returns in WP is due to impact of WDP.

A large number of farmers in WP are rearing livestock on a small scale after the WDP. Farmers expressed during the discussion that due to availability of fodder on farm and common lands, the number of bullocks, cows, buffaloes, sheep, goat has increased. The net return from livestock per farm and per acre are

Rs. 24.12/- and Rs. 38.22/-, respectively in WP area and Rs. 21.42/- and Rs. 5.15/- in NWP area.

The equity in the distribution of income among different categories of farmers due to WDP has been analysed using Gini coefficients. Gini coefficients are computed for marginal, small and medium farms. Gini coefficients for WP and NWP areas are 0.44 and 0.41 for all farms, respectively. This indicates a fairly equitable distribution of income in WP area than that of NWP area.

5.3.2 Rajasthan

In 2006-07, compared to base year 2001-02, beneficiary as well as non-beneficiary households recorded marginal increase in respect of area under Kharif crops and area allocation to different crops in Kirap watershed. The area under rabi crops has also increased. Similarly, beneficiary and non-beneficiary have also registered increase in GCA. The beneficiary households increased the irrigation area by 2.59 hectares as against 3.43 hectares by non-beneficiary households. This gives clear indication of no role of NWDPRA in expanding irrigation area in this watershed.

Compared to base year, beneficiary households increased the area allocation to more remunerative and higher moisture/water demanding crops such as soyabean and groundnut in 2006-07 in Sakariya watershed. Whereas, in case of non-beneficiary, it remained nearly stable for soyabean and declined to a few extent for groundnut. In 2006-07, beneficiary households increased area under rabi crops and GCA by about 9 percent. The increase in rabi area and GCA for non-beneficiary households was meagre. Beneficiary households were able to put additional area under irrigated wheat and rapeseed in 2006-07. This clearly indicates that NWDPRA intervention impacted positively on shifting of crop-pattern and crop-diversification.

In crop-pattern, soyabean and maize among Kharif crops and coriander and wheat among rabi crops occupied the dominant position in Modak-VI watershed. As compared to 2001-02, for beneficiary households, increase in area under rabi crops and GCA was by 13.60 ha and 18.60 ha, respectively. Whereas for non-beneficiary households, it was only 3.24 ha for rabi crops and 3.56 ha. for GCA. The beneficiary households recorded 91 percent increase in area under irrigation, whereas, it was only 22.04 percent for non-beneficiary households. Compared to non-beneficiary households, higher quantum of incremental area under irrigation and GCA for beneficiaries clearly demonstrates positive impact of NWDPR activities on irrigation and crop-pattern.

As compared to pre-project year, beneficiary households increased area under rabi crops by 5.26 ha. in 2006-07 as against 1.51 ha. by non-beneficiary households in Dhar watershed. A similar trend was witnessed in respect of GCA. In 2006-07, 20.13 percent of Kharif crop area was irrigated by beneficiary households as against only 3.03 percent by non-beneficiary households. This indicates positive impact of NWDPRA intervention on irrigation and cropped area.

In all 4 watersheds, compared to base year 2001-02, cropping intensity recorded notable increase in 2006-07 for beneficiary as well as non-beneficiary households. However, this increase in percentage and absolute term was much higher for beneficiary households. The NWDPRA intervention improved the ground water aquifers and soil-moisture which subsequently helped beneficiary households to increase double cropped areas and supplemental irrigation. This helped beneficiary households in enhancing cropping intensity.

As compared to 2001-02, the overall average cost of cultivation per hectare in 2006-07 for beneficiary shows an increase of 58.80 percent in Kirap, 43.56 percent in Sakariya, 48.29 percent in Modak-VI and 81.97 percent in Dhar watershed. For non-beneficiary, it ranged between 43.25 percent for Kirap and 86.10 percent for Dhar. The increase in cost of cultivation was mainly due to

higher use of costly inputs such as HYV seeds, fertilizers, higher rate of application of inputs and increase in input prices. Thus, watershed treatments brought changes in use pattern of inputs and also enhanced cost of cultivation. In total cost of cultivation, most important items were human labour, bullock labour and machine labour.

In all the 4 watersheds, compared to base year, beneficiary and non-beneficiary farmers achieved higher yield for all crops (barring few cases) in 2006-07. In Sakariya, the incremental yields achieved by beneficiary farmers varied from 35.96 percent for gram to 188.46 percent for Isabgul. And for non-beneficiary, it varied from 3.98 percent for gram to 100 percent for Isabgul. In Kirap, for beneficiary farmers, it varied from 23.07 percent for Bajra to 58.18 percent for Udad. And for non-beneficiary, it varied from -22.50 percent for gram to 38.74 percent for Jowar. In Modak-VI, yield increment for beneficiary households varied from 15.01 percent for Soyabean to 90.02 percent for Jowar. In Dhar also, increment in yields of different crops (except gram) obtained by beneficiary households were far superior as compared to same for non-beneficiary. Thus, in all 4 watersheds, NWDPRA had noticeable positive impact on crop-yields. However, scale of impact varied across watersheds due to variation in soil-climatic conditions, soil-moisture level, terrain, rainfall, inputs of pattern etc.

In all 4 selected watersheds, as compared to base year, value of gross produce per hectare of cropped area shoot up sharply for both, beneficiary and non-beneficiary households. Overall, for beneficiary farmers, it went up by 73.45 percent in Kirap, 111.21 percent in Sakariya, 175.62 percent in Modak-VI and 63.92 percent in Dhar watershed. For non-beneficiary households, it ranged from 51.92 percent in Kirap to 117.76 percent in Modak-VI. The significant upsurge in the value of gross produce was mainly due to higher farm harvest prices and higher yield achievement.

In all 4 sample watersheds, net farm income per hectare of GCA and output-input ratio (except Dhar) for beneficiary and non-beneficiary households in 2006-07 were found much higher than those in 2001-02. Further, net farm income and output input ratio for beneficiary households was found substantially higher than those for non-beneficiary households. This suggests quite positive impact of NWDPRA on net return from farm enterprise.

In selected watersheds, as compared to 2001-02, the average annual net income per household from various sources recorded impressive upsurge in 2006-07, for both, beneficiary and non-beneficiary households. For beneficiary, increase was Rs. 25427 in Kirap, Rs. 16068 in Sakariya, Rs. 37270 in Modak-VI and Rs. 13819 in Dhar. The corresponding numbers for non-beneficiary were Rs. 14489, Rs. 11144, Rs. 25745 and Rs. 10196 respectively. The sharp increase in the net annual income per beneficiary households shows positive impact of NWDPRA on livelihood security of different stakeholders of the watersheds.

As compared to non-beneficiary, assets investment per beneficiary household during 2001-02 to 2006-07 was found higher by Rs. 27260 in Kirap, Rs. 12638 in Sakariya, Rs. 18281 in Modak-VI and Rs. 20035 in Dhar watershed.

As compared to base year 2001-02, the average rise in water level in wells during Kharif-2006-07 recorded by beneficiary households ranged from 7.03 feet in Dhar watershed to 8.55 feet in Kirap watershed. During summer, it ranged from 1.88 feet in Dhar to 2.66 feet in Sakariya watershed. As compared to non-beneficiary, net increase in water table for beneficiary households was more than 4.43 feet in Kharif, 1.88 feet in rabi and 0.62 feet in summer season. This clearly indicates that water conservation technology adopted under NWDPRA is effective. This improvement in water table situation eased the drinking water problems of watershed community to some extent.

Mango, Lemon and Amala (Anola) were main horticulture plants and Ratanjyot, Neem, Bamboo were important agro-forestry trees. The survival rate of

horticulture plants was found below 50 percent in Dhar, Sakariya and Kirap. For Neem, Bamboo survival rate was found 47 percent or less.

In all 4 selected watersheds, as compared to base year, the proportion of beneficiaries as well as non-beneficiaries who adopted various improved farming practices is found higher in 2006-07. As compared to non-beneficiary households, the adoption rate was found moderately higher for beneficiary households which indicates positive impact of NWDPRA on adoption of improved farm technology.

As expected, in all selected watersheds, number of milch animals and total number of livestock increased moderately in 2006-07.

In selected watersheds, requirement of human labour for farming sector shows noticeable upsurge in 2006-07. Compared to 2001-02, beneficiary households in 2006-07 generated per ha./annum additional farm employment of 42 mandays in Kirap and Sakariya, 36 mandays in Modak-VI and 56 mandays in Dhar watershed. Additional farm employment generation was observed relatively very low for non-beneficiary households.

In majority cases, the out-migration was of short duration. In selected watersheds, average period of out-migration in 2006-07 was somewhat lower for beneficiary as compared to non-beneficiary households.

The perceptions of beneficiaries indicates that most of the indicators determining the quality of life are showing positive changes in all the selected watersheds. Beneficiaries reported moderate improvement in transportation, communication, educational facilities. They also reported moderate to high positive changes in respect of farming aspects, irrigation and household income. The impact has been found positive but somewhat below the expectation in respect of out-migration, availability of drinking water etc.

In selected watersheds, bunding activities, soil-conservation measures on farm, creation of structures for run off management, water storage and harvesting

and drainage line, testing and demonstration of new technology, livestock management, planting of horticulture/agro forestry trees etc. were considered as most relevant and sustainable activities by more than 85 percent of sample beneficiaries. Further, all watershed farmers found bunding activities on arable land as most effective in increasing soil-moisture and recharge of water, reducing soil-erosion and conservation of rain-water. However, due to average / poor quality of structures, 30 to 40 percent beneficiaries feared that created structures will be less effective in the years to come. Therefore, proper financial and administrative arrangement for timely repair and maintenance of these structures is most important. With regards to different activities of the NWDPRA, 35-50 percent beneficiaries were found lacking awareness on some of the components of the programme. Majority farmers believes that role of UGs is not so effective. All beneficiaries participated/ contributed by way of "Shramdan" in project activities and avoided financial contribution. Majority of beneficiaries did not get the chance of participating in training programme, subject tours etc. Nearly 26 percent beneficiaries believed that selection of participants for training programme, subject tours, visit to KVK, Krishi Mela etc. is not free from personal favour and bias. Almost all sample beneficiaries/ non-beneficiaries believed that NWDPRA is a most effective multi sectoral programme for developing rainfed areas and after effecting suitable corrections it should be replicated on a larger scale in other untreated rainfed areas too.

Using 10 percent discount rate, BCR, IRR and NPV have been worked out for 10 and 20 years time horizon. For 10 years horizon, Benefit Cost Ratio (BCR) was 3.50 for Kirap, 3.82 for Sakariya, 9.02 for Modak-VI and 1.17 for Dhar watershed. And the Net Present Value (NPV) was Rs. 51.78 lakhs for Kirap, 60.05 lakhs for Sakariya, 83.11 lakhs for Modak-VI and 16.17 lakhs for Dhar watershed. The Internal Rate of Return (IRR) was 9 % for Kirap, 62% for Sakariya, 144% for Modak-VI and 23 % for Dhar. BCR, IRR and NPV worked out for 20 years

horizon are higher than 10 years time horizon. For each selected watershed, IRR are greater than opportunity cost of capital and BCR are greater than one which clearly indicates that investment on NWDPRA is economically very attractive and viable. A positive and high NPV for each sample watershed implies positive worth of project in generating returns in excess of all costs.

5.3.3 State: Bihar

In Bihar, the work activities commenced in 2002-03 and completed in 2006-07. Land and water resource development activities constitute the primary areas of intervention. The expenditure on management constitutes about 18.38 per cent whereas 81.62 per cent incurred on development components, which includes resource management (51.64%), farm production system for land owning families (20.58%) and livelihood support system for landless families (9.10%). The impact of the project on various items may be briefly seen as below:

In WS-I, the area under private wasteland decreased by 16.67 per cent indicating development of waste lands by way of plantation, etc. the benefits from which would also be available to the non-landholders. Similarly in WS-II, the area under govt. wasteland and private wasteland decreased by 15.00 per cent and 22.00 per cent respectively, which reveals that community as well as private waste land by 21.92 per cent and 21.43 per cent and 31.44 per cent respectively have been found, clearly indicating increase in community and private plantations.

The change in irrigational status of agricultural land in 2006-07 over 2001-02 of the watershed indicate marginal increase in irrigated area in all the selected watersheds and almost in all the crop seasons, which may be due to increase in number of water harvesting structures (tanks, check dams, ponds, etc.). The increase was mainly found to big farms, which showed that perceived benefits are concentrated on large farms. Of course it is not a new concern. In fact, it needs

group owned water harvesting structures in real sense rather jointly owned by own relatives/neighbours or raiyets. The approach to sharing the benefits of water harvesting structure among the resource poor farmers is to develop well, which has been found important sources of irrigation.

The land development and creation of new water harvesting structures in all the watershed areas have not much effectively brought some additional areas under the important crops both in kharif and rabi. The data indicate that there is increase in the area under paddy crops from 0.64 per cent to 4.37 per cent, maize 0.65 per cent to 3.37 per cent, pulses 0.99 per cent to 2.08 per cent and oilseeds up to 1.85 per cent. Of course, there is increase in area of important crops but it is not much appreciable. It is worth to mention here that almost similar increase has been indicated by the non-beneficiary respondents.

In regard to production, it increased from 1.11 per cent to 4.87 per cent in case of paddy, 1.25 per cent to 6.97 per cent in case of wheat, 2.28 per cent to 6.61 per cent in case of maize, 1.24 per cent to 3.97 per cent in case of pulses and oilseeds witnessed negative growth. The findings indicate that the production increase is higher in rabi season for wheat, pulses and oilseeds across all the watersheds and this indicates the overall effectiveness of the watershed activities. Similarly change was also indicated in case of non-beneficiary respondents, which related that benefits were not centered on the beneficiaries rather shared with non-beneficiaries also.

It is generally presumed that if the facilities are extended to farmers, the cost of the production of the crops will come down provided the prices of the inputs are constant. But things are different. Neither the cost fallen nor is the prices of any inputs constant. Among the beneficiary farmers, it rose at the overall level to 8.16 per cent in WS-I, 5.54 per cent in WS-II, 4.38 per cent in WS-III and 13.08 per cent in WS-IV. Among the non-beneficiary farmers, it increased to 8.53 per cent in WS-I, 12.36 per cent in WS-II, 12.39 per cent in WS-III and 5.16 per

cent in WS-IV. The reason for increase in cost of cultivation is mainly due to increase in prices of the inputs like fertilizer, irrigation, seeds, etc. The watershed development programme could not slash to the cost of production. The reason is obvious lesser the impact of the programme.

The disposal for all the crops level in WS-I is lower among the beneficiary households. However it is a bit higher among the non- beneficiary households. The reason behind low disposal may be lower production. Among the beneficiary households, the percentage of disposal is comparatively higher across all the three watersheds viz., 34.47 per cent in WS-II, 18.82 per cent in WS-III and 19.86 per cent in WS-IV. It is by 0.39 per cent in WS-I, 6.46 per cent in WS-II, 17.15 in WS-III and 21.93 per cent in WS-IV among the non- beneficiaries households. It revealed that the volume of disposal has increased, which may be due to distribution of benefits amongst the households or villagers.

The total average income of beneficiary group has increased in all the sample watersheds but it recorded higher in WS-III (25.24 per cent) followed by WS-II (19.22 per cent), WS-IV (11.30 per cent) and WS-I (0.31 per cent). Almost similar is the case of non- beneficiary group. It increased by 23.18 per cent in WS-IV followed by 14.72 per cent in WS-I, 5.13 per cent in WS-II and 2.56 per cent in WS-III.

The data suggest in all watersheds milk and meat generating animals/birds are kept by a large number of families to supplement their food items and cash resources, while cows and buffaloes are kept for sourcing domestic milk consumption of children and course for generating income. In all the selected watersheds the total number of livestock increased. It increased as much as 73.00 per cent in WS-I, 30.74 per cent in WS-IV, 21.32 per cent in WS-III and 10.78 per cent in WS-II. It reveals that the project has facilitated in keeping larger number of livestock. But in absence of clear and agreed livestock holding and grazing

practices there can not be favorable long term impact on conservation of common land resources.

The perception of beneficiary farmers indicate that positive changes have taken place in recharging of groundwater level and qualitative aspects of livelihoods by about 15.00 to 20.00 per cent across the watersheds. Irrigation, afforestation and availability of irrigation have changed positively to the tune of 17.50 per cent, absorption of women in various activities (7.50 to 15.00%), production (10.00 to 15.00%), cropping intensity (7.50 to 10.00%) etc. Non-beneficiary farmers also indicated positive change of the programme on improvement in groundwater conditions (7.50 to 15.00%), qualitative aspect of livelihood (5.00 to 12.50%), production (2.50 to 7.50), availability of irrigation (5.00 to 15.00%). The analysis reveals that there is a general improvement in quality of life but in overall sense, the impact of the programme in these watersheds has been somewhat lower.

In the initial years of the programme no UGs/SHGs could be formed in any of the sample districts, which may be due to delay in launching of the programme. These could be formed after 2003-04. SHGs formed by landless and women particularly of SCs received sewing machines, she-goats, leaf plate making machine, dhankutti machine, etc. for undertaking non-farm group activities. 3 to 4 training programmes relating to know-how of the programme and land management practices are organized across all the watersheds. But due to poor knowledge, skill and now level of maintenance of the assets substantial support to the livelihood has not been found.

The overall approaches of all the PIAs have been to implement the plan/activities within the prescribed budget limit with almost no planning for user groups. The WDT is not effective in the area of community organization. However, they all have performed well in terms of level of achievements of

physical (93% and above in number and 83% and above in overage) and financial (98% and above).

In fact, there is no single indicator of successful watershed development, so the most feasible approach is to compare the performance of a variety of indicators, which also reflect the diversity of project objectives. It is noteworthy that the cost per hectare is helpful in assessing their cost effectiveness. It is calculated at Rs. 8213/ha in WS-I, Rs. 8144/ha in WS-II, Rs. 7103/ha in WS-IV and Rs. 6561/ha in WS-III. The programme has significant positive impact on creation of employment opportunities. It has been created about 7142 man days in Ws-I to the highest of 8915 of man days in WS-III. The internal rate of return calculated on the basis of the additional income over and above the pre-project income from agriculture, micro-enterprises, wages etc. within the village, varies from 187.00 per cent to 202.00 per cent (average of 4^{th} &5^{th} year) across the sample watersheds. The cost and benefit ratio also varies from 1: 1.87 to 1: 202. The average employment generation per hectare works out to 12.75 man days in WS-I, 14.80 man days in WS-IV, 16.31mandays in WS-II and 17.58 man days in WS-III. The quantitative impact on productivity of the crops indicates that expect pulses (-2.55%) in WS-III, the productivity of major crops have noted positive change but in case of cereals, pulses (-) 2.55% to 10.44%, oilseeds from 0.59% to 6.78% and vegetables and others form 0.19% to 2.40% across the watersheds. The cropping intensity has fallen by 4.72 per cent in WS-I. No change has been found in WS-IV. As regards the income benefit it has increased from 8.22 per cent to 13.28 per cent per hectare per annum. Similarly annual per hectare family income has also increased from 5.45 per cent to 10.49 per cent across the sample watersheds. However, its equity depends on the magnitude of the households of the area. Positive change has also been found in case level of groundwater and coverage of green/ biomass in the villages.

5.3.4 State: Maharashtra

In Maharashtra, watershed changed the status of the rain fed agricultural land in to irrigated land and thus, paved the way for enhanced agricultural productivity, employment and income of the farmers in the villages covered the selected watershed. Enhanced irrigation potentiality has been created due to watershed and visible increase in the area of cultivation has taken place in all the watersheds. Watershed has positive impact in the beneficiary villages as it ensures assured sources of drinking water facilities to the stakeholders.

Among the four selected watershed, watershed-I (Kolhapur) manifest a remarkable progress do far as various live stock position is covered during the period 2001-02 to 2006-07, increase of cow calf is by 94.84% followed by Buffalo (74.43%), Goat (71.67%) and Sheep (70.83%). In the watershed-II (Nagpur) the increase of Goat in 138.23% followed by Buffalo calf (115.62%). In watershed-III (Raigarh) during the period 2001-02 to 2006-07, the increase of cow calf is by 100% followed by buffalo calf (50%). Similarly, in watershed –IV (Nanded) the number of cows has increased by 33.33% followed by bullock (25%).

Though the basic facilities of medical services and post offices are found in all most all beneficiary villages but it is deplorable that expect the watershed-1 (Kolhapur), we find that in all most all other watersheds there is conspicuous absence of latrines facilities.

It reveals from the observations that the watershed beneficiary villages have recorded impressive growth in terms of crop production recorded impressive growth in terms of cost of cultivation. In the watershed beneficiary villages the marginal farmers have impressive growth of marketable surplus during 2001-02 to 2006-07.

With regard to percentage change in the annual income in the ‘before’ the operation of watershed and ‘after’ its operation, it is reveled that the highest

percentage of (146.92%) increased in the annual income has occurred during the period 2001-02 to 2006-07 in the watershed–IV (Nanded) followed by the watershed-II (Nagpur) with 139.48%. the watershed-III (Raigarh) demonstrates a record increase of 192.06% in the annual income during the period 2001-02 to 2006-07, followed by the watershed-II (Nagpur) with 67.24%.

As per the performance indicator of the selected watershed in Maharashtra, it reveals that the highest area has been developed in the watershed-II (Nagpur) (91.01%), followed by the watershed-IV (Nanded) (77.44%). In all the watersheds there has been encouraging number of man days employment generated, the highest position in occupies by the watershed-I (Kolhapur) with 46765 man days, followed by the watershed-IV (Nanded) with 36907 man days. The additional area brought under cultivation also indicates a growing trend the highest position occupied by the watershed-IV (Nanded) with 65 ha., followed by the watershed-III (Raigarh) with 49 ha. There are also positive performance indicates with regard to additional area brought under supplemental irrigation. The watershed-I (Kolhapur) has 142.50 ha, the watershed–III (Raigarh) has 64 ha., and the watershed-IV (Nanded) has 34 ha. of additional area brought under supplemental irrigation. On the contrary, due to lack benefits accruing to the non-beneficiary big farmers, the productivity in agriculture, crop intensity, irrigation, quality of land, recharging of water, availability of irrigation, absorption of women in various activities, change forestry, literacy level and quality aspects of livelihood all remained standstill.

With regard to crops like cereals, pulses and oil seeds there has been positive co relationship so far as irrigated land and its productivity of these crops are concerned (x denote quantity of irrigated land (in hectare) cultivated, ‘y’ is the production in quintals). The crop-wise co relation shows positive correlation. Since fruits and sugar cane are in the category of cash crops, we have subtracted the figures and also found a positive correlation.

The foregone analysis in assessing the impact of NWDPRA on the rural agricultural economy of Maharashtra has concluded that watershed developments have greater potential to generate employment opportunities to the rural people. This is due to the increased availability of water resources, diversified cropping pattern including cultivation of labor-intensive vegetable crops and other horticultural crops. This additional employment generation from a watershed program varies across regions depending on the cropping intensity, and the labor-intensity crops grown in that region. This additional employment generation in the villages led to minimizing migration of landless and other labor. Thus, watershed programs also contributed towards checking migration of rural people to the urban areas. This migration has greater concern for planning and devising rural development strategies. Water shed approach has captured development as a strategy for raising agricultural productivity has been indispensable particularly in dry land areas- one that integrates sectors and provides the foundation for subsequent development. Thus, the impact evaluation has demonstrated that watershed development programme to large extent able to regenerate natural resources including land, forest and water and play a crucial role in augmenting agricultural growth, productivity, cropping intensity and cropping pattern.

5.4 Suggestions for Policy Implications

In view of the above, the following suggestions are made with regard to the selected states for policy implications.

5.4.1 West Bengal

(1) Watershed development programme intervention in natural resource conservation resulted in diversified land use and cover. Therefore, for sustainability of the programme other incentive augmenting rural

development programmes could be linked in watershed development programme in phased manner. In the aggregate, the watershed development programme can be considered as an appropriate rural development strategy by implementing all land based rural development programmes under the concept of watershed development programme.

(2) Dry land horticulture component increased and stabilised the net farm returns by improving the socio-economic conditions of marginal and small farmers. Hence, higher budgetary allocation in watershed development programme could be given to dry land horticulture development to maintain the environmental economic goal of maximized net farm income of marginal and small farmers together conserving the ecosystem.

(3) Promotion of local institutions through training and education of members for maintenance of water harvesting structures is crucial for sustainability of the watershed development programme.

(4) Construction of water harvesting structures through watershed development approach enhanced groundwater recharge. Proximity of irrigation ponds to water harvesting structures played a complimentary role in augmenting yield, age and life of ponds. Hence, a large proportion of water harvesting structures preferably located closer to cultivated lands to realize greater economic impact on irrigated farms.

(5) Policy guidelines for institutional mechanisms for management of groundwater as well as assets created under watershed need to be developed.

5.4.2 Rajasthan

Based on evaluation carried out in Rajasthan using field level data, it can be inferred that NWDPRA holds the key to the development of country's vast rainfed

areas. The programme improved the groundwater aquifers as well as in *situ* moisture level of soil. Further NWDPRA programme brought very positive changes in respect of irrigation, cropping intensity, crop-pattern, farm employment, fodder and bio-mass, out-migration, status of land less households etc. It boost the village economy. The NWDPRA is beneficial but it lacks certainty regarding its sustainability in future.

Though, it is very difficult to identify a single key factor, improvement in water availability for irrigation and in situ moisture lead to rise in crop-yields and farm income seem to be the driving force behind the noticeable performance of NWDPRA.

(1) The study in Rajasthan further reveals that quantum of benefits derived were below the expected level. By effecting necessary corrections to eliminate constraints discussed in forgoing analysis, benefit level of programme can be raised further. The participation of beneficiaries was low at the stages of planning, implementation and in village meetings. The awareness level about project activities was also low to moderate. This call for higher efforts to increase the people's participation at all the stages of programme, decision making process and particularly activities related to common property resources. Further, additional efforts are needed to raise the awareness level and building capacity of the stakeholders/ beneficiaries. Regular arrangement of meetings of WC/WA will bring more transparency. The regular interaction between PIA/WDT/WC and beneficiaries will be helpful in identify problems and evolving solution in a participatory ways. Though, NWDPRA have an essential component of institutional building, but most of the created institutions were found average/ weak in nature. On FPS, LSS and capacity building activities, WDT/PIA had paid little attention. Hence, there is a need for WDT, PIA and WC to give more emphasis on these aspects. The inclusion/ support of local NGOs in the programme will be helpful in reducing

implementation problems. The effective arrangement of timely repairs and maintenance of created structures also needed for sustainability of the impact of the programme.

(2) The NWDPRA is economically very attractive and viable and has succeeded in boosting people's empowerment. The goals of upliftment of farming communities of rainfed areas, equity, employment and food-security would not look distant, if NWDPRA is pursued in earnest. In the years to come, the NWDPRA deserves higher financial allocation and large scale replication in untreated rainfed areas of Rajasthan.

5.4.3 Bihar

The emerging issues in regard to NWDPRA in Bihar and the suggestions for improvement are presented below:

(1) People's participation in watershed activities is poor except in case of wage earners/subsidy beneficiaries. Most of the farmers expressed that improved, certified and guaranteed seeds in addition to enlarging water potential and providing market would usher agriculture in rainfed agro-eco-regions. In fact, people's participation is expected only when provisions of direct benefits to the farmers are made. So watershed activities should be taken up in such a way (PRA and action research) that majority of villagers could be encouraged/incentivized to participate

(2) It has found that although rainfed and water scarce areas have been chosen for the programme, the land areas developed are essentially private croplands. The community land development activities do not get much attention. As the target of PIA is to develop a total area of 500 ha, with no minimum expenditure or area earmarked for community land. PIAs usually opt for the easier course of developing only the flatter terrain of cropland areas, where

quick participation of land owning households is also possible. In such a situation land beneficiaries are deprived of any direct benefits. In order to avoid such problem and conflict between beneficiaries and non-beneficiaries, development of community land resources and introduction of income generating activities for the landless and other weaker sections should be considered.

(3) There should be a Detailed Project Report (DPR) of the selected micro watershed area in the initial year of project and get it known to all by displaying the list of activities to be undertaken during the project period. It should be prepared by a team of technical experts on the basis of felt needs of local people.

(4) The effectiveness of community organisation and sustaining watershed activities largely depend on the training and awareness of the members of WA, WC and WDT. The roles and responsibilities of these groups are defined but not in practice, which need to be activated by regular reviewing and monitoring of the programme.

(5) There is need to diversify the role of WDT to get associated in the post-project area activities for a minimum of 3-4 years after the project is completed to help various user groups. It requires re-validation of WDT as a professional body to render its services in the area.

(6) It has been found that high breed she-goats are given to SHG members under livelihood support system to landless families, which could not survive after a month or so in local conditions. Hence, the husbandry ability of the beneficiary members as well as suitability of the area must be considered before extending the assistance under the programme.

5.4.4 Maharashtra

Watershed management is essentially a resource based approach to livelihood enhancement. It ensures supply of water to every field, removes hunger and poverty from rural areas, restores ecological balances, provides green cover in the denuded areas, bring in more rains and improved environment. The suggestions for improvement of NWDPRA programme in Maharashtra are enumerated below:

(1) Watershed development needs to integrated into the main stream strategy for agricultural growth, if a large part of it is going to realised from the hitherto rainfed areas.

(2) Regular training at watershed committee, PAI/block and district level should continue all along the year. Training on innovative activities, local skills, improved technology etc. should be given priority. In fact, a training and community organisation activities calendar should be prepared and accordingly the programme be organised. Nursery is a vital need in all the watersheds. Provision of saplings of fuel and fodder plantation, fruit bearing trees, vegetable cultivation should be ensured either through individual nursery or from central nursery at every watershed area. Establishment of a medicinal/herbal plantation garden is felt essential in the watershed. Community based grain banks and seed banks should be established in the watershed and government support should be ensured at the beginning for food and seed security. Since the climate of Maharashtra is conducive for the cultivation of flowers and it has a high market value in the neighbouring state of Andhra Pradesh, floriculture should be promoted for the economic up-liftment of the rural poor. In all the watershed projects, it is necessary to fix target and allocate fund for other activities like soil and moisture conservation, development of non-arable land, drainage line treatment etc. are indispensable for the all round development of the watershed project.

(3) Promotion of sustainable livelihoods for marginal and small farmers in the rainfed regions, through tree based approach, plantation of cashew nut trees, adoption of soil and water conservation measures, development of plantation, intercropping and introducing new technologies for sustainable productivity in rainfed area emphasizing on soil-water-plant conservation seems more urgent as such areas are prone to degradation process in comparison with irrigated areas. Therefore, a developmental strategy based on integrated management of land, water and other production resources coupled with appropriate cropping and other agro-techniques has been justified for sustainable production.

(4) In order to check further depletion of the existing resources and bring about socio-economic changes in keeping a balance between the production and the environment, watershed approach has been taken up as comprehensive programme of action with a view to address some of the basic question of survival such as long term self reliance and sustainability in the livelihood system, regeneration of bio-mass and the degraded eco-system, entitlement and equitable control over community, and economic viability of a self managed resources system at the micro-level etc.

(5) There should be a holistic approach to rural agriculture development through watershed programme, primarily aiming at integration of several development activities such as soil conservation, land and water management, agriculture, afforestation and animal husbandry with special emphasis to relate these actions with human issues and to develop the capability of the target population at the micro level befitting to the local conditions.

VOLUME II

WEST BENGAL

Table 1: Socio-economic characteristics of sample farmers of the selected watersheds (beneficiary and non-beneficiary), 2007

Sl. No.	Particulars	Beneficiary	Non-beneficiary
	Birbhum		
1.	Family size (Avg.)	5.25	5.30
2.	Literacy (%)	60.48	61.32
	1. Male	73.33	77.01
	2. Female	47.62	50.40
3.	Avg. land holdings (ha.)*	1.45	1.36
4.	Total number of bullock carts	15	11
5.	No. of Tractors/Power Tillers	0	2
6.	No. of Pump Sets	7	9
7.	Thresher	10	11
8.	Sprayer	5	4
	Cooch Bhear		
1.	Family size (Avg.)	4.85	4.47
2.	Literacy (%)	75.26	70.95
	1. Male	80.37	78.31
	2. Female	68.97	61.04
3.	Avg. land holdings (ha.)*	1.02	.72
4.	Total number of bullock carts	11	9
5.	No. of Tractors	1	2
6.	No. of Pump Sets	13	9
7.	Thresher	15	16
8.	Sprayer	8	12
	24-Parganas (North)		
1.	Family size (Avg.)	4.45	5.65
2.	Literacy (%)	81.36	62.39
	1. Male	87.76	66.67
	2. Female	73.42	58.47
3.	Avg. land holdings (ha.)*	.74	.55
4.	Total number of bullock carts	6	11
5.	No. of Tractors	0	2
6.	No. of Pump Sets	3	2
7.	Thresher	4	3
8.	Sprayer	5	7
	24-Parganas (South)		
1.	Family size (Avg.)	5.13	4.55
2.	Literacy (%)	78.54	51.65
	1. Male	85.58	59.79
	2. Female	71.29	42.35
3.	Avg. land holdings (ha.)*	.87	.43
4.	Total number of bullock carts	3	0
5.	No. of Tractors	0	0
6.	No. of Pump Sets	3	2
7.	Thresher	2	1
8.	Sprayer	2	3
	All		
1.	Family size (Avg.)	4.91	4.99
2.	Literacy (%)	73.75	62.22
	1. Male	82.29	71.41
	2. Female	64.47	55.38
3.	Avg. land holdings (ha.)*	1.02	0.77
4.	Total number of bullock carts	35	31
5.	No. of Tractors	1	6
6.	No. of Pump Sets	26	22
7.	Thresher	31	31
8.	Sprayer	20	26

Table 2: Land use pattern of sample farmers in selected watershed (beneficiary and non-beneficiary), 2007

Sl. No.	Land type	Beneficiary		Non-beneficiary	
		Area	%	Area	%
Birbhum					
1.	A. Cultivated (Operational)	37.21	64.22	38.93	71.43
	B. Current Fallow*	20.73	35.78	15.57	28.57
	a) Cultivable Fallow	4.83	8.34	4.14	7.60
	b) Permanent Fallow	14.02	24.20	8.82	16.18
	c) Home Stead	1.89	3.26	2.61	4.79
2.	A. Non-Irrigated Area	24.78	66.60	27.96	71.82
	B. Irrigated Area	12.43	33.40	10.97	28.18
	Tank/Pond	6.84	18.38	5.44	13.97
	Canal	2.79	7.50	4.33	11.12
	STW	1.90	5.11	0.00	0.00
	Other Well s	0.27	0.73	0.50	1.28
	Other Sources	0.63	1.69	0.70	1.80
Cooch Behar					
1.	A. Cultivated (Operational)	24.63	60.31	20.53	71.28
2.	B. Current Fallow*	16.20	39.67	8.28	28.75
	a) Cultivable Fallow	2.66	6.51	0.30	1.04
	b) Permanent Fallow	9.55	23.38	3.76	13.06
	c) Home Stead	4.00	9.79	4.22	14.65
3.	A. Non-Irrigated Area	13.37	54.28	13.57	66.10
4.	B. Irrigated Area	11.26	45.72	6.96	33.90
	Tank/Pond	2.07	8.40	0.20	0.97
	Canal	0.00	0.00	0.00	0.00
	STW	7.02	28.50	5.92	28.85
	Other Wells	0.00	0.00	0.00	0.00
	Other Sources	2.17	8.81	0.84	4.09
24-Parganas (North)					
1.	A. Cultivated (Operational)	17.62	59.63	13.82	62.96
2.	B. Current Fallow*	11.93	40.37	8.12	36.99
	a) Cultivable Fallow	0.00	0.00	0.00	0.00
	b) Permanent Fallow	8.97	30.36	4.79	21.82
	c) Home Stead	2.95	9.98	3.33	15.17
3.	A. Non-Irrigated Area	12.15	68.96	11.71	84.73
4.	B. Irrigated Area	5.47	31.04	2.11	15.27
	Tank/Pond	5.09	28.89	0.82	5.93
	Canal	0.00	0.00	0.00	0.00
	STW	0.00	0.00	1.19	8.61
	Other Wells	0.32	1.82	0.07	0.51
	Other Sources	0.06	0.34	0.03	0.22
24-Parganas (South)					
1.	A. Cultivated (Operational)	21.50	61.46	14.14	81.73
2.	B. Current Fallow*	13.49	38.56	3.16	18.27
	a) Cultivable Fallow	0.52	1.49	0.00	0.00
	b) Permanent Fallow	7.87	22.50	0.69	3.99
	c) Home Stead	5.05	14.44	2.47	14.28
3.	A. Non-Irrigated Area	13.32	61.95	10.00	70.72
4.	B. Irrigated Area	8.18	38.05	4.14	29.28
	Pond	7.07	32.88	0.79	5.59
	Canal	0.00	0.00	0.00	0.00
	STW	0.00	0.00	0.00	0.00
	Other Wells	0.51	2.37	2.65	18.74
	Other Sources	0.60	2.79	0.70	4.95

Table 2 contd…

Table 2 contd…

	All				
1.	C. Cultivated (Operational)	100.96	61.41	87.42	71.85
2.	D. Current Fallow*	62.35	38.60	35.13	28.15
	a) Cultivable Fallow	8.01	4.09	4.44	2.16
	b) Permanent Fallow	40.41	25.11	18.06	13.76
	c) Home Stead	13.89	9.37	12.63	12.22
3.	C. Non-Irrigated Area	63.62	62.95	63.24	73.34
4.	D. Irrigated Area	37.34	37.05	24.18	26.66
	Pond	21.07	22.14	7.25	6.62
	Canal	2.79	1.88	4.33	2.78
	STW	8.92	8.40	7.11	9.37
	Other Wells	1.10	1.23	3.22	5.13
	Other Sources	3.46	3.41	2.27	2.77

Table 3: Adoption of watershed/agronomic technologies in selected watershed (beneficiary and non-beneficiary), 2007

Technology	Beneficiary		Non-beneficiary	
	Adopted	%	Adopted	%
Birbhum				
Use of improved var.	40	100.00	40	100.00
Use of seed cum fert. Drill	40	100.00	39	97.50
Plantation crop	3	7.50	2	5.00
Inter cropping	7	17.50	6	15.00
Protective irrigation	2	5.00	2	5.00
Agro-horticulture	2	5.00	0	0.00
Agro-forestry	3	7.50	0	0.00
Total adoption ratio	97/280	34.64	89/280	31.79
Cooch Behar				
Use of improved var.	38	95.00	37	92.50
Use of seed cum fert. Drill	36	90.00	36	90.00
Plantation crop	7	17.50	3	7.50
Inter cropping	9	22.50	8	20.00
Protective irrigation	4	10.00	1	2.50
Agro-horticulture	5	12.50	3	7.50
Agro-forestry	4	10.00	1	2.50
Total adoption ratio	103/280	36.79	89/280	31.79
24-Parganas (North)				
Use of improved var.	39	97.50	34	85.00
Use of seed cum fert. Drill	37	92.50	27	67.50
Plantation crop	1	2.50	2	5.00
Inter cropping	5	12.50	4	10.00
Protective irrigation	0	0.00	1	2.50
Agro-horticulture	5	12.50	2	5.00
Agro-forestry	0	0.00	0	0.00
Total adoption ratio	87/280	31.07	70/280	25.00
24-Parganas (South)				
Use of improved var.	37	92.50	31	77.50
Use of seed cum fert. Drill	31	77.50	27	67.50
Plantation crop	3	7.50	1	2.50
Inter cropping	4	10.00	2	5.00
Protective irrigation	1	2.50	0	0.00
Agro-horticulture	4	10.00	1	2.50
Agro-forestry	2	5.00	0	0.00
Total adoption ratio	82/280	29.29	62/280	22.14
All				
Use of improved var.	154	96.25	142	88.75
Use of seed cum fert. Drill	144	90.00	129	80.63
Plantation crop	14	8.75	8	5.00
Inter cropping	25	15.63	20	12.50
Protective irrigation	7	4.38	4	2.50
Agro-horticulture	16	10.00	6	3.75
Agro-forestry	9	5.63	1	0.63
Total adoption ratio	369/1120	32.95	310/1120	27.68

Table 4: Distribution of land by source of irrigation among sample farmers in selected watershed (beneficiary and non-beneficiary), 2007

Particulars	Beneficiary					Non-beneficiary				
	No. of farmers	%	Area under Irrigation	%	Avg. Farm Size*	No. of farmers	%	Area under Irrigation	%	Avg. Farm Size*
Birbhum										
Dry land	3	7.50	0	0.00	0.58	6	15.00	0	0.00	0.39
Pond	14	35.00	3.52	28.32	1.03	16	40.00	2.71	24.70	0.93
Wells (incl. STW)	6	15.00	1.7	13.68	1.05	-		-		-
Other (incl. Canal)	2	5.00	0.22	1.77	0.62	4	10.00	1.39	12.67	0.7
Ponds + Wells	1	2.50	0.37	2.98	0.67	1	2.50	0.67	6.11	3.33
Ponds + Others	12	30.00	5.42	43.60	0.89	13	32.50	6.2	56.52	1.2
Wells + Others	-		-		-	-		-		-
Ponds+Wells+Others	2	5.00	1.2	9.65	1.1	-		-		
Total (All)	40	100.00	12.43	100.00	0.93	40	100.00	10.97	100.00	0.97
Cooch Behar										
Dry land	5	12.50	0	0.00	0.4	6	15.00	0	0.00	0.08
Pond	2	5.00	0.17	1.51	0.12	-		-		-
Wells (incl. STW)	12	30.00	2.44	21.67	0.43	23	57.50	4.72	67.82	0.62
Other (incl. Canal)	4	10.00	0.7	6.22	0.59	4	10.00	0.5	7.18	0.5
Ponds + Wells	11	27.50	4.52	40.14	0.75	2	5.00	0.37	5.32	0.4
Ponds + Others	-		-		-	-		-		-
Wells + Others	4	10.00	2.39	21.23	1.25	5	12.50	1.37	19.68	0.61
Ponds+Wells+Others	2	5.00	1.04	9.24	0.87	-		-		-
Total (All)	40	100.00	11.26	100.00	0.62	40	100.00	6.96	100.00	0.51
24-Parganas (North)										
Dry land	2	5.00	0	0.00	0	22	55.00	0	0.00	0.2
Pond	32	80.00	4.77	87.20	0.5	8	20.00	0.5	23.70	0.55
Wells (incl. STW)	4	10.00	0.27	4.94	0.17	6	15.00	0.96	45.50	0.5
Other (incl. Canal)	-		-		-	1	2.50	0.03	1.42	0.26
Ponds + Wells	1	2.50	0.1	1.83	0.27	3	7.50	0.62	29.38	0.58
Ponds + Others	1	2.50	0.33	6.03	0.53	-		-		-
Wells + Others	-		-		-	-		-		-
Ponds+Wells+Others	-		-		-	-		-		-
Total (All)	40	100.00	5.47	100.00	0.44	40	100.00	2.11	100.00	0.35
24-Parganas (South)										
Dry land	10	25.00	0	0.00	0.03	16	40.00	0	0.00	0.16
Pond	24	60.00	5.67	69.32	0.6	-		-		-
Wells (incl. STW)	-		-		-	15	37.50	2.13	51.45	0.47
Other (incl. Canal)	-		-		-	-		-		-
Ponds + Wells	2	5.00	0.37	4.52	0.33	4	10.00	0.84	20.29	0.52
Ponds + Others	3	7.50	1.32	16.14	0.8	5	12.50	1.17	28.26	0.51
Wells + Others	-		-		-	-		-		-
Ponds+Wells+Others	1	2.50	0.82	10.02	3.8	-		-		-
Total (All)	40	100.00	8.18	100.00	0.54	40	100.00	4.14	100.00	0.35
All										
Dry land	20	12.50	0	0.00	0.25	50	31.25	0	0.00	0.21
Pond	72	45.00	14.13	37.84	0.56	24	15.00	3.21	13.28	0.37
Wells (incl. STW)	22	13.75	4.41	11.81	0.41	44	27.50	7.81	32.30	0.40
Other (incl. Canal)	6	3.75	0.92	2.46	0.30	9	5.63	1.92	7.94	0.37
Ponds + Wells	15	9.38	5.36	14.35	0.51	10	6.25	2.5	10.34	1.21
Ponds + Others	16	10.00	7.07	18.93	0.56	18	11.25	7.37	30.48	0.43
Wells + Others	4	2.50	2.39	6.40	0.31	5	3.13	1.37	5.67	0.15
Ponds+Wells+Others	5	3.13	3.06	8.19	1.44	0	0.00	0	0.00	0.00
Total (All)	160	100.00	37.34	100.00	0.63	160	100.00	24.18	100.00	0.55

Table 5: Cropping pattern of sample farmers in selected watersheds (beneficiary and non-beneficiary), 2007

(area in ha.)

Particulars	Beneficiary				Non-beneficiary			
	Landless*	Marginal	Small	Medium	Landless*	Marginal	Small	Medium
Birbhum								
Kharif	-	18.10	19.11	-	-	17.88	12.26	8.79
Rabi	-	8.24	3.74	-	-	7.39	2.63	1.48
Summer	-	6.29	3.59	-	-	4.86	5.35	0.80
GCA	-	32.63	26.44	-	-	30.13	20.24	11.07
NCA	-	18.10	19.11	-	-	17.88	12.26	8.79
C. intensity	-	180.28	138.36	-	-	168.51	165.09	125.94
Cooch Behar								
Kharif	0.00	13.55	8.81	2.27	0.00	15.20	5.33	-
Rabi	0.18	12.86	3.95	0.70	0.00	9.36	2.04	-
Summer	0.13	5.16	0.74	0.33	0.00	2.56	1.87	-
GCA	0.31	31.57	13.50	3.30	0.00	27.12	9.24	-
NCA	0.00	13.55	8.81	2.27	0.00	15.20	5.33	-
C. intensity	(-)	232.99	153.23	145.37	0.00	178.42	173.36	-
24-Parganas (North)								
Kharif	0.00	12.69	2.66	2.27	0.00	7.83	6.00	-
Rabi	0.01	2.49	1.28	0.09	0.29	2.39	0.98	-
Summer	0.00	0.34	0.94	0.09	0.00	0.66	0.13	-
GCA	0.01	15.52	4.88	2.45	0.29	10.88	7.11	-
NCA	0.00	12.69	2.66	2.27	0.00	7.83	6.00	-
C. intensity	(-)	122.30	183.46	107.93	(-)	138.95	118.50	-
24-Parganas (South)								
Kharif	0.00	11.03	6.67	3.80	0.00	14.14	-	-
Rabi	0.32	5.39	1.78	0.81	0.00	8.90	-	-
Summer	0.47	3.34	0.00	0.00	0.00	0.78	-	-
GCA	0.79	19.76	8.45	4.61	0.00	23.82	-	-
NCA	0.00	11.03	6.67	3.80	0.00	14.14	-	-
C. intensity	(-)	179.15	126.69	121.32	(-)	168.46	-	-
All								
Kharif	0.00	55.37	37.25	8.34	0.00	55.05	23.59	8.79
Rabi	0.51	28.98	10.75	1.60	0.29	28.04	5.65	1.48
Summer	0.60	15.13	5.27	0.42	0.00	8.86	7.35	0.80
GCA	1.11	99.48	53.27	10.36	0.29	91.95	36.59	11.07
NCA	0.00	55.37	37.25	8.34	0.00	55.05	23.59	8.79
C. intensity	0.00	178.68	150.44	93.66	0.00	163.59	114.24	31.49

Table 6: Cost and returns for field crops in selected watershed (beneficiary and non-beneficiary), 2007

(figures in Rs.'000)

Size-Class	Beneficiary			Non-beneficiary			Absolute change	
	Avg. Gross return	Avg. Total cost	Avg. Net return	Avg. Gross return	Avg. Total cost	Avg. Net return	Avg. Net return	%
Birbhum								
Landless*	-	-	-	-	-	-	-	-
Marginal	31.92	11.24	20.67	30.08	9.65	20.43	0.24	1.17
Small	57.96	19.57	38.39	60.04	28.67	31.37	7.02	22.38
Medium	-	-	-	104.36	39.8	64.57	-	-
Cooch Behar								
Landless*	2.5	0.93	1.57	-	-	-	-	-
Marginal	29.41	12.75	16.66	21.62	8.85	12.77	3.89	30.46
Small	58.03	24.41	33.62	62.95	29.53	33.41	0.21	0.63
Medium	89.17	40.8	48.38	-	-	-	-	-
24-Parganas (North)								
Landless*	0.13	0.05	0.08	0.67	0.14	0.53	-0.45	-84.91
Marginal	10.14	3.57	6.58	13.2	4.65	8.55	-1.97	-23.04
Small	65.00	24.73	40.28	34.58	14.61	19.97	20.31	101.70
Medium	65.83	19.96	45.87	-	-	-	-	-
24-Parganas (South)								
Landless*	2.82	0.95	1.87	-	-	-	-	-
Marginal	18.51	7.41	11.11	17.6	7.59	10.01	1.10	10.99
Small	35.31	17.95	17.35	-	-	-	-	-
Medium	96.61	58.61	38.00	-	-	-	-	-
All								
Landless*	2.34	0.82	1.53	0.36	0.07	0.29	1.24	427.59
Marginal	21.8	8.47	13.34	21.05	7.92	13.13	0.21	1.60
Small	54.16	20.67	33.49	53.61	24.96	28.66	4.83	16.85
Medium	83.87	39.79	44.08	104.36	39.8	64.57	-20.49	-31.73

Table 7: Regression estimates of factors contributing to gross returns from rainfed field crops on sample farms in selected watershed, 2007

Sl. No.	Variables	Beneficiary		Non-beneficiary	
		Coefficient	t stat	Coefficient	t stat
Birbhum					
1.	Log of intercept	4.14	11.19	3.86	12.67
2.	Log of land (acres)	0.89	6.77	0.78	6.65
3.	Log of human labour (Rs.)	0.03	0.31	0.16	1.79
4.	Log of bullock labour (Rs.)	0.01	0.08	-0.02	-0.29
5.	Log of seed (Rs.)	-0.04	-0.36	-0.04	-0.33
6.	Log of fertiliser (Rs.)	0.08	0.89	0.04	0.38
7.	R^2	.87	-	.94	-
9.	Returns to Scale	.97	-	.92	-
Cooch Behar					
1.	Log of intercept	3.70	4.08	3.42	4.50
2.	Log of land (acres)	0.89	3.00	0.74	2.98
3.	Log of human labour (Rs.)	0.08	0.42	0.09	0.84
4.	Log of bullock labour (Rs.)	-0.02	-0.20	0.00	-0.04
5.	Log of seed (Rs.)	0.02	0.09	0.23	2.84
6.	Log of fertiliser (Rs.)	0.12	0.91	0.02	0.15
7.	R^2	.90	-	.96	-
9.	Returns to Scale	1.09	-	1.08	-
24-Parganas (North)					
1.	Log of intercept	3.25	4.73	2.76	6.69
2.	Log of land (acres)	0.65	2.94	0.46	3.39
3.	Log of human labour (Rs.)	0.26	1.75	0.23	2.76
4.	Log of bullock labour (Rs.)	0.11	1.77	0.07	1.79
5.	Log of seed (Rs.)	-0.08	-0.89	-0.07	-0.96
6.	Log of fertiliser (Rs.)	0.01	0.14	0.25	3.24
7.	R^2	.96	-	.98	-
9.	Returns to Scale	.95	-	.94	-
24-Parganas (South)					
1.	Log of intercept	6.39	6.99	4.33	11.09
2.	Log of land (acres)	1.66	5.36	1.03	6.90
3.	Log of human labour (Rs.)	-0.33	-1.78	0.06	0.92
4.	Log of bullock labour (Rs.)	-0.06	-1.08	0.05	1.10
5.	Log of seed (Rs.)	0.03	0.30	-0.09	-1.04
6.	Log of fertiliser (Rs.)	-0.21	-2.52	-0.04	-0.76
7.	R^2	.97	-	.97	-
9.	Returns to Scale	1.09	-	1.01	-
All					
1.	Log of intercept	4.31	15.55	4.14	20.11
2.	Log of land (acres)	1.01	10.98	0.93	13.05
3.	Log of human labour (Rs.)	0.02	0.37	0.06	1.30
4.	Log of bullock labour (Rs.)	-0.01	-0.16	-0.03	-1.20
5.	Log of seed (Rs.)	-0.03	-0.47	0.07	1.36
6.	Log of fertiliser (Rs.)	0.02	0.41	0.01	-0.09
7.	R^2	.93	-	.95	-
9.	Returns to Scale	1.01	-	1.04	-

Table 8: Geometric mean levels of gross return and input use in rainfed field crops on sample farms in selected watershed, 2007

Sl. No.	Variables	Beneficiary	Non-beneficiary
Birbhum			
1.	No. of farms	40	40
2.	Gross returns (Rs.)	20681.97	19333.02
3.	Land (ha.)	0.80	0.74
4.	Human labour (Rs.)	3678.53	3344.16
5.	Bullock labour (Rs.)	618.84	560.86
6.	Seed (Rs.)	258.75	226.13
7.	Fertiliser (Rs.)	918.69	914.09
Cooch Behar			
1.	No. of farms	36	37
2.	Gross returns (Rs.)	10660.04	9877.68
3.	Land (ha.)	0.50	0.43
4.	Human labour (Rs.)	2489.19	2042.07
5.	Bullock labour (Rs.)	414.62	384.18
6.	Seed (Rs.)	187.27	148.19
7.	Fertiliser (Rs.)	677.88	562.45
24-Parganas (North)			
1.	No. of farms	38	26
2.	Gross returns (Rs.)	7463.70	9507.23
3.	Land (ha.)	0.32	0.37
4.	Human labour (Rs.)	1340.51	1714.71
5.	Bullock labour (Rs.)	236.21	337.93
6.	Seed (Rs.)	101.04	128.47
7.	Fertiliser (Rs.)	373.53	462.69
24-Parganas (South)			
1.	No. of farms	32	31
2.	Gross returns (Rs.)	10051.38	9129.59
3.	Land (ha.)	0.44	0.39
4.	Human labour (Rs.)	2225.05	2102.75
5.	Bullock labour (Rs.)	485.60	380.02
6.	Seed (Rs.)	178.46	146.43
7.	Fertiliser (Rs.)	592.73	529.24
All			
1.	No. of farms	146	134
2.	Gross returns (Rs.)	11500.83	11764.65
3.	Land (ha.)	.49	.48
4.	Human labour (Rs.)	2300.87	2302.69
5.	Bullock labour (Rs.)	413.75	418.49
6.	Seed (Rs.)	172.43	163.07
7.	Fertiliser (Rs.)	612.60	617.26

Table 9: Age, depth and yield of irrigation tanks/ponds in selected watershed (beneficiary and non-beneficiary), 2007

BIRBHUM (Tanks/Ponds)			
Sl. No.	Particulars	Beneficiary	Non-Beneficiary
1.	Total	15	4
2.	Functional (Nos.)	13	3
3.	Non-functional (Nos.)	2	1
4.	Avg. Water Area of Tanks (ha.)	0.10	0.11
5.	Avg. Command Area of Tanks (ha.)	0.53	1.81
6.	Average depth (ft.)	6	5.5
7.	Average age (yrs)	30	35
8.	Average life (yrs.)	n.a.	n.a.
9.	Average Yield (gallons/hr)	n.a.	n.a.
COOCH BEHAR (Tanks/Ponds)			
Sl. No.	Particulars	Beneficiary	Non-Beneficiary
1.	Total	7	6
2.	Functional (Nos.)	7	5
3.	Non-functional (Nos.)	0	1
4.	Avg. Water Area of Tanks (ha.)	0.16	0.27
5.	Avg. Command Area of Tanks (ha.)	0.30	0.04
6.	Average depth (ft.)	4.5	4
7.	Average age (yrs)	75	86
8.	Average life (yrs.)	n.a.	n.a.
9.	Average Yield (gallons/hr)	n.a.	n.a.
24 PARGANAS (NORTH) (Tanks/Ponds)			
Sl. No.	Particulars	Beneficiary	Non-Beneficiary
1.	Total	12	3
2.	Functional (Nos.)	12	3
3.	Non-functional (Nos.)	0	0
4.	Avg. Water Area of Tanks (ha.)	0.11	0.17
5.	Avg. Command Area of Tanks (ha.)	0.42	0.27
6.	Average depth (ft.)	4.5	4
7.	Average age (yrs)	25	30
8.	Average life (yrs.)	n.a.	n.a.
9.	Average Yield (gallons/hr)	n.a.	n.a.
24 PARGANAS (SOUTH) (Tanks/Ponds)			
Sl. No.	Particulars	Beneficiary	Non-Beneficiary
1.	Total	31	16
2.	Functional (Nos.)	29	15
3.	Non-functional (Nos.)	2	1
4.	Avg. Water Area of Tanks (ha.)	0.09	0.13
5.	Avg. Command Area of Tanks (ha.)	0.24	0.05
6.	Average depth (ft.)	7	4
7.	Average age (yrs)	25	32
8.	Average life (yrs.)	n.a.	n.a.
9.	Average Yield (gallons/hr)	n.a.	n.a.
ALL (Tanks/Ponds)			
Sl. No.	Particulars	Beneficiary	Non-Beneficiary
1.	Total	65	29
2.	Functional (Nos.)	61	26
3.	Non-functional (Nos.)	4	3
4.	Avg. Water Area of Tanks (ha.)	0.12	0.17
5.	Avg. Command Area of Tanks (ha.)	0.35	0.28
6.	Average depth (ft.)	5.50	4.38
7.	Average age (yrs)	38.75	45.75
8.	Average life (yrs.)	n.a.	n.a.
9.	Average Yield (gallons/hr)	n.a.	n.a.

Table 10: Investment on irrigation wells in selected watershed (beneficiary and non-beneficiary) area, 2007

Particulars	Beneficiary				Non-beneficiary				Impact of WS	
	Lndls	M	S	Me	Lndls	M	S	Me	Absolute	%
Birbhum										
Field crops (ha.)	-	18.10	19.11	-	-	17.88	12.26	8.79	-1.72	-4.62
No. of farmers	-	27	13	-	-	28	9	3	-	-
GCA	-	32.63	26.44	-	-	30.13	20.24	11.07	-2.37	-4.01
No. of failed tanks/ponds	-	1	1	1	-	-	1	-	2.00	66.67
No. of working tanks/ponds	-	6	7	-	-	2	1	-	10.00	76.92
Total no. of tanks/ponds	-	7	8	-	-	2	2	-	11.00	73.33
Cooch Behar										
Particulars	Beneficiary				Non-beneficiary				Impact of WS	
	Lndls	M	S	Me	Lndls	M	S	Me	Absolute	%
Field crops (ha.)	-	13.55	8.81	2.27	-	15.20	5.33	-	4.10	16.65
No. of farmers	4	29	6	1	3	33	4	-	-	-
GCA	.31	31.57	13.50	3.30	.00	27.12	9.24		12.32	25.31
No. of failed tanks/ponds	-	-	-	-	-	1	-	-	-1.00	-
No. of working tanks/ponds	-	5	1	1	-	4	1	-	2.00	28.57
Total no. of tanks/ponds	-	5	1	1	-	5	1	-	1.00	14.29
24-Parganas (North)										
Particulars	Beneficiary				Non-beneficiary				Impact of WS	
	Lndls	M	S	Me	Lndls	M	S	Me	Absolute	%
Field crops (ha.)	-	12.69	2.66	2.27	-	7.83	6.00	-	3.79	21.51
No. of farmers	2	35	2	1	14	21	5	-	-	-
GCA	.01	15.52	4.88	2.45	.29	10.87	7.10	-	4.60	20.12
No. of failed tanks/ponds	-	-	-	-	-	-	-	-	0.00	-
No. of working tanks/ponds		10	1	1	-	3	-	-	9.00	75.00
Total no. of tanks/ponds	-	10	1	1	-	3	-	-	9.00	75.00
24-Parganas (South)										
Particulars	Beneficiary				Non-beneficiary				Impact of WS	
	Lndls	M	S	Me	Lndls	M	S	Me	Absolute	%
Field crops (ha.)	-	11.03	6.67	3.80	-	14.14	-	-	7.36	34.23
No. of farmers	8	26	5	1	9	31	-	-	-	-
GCA	.79	19.76	8.45	4.61	.00	23.82	-	-	9.79	29.13
No. of failed tanks/ponds	-	1	1	-	-	1	-	-	1.00	50.00
No. of working tanks/ponds	-	25	4	-	-	15	-	-	14.00	48.28
Total no. of tanks/ponds	-	26	5	-	-	16	-	-	15.00	48.39
All										
Field crops (ha.)	-	55.37	37.25	8.34	-	55.05	23.59	8.79	13.53	13.40
No. of farmers	14	117	26	3	26	113	18	3	-	-
GCA	1.11	99.48	53.27	10.36	.29	91.95	36.58	11.07	24.33	14.82
No. of failed tanks/ponds	-	2	2	1	-	2	1	-	2.00	40.00
No. of working tanks/ponds	-	46	13	2	-	24	2	-	35.00	57.38
Total no. of tanks/ponds	-	48	15	2	-	26	3	-	36.00	55.38

Table 11: Investment on major water harvesting structure in selected watershed

Birbhum			
Particulars	No.	Unit cost	Total cost
Farm pond	42	11,309.52	4,75,000.00
Nalabunds	2	25,000.00	50,000.00
Check dams	2	57,500.00	1,15,000.00
Total	46	13,913.05	640000.00
Cooch Behra			
Particulars	No.	Unit cost	Total cost
Farm pond	15	30,382.73.00	4,55,741.00
Nalabunds	1	47,600.00	47,600.00
Check dams	2	1,12,031.00	2,24,062.00
Total	18	40,411.28	7,27,403.00
24-Parganas (North)			
Particulars	No.	Unit cost	Total cost
Farm pond	50	19,000.00	9,50,000.00
Nalabunds	1	1,15,000.00	1,15,000.00
Check dams	-	-	-
Total	51	20,882.35	10,65,000.00
24-Parganas (South)			
Particulars	No.	Unit cost	Total cost
Farm pond	127	7,444.44	10,70,000.00
Nalabunds	-	-	-
Check dams	1	50,000.00	50,000.00
Total	128	8,750.00	11,20,000.00
All			
Particulars	No.	Unit cost	Total cost
Farm pond	234.00	12,610.00	29,50,741.00
Nalabunds	4.00	53,150.00	2,12,600.00
Check dams	5.00	77,812.40	3,89,062.00
Total	243.00	14,618.94	35,52,403.00

Table 12: Impact of WDP on irrigated farm economy of selected watershed in 2007

Birbhum				
Particulars	Marginal	Small	Medium	Large
Avg. farm size	.65	1.43	2.93	-
Net irrigated area	12.61	8.72	2.07	-
Cropping intensity	174.45	151.12	124.98	-
Net returns per farm	295.47	585.68	1322.57	-
Cooch Behar				
Particulars	Marginal	Small	Medium	Large
Avg. farm size	.46	1.41	2.27	-
Net irrigated area	12.89	4.47	.86	-
Cropping intensity	225.02	161.69	145.37	-
Net returns per farm	172.377	499.24	639.97	-
24-Parganas (North)				
Particulars	Marginal	Small	Medium	Large
Avg. farm size	.37	1.24	2.27	-
Net irrigated area	5.28	1.77	.53	-
Cropping intensity	133.72	137.33	107.93	-
Net returns per farm	148.81	443.68	1067.61	-
24-Parganas (South)				
Particulars	Marginal	Small	Medium	Large
Avg. farm size	.44	1.33	3.80	-
Net irrigated area	9.70	1.80	.82	-
Cropping intensity	170.49	129.11	121.32	-
Net returns per farm	146.57	366.00	672.18	-
All				
Particulars	Marginal	Small	Medium	Large
Avg. farm size	.4801	1.3827	2.8550	-
Net irrigated area	40.48	16.76	4.28	-
Cropping intensity	177.1844	148.8269	124.9252	-
Net returns per farm	189.6781	518.4834	1057.913	-

Table 13: Livestock assets of sample farmers in selected watershed (beneficiary and non-beneficiary), 2007

Particulars	Beneficiary					Non-beneficiary					Change
	Nos.	Value	Mtc. Cost	GR	NR	Nos.	Value	Mtc. Cost	GR	NR	NR
Birbhum											
Bullocks	48.00	282.50	61.20	409.63	348.43	62.00	349.06	70.18	506.14	435.95	-20.08
Cows	31.00	245.83	60.76	373.66	312.90	33.00	265.06	57.26	402.89	345.63	-9.47
Buffaloes	4.00	49.40	8.40	88.92	80.52	0.00	0.00	0.00	0.00	0.00	100.00
Sheep	18.00	13.41	2.07	21.46	19.39	12.00	7.58	1.16	12.13	10.97	76.75
Goat	56.00	37.24	6.72	65.17	58.45	124.00	79.48	10.29	139.10	128.81	-54.62
Total	157.00	628.38	139.15	958.84	819.69	231.00	701.18	138.90	1060.25	921.36	-11.03
Per farm	3.93	15.71	3.48	23.97	20.49	5.78	17.53	3.47	26.51	23.03	-11.03
Per acre	4.22	16.89	3.74	25.77	22.03	5.93	18.01	3.57	27.23	23.67	-6.93
Cooch Behar											
Bullocks	44.00	278.08	51.35	403.22	351.87	56	338.55	70.28	490.89	420.61	-16.34
Cows	52.00	423.38	96.41	643.54	547.14	34	270.37	67.15	410.96	343.81	59.14
Buffaloes	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	-
Sheep	0.00	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	-
Goat	68.00	39.10	5.10	68.43	63.33	57	39.05	5.24	68.33	63.08	0.40
Total	164.00	740.56	152.86	1115.18	962.33	147	647.96	142.67	970.18	827.51	16.29
Per farm	4.10	18.51	3.82	27.88	24.06	3.68	16.20	3.57	24.25	20.69	16.29
Per acre	6.66	30.07	6.21	45.28	39.07	7.16	31.56	6.95	47.26	40.31	-3.08
24-Parganas (North)											
Bullocks	12	75.84	11.18	109.97	98.78	23	149.96	27.46	217.44	189.98	-48.01
Cows	48	408.10	74.16	620.31	546.15	36	316.51	68.29	481.10	412.81	32.30
Buffaloes	0	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	-
Sheep	22	13.79	1.43	22.07	20.64	2	1.45	0.17	2.31	2.15	860.00
Goat	53	38.43	2.92	67.24	64.33	81	54.68	5.83	95.68	89.85	-28.40
Total	135	536.16	89.69	819.59	729.90	142	522.59	101.75	796.54	694.78	5.05
Per farm	3.38	13.40	2.24	20.49	18.25	3.55	13.06	2.54	19.91	17.37	5.07
Per acre	7.66	30.43	5.09	46.51	41.42	10.27	37.81	7.36	57.64	50.27	-17.60
24-Parnagas (South)											
Bullocks	6	38.65	6.87	56.05	49.18	0	0.00	0.00	0.00	0.00	100.00
Cows	102	890.46	156.67	1353.50	1196.83	58	495.44	101.04	753.06	652.03	83.55
Buffaloes	0	0.00	0.00	0.00	0.00	0	0.00	0.00	0.00	0.00	-
Sheep	22	16.17	1.21	25.87	24.66	16	10.16	0.72	16.26	15.54	58.69
Goat	69	45.20	3.11	79.09	75.99	54	39.15	1.89	68.51	66.62	14.06
Total	199	990.48	167.86	1514.51	1346.65	128	544.75	103.65	837.83	734.19	83.42
Per farm	4.98	24.76	4.20	37.86	33.67	3.20	13.62	2.59	20.95	18.35	83.49
Per acre	9.26	46.07	7.81	70.44	62.63	9.05	38.53	7.33	59.25	51.92	20.63
All											
Bullocks	110	675.07	130.6	978.87	848.26	141	837.57	167.92	1214.47	1046.54	-18.95
Cows	233	1967.77	388	2991.01	2603.02	161	1347.38	293.74	2048.01	1754.28	48.38
Buffaloes	4	49.4	8.4	88.92	80.52	0	0	0	0	0	100.00
Sheep	62	43.37	4.71	69.4	64.69	30	19.19	2.05	30.7	28.66	125.72
Goat	246	159.97	17.85	279.93	262.1	316	212.36	23.25	371.62	348.36	-24.76
Total	655	2895.58	549.56	4408.12	3858.57	648	2416.48	486.97	3664.8	3177.84	21.42
Per farm	4.09	18.10	3.43	27.55	24.12	4.05	15.10	3.04	22.91	19.86	21.42
Per acre	6.49	28.68	5.44	43.66	38.22	7.41	27.64	5.57	41.92	36.35	5.15

Table 14: Gini coefficient of income in selected watershed (beneficiary and non-beneficiary), 2007

Type of farm	Beneficiary				Non-beneficiary			
	Marginal	Small	Medium	All	Marginal	Small	Medium	All
Birbhum	.2403	.2075	0.00*	.3175	.2613	.1900	.1854	.3860
Cooch Behar	.3891	.1027	0.00*	.4468	.3515	.1866	-	.4007
24 parganas (North)	.3814	.1765	0.00*	.4710	.3840	.0566	-	.4114
24 Parganas (South)	.4076	.0568	-.	.4791	.2670	-	-	.2670
All	.3375	.1681	.2791	.4417	.3322	.1635	.1854	.4161

* Single observation

Table 15: Physical and financial achievement of the selected watershed

Sl. No.	Activity	Unit	Physical			Financial (Rs.)		
			Proposed	Achieved	%	Estimated	Actual Exp.	%
Birbhum								
1.	Management Component							
	A.Admn. Cost	-	-	-	-	1,12,500/-	1,12,500/-	100.00
	B.Community Organisation							
	(i) Entry point activity	No.	1	1	100.00	67,500/-	67,500/-	100.00
	(ii) Corpus for WDF	%	1.00	1.00	100.00	22,500/-	22,500/-	100.00
	(iii) Honorarium to village community organizer	-	-	-	-	45,000/-	45,000/-	100.00
	(iv) Expenses at District HQ	-	-	-	-	33,750/-	33,750/-	100.00
	C.Training Programme	No.	25	25	100.00	1,12,500/-	1,12,500/-	100.00
2.	Development Component							
	A.Arable land							
	i) Soil & Moisture Conservation	Ha.	11.10	51.10	460.36	50000.00/-	230000.00/-	460.00
	ii) Agronomic Conservation	Ha.	6.70	10.00	149.25	30000.00/-	45000.00/-	150.00
	B.Non-arable land							
	i) Run-off Management	Ha.	25.60	0	-	1,15,000.00/-	0	-
	ii) WHS	Ha.	111.10	122.20	109.99	5,00,000.00/-	5,50,000.00/-	110.00
	iii) Dry-land Horticulture	Ha.	6.70	15.80	235.82	30,000.00/-	71,160.00/-	237.20
	iv) Bio-mas Development	Ha.	22.20	30.90	139.18	1,00,000/-	1,38,850.00/-	138.85
	C. Drainage line treatment							
	Upper reaches	Ha.	22.20	0	-	1,00,000.00/-	0	-
	Middle reaches	Ha.	22.20	20.00	90.09	1,00,000.00/-	90,000.00/-	90.00
	Lower reaches	Ha.	22.20	0	-	1,00,000.00/-	0	0
	Farm Ponds	-	-	-	-	-	-	-
	Water harvesting structure	-	-	-	-	-	-	-
3.	Farm production system for land owing families	HHs	430	429	99.77	450000.00/-	450000/-	100.00
4.	Livelihood support system for landless families	HHs	350	345	98.57	168750.00/-	168750.00/-	100.00

Source: SCO, Dept. of Agril., Govt. of West Bengal

Table 16: Physical and financial achievement of the selected watershed

Sl. No	Activity	Unit	Physical			Financial (Rs.)		
			Proposed	Achi-eved	%	Estimated	Actual Exp.	%
Cooch Behar								
1.	Management Component							
	A.Admn. Cost	-	-	-	-	1,12,500/-	1,12,500/-	100.00
	B.Community Organisation							
	(i) Entry point activity	No.	1	2	200.00	67,500/-	67,500/-	100.00
	(ii) Corpus for WDF	%	1.00	1.00	100.00	22,500/-	22,500/-	100.00
	(iii) Honorarium to village community organizer	-	-	-	-	45,000/-	45,000/-	100.00
	(iv) Expenses at District HQ	-	-	-	-	33,750/-	33,750/-	100.00
	C.Training Programme	No.	25	25	100.00	1,12,500/-	1,12,500/-	100.00
2.	Development Component							
	A.Arable land							
	i) Construction of Culvert	No.	2	2	100.00	224062.50/-	224000.00/-	99.97
	ii) Construction of Water Retention Structure	No	1	1	100.00	310855.35/-	310800.00/-	99.98
	iii) Excavation of Drainage Channels	Rmt	742	742	100.00	47,600/-	47,600/-	100.00
	iv) Correction of Soil Acidity	No.	200	200	100.00	75,000/-	75,000/-	100.00
	B.Non-arable land							
	i) Construction of WHS	No.	5	5	100.00	196228.57/-	196200.00/-	99.98
	ii) Seedling Distribution	No.	200	200	100.00	90,000/-	90,000/-	100.00
	iii) Culvert for Drainage & Footbridge	No.	1	1	100.00	169642.85/-	169600.00/-	99.97
	iv) Field Bunding	Mouza	1	1	100.00	11,625/-	11,600/-	99.78
	C. Drainage line treatment							
	Upper reaches	-	-	-	-	-	-	-
	Middle reaches	-	-	-	-	-	-	-
	Lower reaches	-	-	-	-	-	-	-
	Farm Ponds	No	15	15	100.00	144186.00/-	144100.00	99.94
	Water harvesting structure	No	0	0	-	0	0	0
3.	Farm production system for land owing families	HHs	460	459	99.78	3,02,500/-	300588.00/-	99.37
4.	Livelihood support system for landless families	HHs	140	140	100.00	168750.00/-	168750.00/-	100.00

Source: SCO, Dept. of Agril., Govt. of West Bengal

Table 17: Physical and financial achievement of the selected watershed

Sl. No	Activity	Unit	Physical			Financial (Rs.)		
			Proposed	Achi-eved	%	Estimated	Actual Exp.	%
24-Parganas (North)								
1.	Management Component							
	A.Admn. Cost	-	-	-	-	1,12,500/-	1,12,500/-	100.00
	B.Community Organisation							
	(i) Entry point activity	No.	2	2	100.00	67,500/-	67,500/-	100.00
	(ii) Corpus for WDF	%	1.00	1.00	100.00	22,500/-	22,500/-	100.00
	(iii) Honorarium to village community organizer	-	-	-	-	45,000/-	45,000/-	100.00
	(iv) Expenses at District HQ	-	-	-	-	33,750/-	33,750/-	100.00
	C.Training Programme	No.	25	25	100.00	1,12,500/-	1,12,500/-	100.00
2.	Development Component							
	A.Arable land							
	i) Soil & Moisture Conservation	Ha.	2	2	100.00	25,000.00/-	25,000.00/-	100.00
	ii) Agronomic Conservation	Rmt	868.00	712.00	82.00	150000.00/-	149800.00/-	99.87
	B.Non-arable land							
	i) WHS	No.	50	81	162.00	9,50,000/-	9,48,000/-	99.80/-
	C. Drainage line treatment							
	Upper reaches	-	-	-	-	-	-	-
	Middle reaches	-	-	-	-	-	-	-
	Lower reaches	-	-	-	-	-	-	-
	Farm Ponds	-	-	-	-	-	-	-
	Water harvesting structure	-	-	-	-	-	-	-
3.	Farm production system for land owing families	HHs	320	320	100.00	345000.00/-	345000.00/-	100.00
4.	Livelihood support system for landless families	HHs	145	145	100.00	168750.00/-	167750.00/-	99.41

Source: SCO, Dept. of Agril., Govt. of West Bengal

Table 18: Physical and financial achievement of the selected watershed

Sl. No.	Activity	Unit	Physical			Financial (Rs.)		
			Proposed	Achi-Eved	%	Estimated	Actual Expenditure	%
24-Parganas (South)								
1.	Management Component							
	A.Admn. Cost	-	-	-	-	1,12,500/-	1,12,500/-	100.00
	B.Community Organisation							
	(i) Entry point activity	No.	2	3	150.00	67,500/-	67,500/-	100.00
	(ii) Corpus for WDF	%	1.00	1.00	100.00	22,500/-	22,500/-	100.00
	(iii) Honorarium to village community organizer	-	-	-	-	45,000/-	45,000/-	100.00
	(iv) Expenses at District HQ	-	-	-	-	33,750/-	33,750/-	100.00
	C.Training Programme	No.	25	25	100.00	1,12,500/-	1,12,500/-	100.00
2.	Development Component							
	A.Arable land							
	i) Periphery Bunding	Rmt	1200.00/-	1460.00/-	121.66	50,000.00/-	43063.00/-	86.12
	B.Non-arable land							
	i) Re-excavation of SWR	No.	100	90	90.00	6,50,000.00/-	6,70,982.00/-	103.22
	ii) New SWR	No.	40	37	92.50	4,00,000.00/-	4,02,500.00/-	100.62
	iii) Dry-land Horticulture	Ha.	3.00	1.00	33.33	25,000.00/-	8455.00/-	33.82
	C. Drainage line treatment							
	Upper reaches	-	-	-	-	-	-	-
	Middle reaches	-	-	-	-	-	-	-
	Lower reaches	-	-	-	-	-	-	-
	Farm Ponds	-	-	-	-	-	-	-
	Water harvesting structure	-	-	-	-	-	-	-
3.	Farm production system for land owing families	HHs	515	509	98.83	400000.00/-	393000.00/-	98.25
4.	Livelihood support system for landless families	HHs	380	387	101.84	168750.00/-	168750.00/-	100.00

Source: SCO, Dept. of Agril., Govt. of West Bengal

Table 19: Performance Indicators of the selected watershed

Sl. No.	Item	Details
	Birbhumn	
1.	Name of the watershed	Kanduri
2.	Name of the district	Birbhum
3.	Project cost (in Rs.)	22.50 lakh
4.	Watershed area taken up for development (in ha)	500.00
5.	Area developed (in ha)	495.00
6.	Internal Rate of Return (%)	119.66%
7.	B.C. Ratio	1:1.5
8.	Net project value (NPV) in watershed (in Rs.)	22.50
9.	Agro Forestry	
	(i) No. of seedlings planted	20500
	(ii) No. of seedlings survived	18450
	(iii) Survival percentage (%)	90%
	(iv) Area covered (in ha)	14.4 ha
10.	Horticulture	
	(i) No. of seedlings planted	-
	(ii) No. of seedlings survived	-
	(iii) Survival percentage (%)	-
	(iv) Area covered (in ha)	-
11.	Employment generated (man days)	11526
12.	No. of training conducted	3
13.	No. of persons trained	-
14.	Total fund given to SHG/others	
	(i) SHG	24197.00
	(ii) UG	144553.00
	(ii) MKM	
15.	Additional area brought under cultivation	15 ha
16.	Additional area brought under supplemental irrigation	18 ha

Source: SCO, Dept. of Agril., Govt. of West Bengal

Table 20: Performance Indicators of the selected watershed

Sl. No.	Item	Details
	Cooch Behar	
1.	Name of the watershed	Phulbari
2.	Name of the district	Cooch Behar
3.	Project cost (in Rs.)	22.50 lakh
4.	Watershed area taken up for development (in ha)	500.00 ha
5.	Area developed (in ha)	500.00 ha.
6.	Internal Rate of Return (%)	97.54%
7.	B.C. Ratio	1:1.4
8.	Net project value (NPV) in watershed (in Rs.)	22.50
9.	Agro Forestry	
	(i) No. of seedlings planted	-
	(ii) No. of seedlings survived	-
	(iii) Survival percentage (%)	-
	(iv) Area covered (in ha)	-
10.	Horticulture	
	(i) No. of seedlings planted	3800
	(ii) No. of seedlings survived	3694
	(iii) Survival percentage (%)	97.21
	(iv) Area covered (in ha)	HHs distribution
11.	Employment generated (man days)	-
12.	No. of training conducted	6
13.	No. of persons trained	265
14.	Total fund given to SHG/others	
	(i) SHG	67500.00
	(ii) UG	135000.00
	(ii) MKM	-
15.	Additional area brought under cultivation	263 ha.(rabi,summer)
16.	Additional area brought under supplemental irrigation	113 ha.

Source: SCO, Dept. of Agril., Govt. of West Bengal

Table 21: Performance Indicators of the selected watershed

Sl. No.	Item	Details
24-Parganas (North)		
1.	Name of the watershed	Hizla-II
2.	Name of the district	North 24 Parganas
3.	Project cost (in Rs.)	22.50
4.	Watershed area taken up for development (in ha)	500.00
5.	Area developed (in ha)	500.00
6.	Internal Rate of Return (%)	116.63%
7.	B.C. Ratio	1:1.5
8.	Net project value (NPV) in watershed (in Rs.)	22.50
9.	Agro Forestry	
	(i) No. of seedlings planted	1800
	(ii) No. of seedlings survived	1680
	(iii) Survival percentage (%)	93.5%
	(iv) Area covered (in ha)	2.5 ha
10.	Horticulture	
	(i) No. of seedlings planted	-
	(ii) No. of seedlings survived	-
	(iii) Survival percentage (%)	-
	(iv) Area covered (in ha)	-
11.	Employment generated (man days)	24656
12.	No. of training conducted	10
13.	No. of persons trained	1004
14.	Total fund given to SHG/others	
	(i) SHG	267800.00
	(ii) UG	118200.00
	(ii) MKM	-
15.	Additional area brought under cultivation	70 ha
16.	Additional area brought under supplemental irrigation	35 ha

Source: SCO, Dept. of Agril., Govt. of West Bengal

Table 22: Performance Indicators of the selected watershed

Sl. No.	Item	Details
24-Parganas (South)		
1.	Name of the watershed	Masjidbati
2.	Name of the district	South 24 Parganas
3.	Project cost (in Rs.)	22.50
4.	Watershed area taken up for development (in ha)	500
5.	Area developed (in ha)	500
6.	Internal Rate of Return (%)	137.29%
7.	B.C. Ratio	1:1.65
8.	Net project value (NPV) in watershed (in Rs.)	26.16577
9.	Agro Forestry	
	(i) No. of seedlings planted	3500
	(ii) No. of seedlings survived	3317
	(iii) Survival percentage (%)	94.76
	(iv) Area covered (in ha)	1 ha
10.	Horticulture	
	(i) No. of seedlings planted	310
	(ii) No. of seedlings survived	295
	(iii) Survival percentage (%)	95
	(iv) Area covered (in ha)	0.5
11.	Employment generated (man days)	32140
12.	No. of training conducted	14
13.	No. of persons trained	955
14.	Total fund given to SHG/others	
	(i) SHG	168750.00
	(ii) UG	135000.00
	(ii) MKM	
15.	Additional area brought under cultivation	99 ha
16.	Additional area brought under supplemental irrigation	96 ha

Source: SCO, Dept. of Agril., Govt. of West Bengal

Table 23: Pre and post scenario of the selected watershed

Sl. No.	Item	Pre project	Post project	% changes
Birbhum				
1.	Productivity of major crops (qt/ha.)			
	Cereals	22.72	25	4.84
	Pulse	0	0	0
	Oilseeds	0	0	0
	Vegetables & Others	110	130	18.18
2.	Major cropped area (in ha)			
	Cereals	390	450	15.38
	Pulse	0	0	0
	Oilseeds	0	0	0
	Vegetables & Others	0	0	0
3.	Cropping intensity (%)	120	0	0
4.	Farm income/ha/year (in Rs.)	0	0	0
5.	Family income/ha/year (in Rs.)	14000	0	0
6.	Migration of rural labour	0	0	0
7.	Green cover/biomass (%)	0	0	0
8.	Ground water level (Meters)	8	0	0
9.	Animal breed improvement	0	0	0
10.	Fodder yield (kg/ha)	0	0	0
11.	Average mil yield (lit/day)	0	0	0
12.	No. of farmers adopted stall feeding	0	0	0
13.	% of run of from the watershed	0	0	0

Source: SCO, Dept. of Agril., Govt. of West Bengal

Table 24: Pre and post scenario of the selected watershed

Sl. No.	Item	Pre project	Post project	% changes
Cooch Behar				
1.	Productivity of major crops (qt/ha.)			
	Cereals	45	60	33
	Pulse	0	0	0
	Oilseeds	0	0	0
	Vegetables & Others	8	15	87.5
2.	Major cropped area (in ha)			
	Cereals	413	478	15.7
	Pulse	0	0	0
	Oilseeds	0	0	0
	Vegetables & Others	20	170	750
3.	Cropping intensity (%)	150	173	23
4.	Farm income/ha/year (in Rs.)	0	0	0
5.	Family income/ha/year (in Rs.)	0	0	0
6.	Migration of rural labour	120	62	51
7.	Green cover/biomass (%)	75	95	20
8.	Ground water level (Meters)	6	5	16.6
9.	Animal breed improvement	0	0	0
10.	Fodder yield (kg/ha)	0	0	0
11.	Average mil yield (lit/day)	0	0	0
12.	No. of farmers adopted stall feeding	0	0	0
13.	% of run of from the watershed	75	30	45

Source: SCO, Dept. of Agril., Govt. of West Bengal

Table 25: Pre and post scenario of the selected watershed

Sl. No.	Item	Pre project	Post project	% changes
24-Parganas (North)				
1.	Productivity of major crops (qt/ha.)			
	Cereals	25	31.5	26
	Pulse	0	0	0
	Oilseeds	0	8.0	0
	Vegetables & Others	0	0	0
2.	Major cropped area (in ha)			
	Cereals	380	380	0
	Pulse	0	0	0
	Oilseeds	30	65	120
	Vegetables & Others	0	0	0
3.	Cropping intensity (%)	112	148	0
4.	Farm income/ha/year (in Rs.)	12500	25000	100
5.	Family income/ha/year (in Rs.)	8250	15000	81.81
6.	Migration of rural labour	87	45	95
7.	Green cover/biomass (%)	12.5	42.5	37.5
8.	Ground water level (Meters)	0	0	0
9.	Animal breed improvement	0	0	0
10.	Fodder yield (kg/ha)	-	3250	0
11.	Average mil yield (lit/day)	1	2.5	150
12.	No. of farmers adopted stall feeding	-	17.5	0
13.	% of run of from the watershed	22.5	75	0

Source: SCO, Dept. of Agril., Govt. of West Bengal

Table 26: Pre and post scenario of the selected watershed

Sl. No.	Item	Pre project	Post project	% changes
24-Parganas (North)				
Sl. No.		Pre project	Post project	% changes
1.	Productivity of major crops (qt/ha.)			
	Cereals	35.13	38.05	8
	Pulse	7.8	8.5	9
	Oilseeds	10.5	11.9	13
	Vegetables & Others	13	13.35	3
2.	Major cropped area (in ha)			
	Cereals	317	412	30
	Pulse	12	35	192
	Oilseeds	19	41	116
	Vegetables & Others	26	60	114
3.	Cropping intensity (%)	120	140	17
4.	Farm income/ha/year (in Rs.)	12000	24000	100
5.	Family income/ha/year (in Rs.)	8500	15400	81
6.	Migration of rural labour	116	34	
7.	Green cover/biomass (%)	17.5	52.5	
8.	Ground water level (Meters)	3	3	
9.	Animal breed improvement	2	31	1450
10.	Fodder yield (kg/ha)			
11.	Average mil yield (lit/day)	1	2.5	150
12.	No. of farmers adopted stall feeding	-	45	0
13.	% of run of from the watershed	19	3	-

Source: SCO, Dept. of Agril., Govt. of West Bengal

Rajasthan

Table 1: Number of watersheds under different programmes in Rajasthan

Sr. No.	Programme	No. of Watersheds
1	CDP (Controlling Desert Extension)	3352
2	DDP	3385
3	DPAP	925
4	IWDP	82
5	NWDPRA	818*
6	Bilaspur	53
7	TAD	27
8	TOTAL	8642

*Excluding 320 pilot watersheds of DDP and DPAP

Table 2: Allocation of funds to major components

Sr. No.	Components	Allocation of funds (%)
A	MANAGEMENT:	
	i) Administrative cost	10.0
	ii) Community organisation	7.5
	iii) Training programme	5.0
	SUB-TOTAL	22.5
B	DEVELOPMENT:	
	i) Natural Resource Management	50.0
	ii) Farm production system for land holding families	20.0
	iii) Livelihood support system for land- less families	7.5
	SUB-TOTAL	77.5
C	Total	100.0

Table 3: Characteristics of agro climatic zones of Rajasthan

Zone	Area (Million Ha.)		District Covered	Range Rainfall (mm)	Temp C°		Major Crops		Soils
	Total	Net Sown			Max.	Min.	Kharif	Rabi	
Ia	4.74	2.34	Barmer & Part of Jodhpur	200-370	40.0	8.0	Pearlmillet, Mothbean, Sesamum	Wheat, Mustard, Cumin	Desert Soils and sand dunes aeolian soil, Coarse sand in texture some places calcareous
Ib	2.10	1.60	Sriganganagar, Hanumangarh	100-350	42.0	4.7	Cotton, Clusterbean	Wheat, Mustard, Gram	Alluvial deposits calcareous, high soluble salts & exchangeable sodium
Ic	7.70	2.44	Bikaner, Jaisalmer, Churu	100-350	48.0	3.0	Pearlmillet, Mothbean, Clusterbean	Wheat, Mustard, Gram	Desert Soils and sand dunes aeolian soil, loamycoarse in texture & calcareous
IIa	3.69	2.68	Nagaur, Sikar,Jhunjhunuu, Part of Churu	300-500	39.7	5.3	Pearlmillet, Clusterbean, Pulses	Mustard, Gram	Sandy loam, sallow depth red soils in depressions
IIb	3.00	1.93	Jalore,Pali, Part of Sirohi, Jodhpur	300-500	38.0	4.9	Pearlmillet, Clusterbean, Sesamum	Wheat, Mustard	Red desert soils in Jodhpur,jalore & Pali sierozems in Pali & Sirohi
IIIa	2.96	1.77	Jaipur,Ajmer, Dausa, Tonk	500-700	40.6	8.3	Pearlmillet, Clusterbean, Sorghum	Wheat, Mustard, Gram	Sierozens, eastern part alluvial,west north west lithosols, foot hills,brown soils
IIIb	2.77	1.41	Alwar,Dholpur, Bharatpur, S.Madhopur, Karauli	500-700	40.0	8.2	Pearlmillet, Cluserbean, Groundnut	Wheat, Barley, Mustard, Gram	Alluvial prone to water logging, nature of recently alluvial calcareous has been observed
iva	3.36	0.92	Bhilwara,Sirohi, Part of Udaipur, Part of Chittorgarh	500-900	38.6	8.1	Maize,Pulses Sorghum	Wheat, Gram	Soil are lithosolsat foot hills & alluvials in plains
ivb	1.72	0.57	Dungarpur, Part of Udaipur, Banswara, Chittorgarh (part)	500-1100	39.0	7.2	Maize,Paddy Sorghum, Black gram	Wheat, Gram	Predominantly reddish medium texture,well drained calcareous,shallow on hills, deep soil in valleys
v	2.70	1.27	Kota, Jhalawar, Bundi,Baran.	650-1000	42.6	10.6	Sorghum, Soyabean	Wheat, Mustard	Black of alluvial origin,clay loam, groundwater salinity.

Source:- Vital Agriculture Statistics (2004-05),DA, Rajasthan,Jaipur

Table 4: Details of land use pattern, climate, rainfall, irrigation, and agriculture

Sr. No.	Particulars	Unit	Rajasthan State
1	Land Use Pattern (2003-04):		
	1) Geographical Area	Ha.	34266151 (100.00 %)
	2) Forest Area	Ha.	2660600 (7.76 %)
	3) Net Area Sown	Ha.	17394433 (50.76 %)
	4) Gross Cropped Area	Ha.	21664039 (63.22 %)
	5) Cropping Intensity	%	124.50
2	Rain fall (2004-05):		
	1)Normal	mm.	575.1
	2)Actual	mm.	512.6
	3) Minimum (Jaisalmer)	mm.	84.3
	4) Maximum (Baran)	mm.	1354.0
3	Irrigation (2003-04):		
	1) Net Irrigated Area (NIA)	Ha.	5239014
	2) Gross Irrigated Area (GIA)	Ha.	6393277
	3) Irrigation Intensity	%	122
	4) Source wise gross irrigated area as % to GIA	-	-
	a) Canal	%	29.81
	b) Wells/ Tubewells	%	68.32
4	Temperature (2004):		
	1) Minimum	C°	3
	2) Maximum	C°	48
5	Crop Area as % to GCA (2004-05):		
	1) Cereals	%	39.79
	2) Pulses	%	16.75
	3) Food grains	%	56.54
	4) Oilseeds	%	24.08
	5) Others	%	19.38
6	Use of Fert. Nutrients (NPK) (2003-04):		
	1) Kharif	Kg./Ha.	18.78
	2) Rabi	Kg./Ha.	65.48
	3) Overall	Kg./Ha.	35.41
7	Important Crops:		
	1)Cereals	Bajara, Maize, Wheat, Jowar	
	2) Pulses	Moth, Gram, Moong, Udad	
	3) Oilseeds	Mustard,Soyabean,Sesamum,Taramira,G'nut	

Source:-Vital Agriculture Statistics 2004-05, Directorate of Agriculture, Rajasthan.

Table 5: District-wise number of watersheds, effective areas and blocks covered under NWDPRA (Tenth plan)

Sr.No.	District	No of NWDPRA W/S			No of Blocks	Effective Areas (Ha.)		
		Pilot	Tenth plan	Total		Pilot	Tenth plan	Total
1	Ajmer	6	51	57	8	3000	25050	28050
2	Nagaur	0	44	44	11	0	21824	21824
3	Tonk	10	33	43	6	4751	15567	20318
4	Bhilwara	47	36	83	11	23090	17850	40940
5	Chittorgarh	60	56	116	14	27450	25180	52630
6	Rajsamand	25	24	49	7	10607	11140	21747
7	Alwar	16	3	19	4	7618	1500	9118
8	Dausa	15	21	36	5	7261	10500	17761
9	Jaipur	19	19	38	7	9265	9185	18450
10	Churu	0	12	12	6	0	6000	6000
11	Jhujhunu	0	36	36	8	0	18000	18000
12	Sikar	0	26	26	8	0	12930	12930
13	Barmer	0	33	33	8	0	15500	15500
14	Bikaner	0	17	17	5	0	8500	8500
15	H.garh	0	16	16	2	0	8000	8000
16	Jalore	0	20	20	5	0	9932	9932
17	Sirohi	13	24	37	5	6119	11201	17320
18	Jaisalmair	0	6	6	3	0	3000	3000
19	Jodhpur	0	41	41	9	0	20375	20375
20	Pali	0	49	49	10	0	24500	24500
21	Jhalawar	11	25	36	6	4492	11769	16261
22	Baran	4	12	16	6	1887	5160	7047
23	Bundi	12	0	12	2	5967	0	5967
24	Kota	0	10	10	2	0	4746	4746
25	Bharatpur	16	8	24	5	7171	3945	11116
26	Dholpur	9	11	20	4	4500	5305	9805
27	Karoli	13	27	40	5	6125	13297	19422
28	S.Madhopur	13	18	31	5	6445	8657	15102
29	Banswara	0	50	50	8	0	23547	23547
30	Dungarpur	0	38	38	5	0	18450	18450
31	Udaipur	31	52	83	11	14788	24350	39138

Table6: Year-wise financial and physical fact sheet of NWDPRA for Xth FYP (Rs. in lacs & areas in Ha)

Sl.No.	Year	Financial (Rs. In lacs)							Physical		
		No. of watersheds	Opening balance (Rs)	Actual Release (Rs)	Total (Rs)	Actual Expenditure (Rs)	Expenditure in %	Unspent balance (Rs)	Target (Ha)	Actual Achievement (Ha)	Achievement in %
1	2	3	4	5	6	7	8	9	10	11	12
1	2001-02	320	-	492.76	492.76	135.39	27.48	357.37	-	-	-
2	2002-03	818	357.37	3122.39	3479.76	2389.41	68.67	1090.35	40000	38960	97.40
3	2003-04	-	1090.35	3474.99	4565.34	3705.87	81.17	859.47	77448	84424	109.01
4	2004-05	-	859.47	5491.69	6351.16	3401.61	53.56	2949.55	83500	81714	97.86
5	2005-06	-	2949.55	3906.02	6855.57	4878.96	71.17	1976.61	124157	111570	89.86
6	2006-07*till sep,07	-	1976.61	3785.23	5761.84	5666.54	98.35	95.30	141825	122038	86.05
Total		1138	7233.35	20273.08	27506.43	20177.78	73.36	7328.65	466930	438706	93.96

Note:- Amount released include Rs. 37.43 lac through State Budget during 2002-03 & 2003-04
Source:- Directorate of Watershred Development and Soil Conservation, Jaipur, Govt. of Rajasthan

Table8: Information regarding village population under selected watersheds-2001-02

Sl.No.	Name of the community	Kirap (Ajmer)				Sakariya (Chittorgardh)				Modak-VI (Kota)				Dhar (Udaipur)				Overall			
		Nos. Of HHs	Male	Female	Total	Nos. Of HHs	Male	Female	Total	Nos. Of HHs	Male	Female	Total	Nos. Of HHs	Male	Female	Total	Nos. Of HHs	Male	Female	Total
1	General	154	247	236	483	12	36	35	71	15	75	70	145	6	14	16	30	177	342	327	669
2	SC	76	235	220	455	0	0	0	0	65	185	190	375	0	0	0	0	141	420	410	830
3	ST	0	0	0	0	176	471	446	917	60	170	165	335	178	513	456	969	364	1004	927	1931
4	Minorities & Others	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	All Total	230	482	456	938	188	507	481	988	140	430	425	855	184	527	472	999	682	1766	1664	3430

Source:- District office of WD & SC located at zilla parishad of Ajmer, Chittorgardh, Kota, Udaipur

Table11: Category-wise operational holdings and change in irrigation in villages under selected watersheds

Sl.No.	Category of farmers	Kirap (Ajmer)				Sakariya (Chittorgardh)				Modak-VI (Kota)				Dhar (Udaipur)			
		Nos. Of HHs	% of Land acquired	% of Land irrigated		Nos. Of HHs	% of Land acquired	% of Land irrigated		Nos. Of HHs	% of Land acquired	% of Land irrigated		Nos. Of HHs	% of Land acquired	% of Land irrigated	
				2001-02	2006-07			2001-02	2006-07			2001-02	2006-07			2001-02	2006-07
1	Marginal	93	16.47	14.00	28.82	106	23.53	20.12	24.04	40	12.00	15.22	22.22	80	40.03	14.58	19.86
2	Small	80	35.29	15.83	32.83	49	22.07	23.85	26.95	50	26.33	14.75	16.46	27	26.93	13.68	23.69
3	Medium	20	15.29	18.00	40.60	29	25.16	23.01	26.46	20	22.00	17.52	3.05	11	24.29	15.82	23.95
4	Big	25	32.95	18.45	41.07	18	29.24	20.70	32.76	20	39.67	23.72	31.80	2	8.75	25.83	48.27
5	All	218	100.00	16.72	36.07	202	100.00	21.84	27.84	130	100.00	18.97	26.33	120	100.00	15.62	23.73

Source:- District office of WD & SC
Note:- Marginal (<1Ha), Small (1-2 Ha), Medium (2-4 Ha), Big (>4 Ha)

Table 7: General information of selected watersheds

Sr. No.	Particular	Watershed Name			
		Kirap	Sakariya	Modak-vi	Dhar
1	District	Ajmer	Chittorgarh	Kota	Udaipur
2	Panchayat Samiti (P.S)	Masuda	Chhoti sadri	Kherabad	Badgaon
3	Villages Covered	Kirap	Sakariya, Bargoti, B. Kundal	Dhuniya	Dhar
4	Agro. climatic zone	III a	IV b	V	IV a
5	Watershed area available for treatment (Ha.)	500	500	370	500
6	Sanction Year	2002-03	2002-03	2002-03	2002-03
7	Total Sanction Cost (Lac. Rs.)	22.50	22.50	16.65	22.50
8	Project Imp. Agency (PIA)	B.D.O Masuda P.S	A.EN.W.D & S.C Nimbahera	B.D.O Kherabad P.S	A.En WD & SC. Udaipur
9	Location :-	-	-	-	-
	(a) Longitude	74º 34' to 74º 35'	74º 46' to 74º 47'	75º 57' to 75º 59'	73º 30' to 73º 35'
	(b) Latitude	20º 10' to 21º 15'	24º 23' to 24º 24'	24º 43' to 24º 45'	24º 35' to 24º 40'
10.	Rainfall (mm)				
	(i) Average/Normal	305	600	980	600
	(ii) During 2006-07 (Ref. year)	696	1010	910	980
11	Average Temperature (Cº)	-	-	-	-
(i)	Summer (Min. -Max.)	30-45	20-47	32-48	28-44
(ii)	Winter (Min. -Max.)	6-/30	2-/24	5 -/27	7- /32
(iii)	Monsoon (Min. -Max.)	20 - 35	18 - 36	22 -40	21 – 36
12	Land use Details (Ha.)	-	-	-	-
	1: Arable Land: (Ha.)	338.40	375	300	52
	(i) Irrigated (Ha.)	37.60	65	50	20
	(ii) Un-irrigated (Ha.)	300.8	310	250	32
	(iii) % of irri.land (Ha.)	11.11	17.33	16.67	38.46
	2: Non- Arable Land (Ha.)	161.6	125	70	448
	(i) Pvt.Land (Ha.)	-	-	-	303
	(ii) Panchayat Land (Ha.)	120.96	125	70	59
	(iii) Govt. Land (Ha.)	40.64	-	-	-
	3 : Forest Land (Ha.)	-	-	-	86
	Total (1+2+3) (Ha.)	500	500	370	500
13	General Soil type	Clay Loam and stony	Clay and Clay Loam	Black Alluvial Clay Loam	Sandy Loam
14	General Soil Depth (CM):	-	-	-	-
	(i) 0 - 10 cm. (Ha.)	-	170	50	250
	(ii) 10 -50 cm. (Ha.)	100	330	200	170
	(iii) Above 50 cm. (Ha.)	400	-	120	80
	Total (Ha.)	500	500	370	500
15	General Slope %	-	-	-	-
	(i) 0 - 3 % (Ha.)	410	500	370	50
	(ii) 3 -10 % (Ha.)	90	-	-	400
	(iii) 10 -15% (Ha.)	-	-	-	50
	Total (Ha.)	500	500	370	500
16	Nos. of Open wells	-	-	-	-
(i)	Before project	86	18	12	18
(ii)	After project	86	26	12	24
17	Nos.of Tube wells	-	-	-	-
(i)	Before project	-	4	15	2
(ii)	After project	-	9	15	3
18	Nos. of SHG Formed	6	5	4	3
19	Total Nos of SHG members	78	53	59	30
20	Nos.of User groups (UG)	6	5	4	4
21	Total Nos. of UG members	30	47	106	40
22	Year of Deployment of WDT	2002-03	2002-03	2002-03	2002-03
23	Date of formation of WC	22-11-02	22-9-03	2002	1/4/2003
24	Watershed Association Reg. Date	16-1-03	2002-03	2002-03	29-3-04
25	Social audit conducted in Gram sabha (year)	2006-07 2007-08	2007-08	2007-08	2007-08
26	Total Amt.in WDF at project completion time (Rs. In lakh)	1.85	0.952	1.05	1.23
27	Benefit-cost ratio (As per PIA)	1.30	1.44	1.50	1.29

Table14: Information regarding SHGs and UGs of the villages under selected watersheds

Sl.No.	Category of farmers	Kirap (Ajmer)				Sakariya (Chittorgardh)				Modak-VI (Kota)				Dhar (Udaipur)			
		SHG		UG		SHG		UG		SHG		UG		SHG		UG	
		Nos	Nos of Mem	Nos	Nos of Mem	Nos	Nos of Mem	Nos	Nos of Mem	Nos	Nos of Mem	Nos	Nos of Mem	Nos	Nos of Mem	Nos	Nos of Mem
1	Total No. of SHGs/UGs in the village	6	78	6	30	5	53	5	47	4	59	4	106	3	30	4	40
2	No. of SHGs/UGs are involved in watershed management	2	27	6	30	5	47	-	-	4	59	4	106	3	30	-	-
3	No. of SHGs/UGs framed by women only	6	68	-	-	1	10	-	-	1	14	-	-	1	10	-	-
4	No. of SHGs/UGs framed only by women are involved in watershed management	2	22	-	-	1	10	-	-	1	14	-	-	1	10	-	-
5	Area of function i) SHGs	Livestock keeping and development				Livestock development, krishi, sale of vegetables				Livestock development, horticultural products				Agriculture, Nala nirman, Pasture development, sale of vegetables, goat rearing			
	ii) UGs	Arable land (Conservation), DLT, Charagahvikas (fodder production)				Arable land (Conservation), DLT, Non-arable land, production, agro-forestry, Charagahvikas (pasture development)				DLT, pasture development, agro-forestry				Saving, Environmental non-arable land-conservation			
6	Total revolving fund provided to SHGs (Rs)	Total 1,50,000 (Rs.25000 to each SHG)				Total Rs. 1 lakh (4 SHGs)				Nil				Total Rs. 70,000/-			
7	UGs Thrift (Rs)	-				-				-				-			

Note:- DLT = Drainage line treatment activities

Source:- District office of WD & SC located at zilla parishad of Ajmer, Chittorgardh, Kota, Udaipur

Table 9: Education level of villagers of selected watersheds (2001-02)

(% of total Villagers)

Education Level	% of Villagers			
	Kirap	Sakariya	Modak-VI	Dhar
Grad. & above	-	0.51	0.58	N.A
U. Grad.	1.06	1.21	1.40	N.A
H.S.C (12^{th})	4.48	3.75	4.44	N.A
V to XI	5.11	8.30	8.42	N.A
Up to IV	26.40	23.28	22.12	N.A
Illiterate	62.95	62.85	63.04	N.A
Total	100.00	100.00	100.00	N.A

Source:-District level department of WD & SC and Panchayat samiti.
Note:-N.A = Not Available.

Table 10: Irrigation sources and source-wise irrigation in selected watersheds (pre & post project)

Sr. No.	Watershed	Items	Particulars					
			Nos.		Irri.Area (Ha.)		Change in Irri.Area (Ha.)	
			2001-02	2006-07	2001-02	2006-07	Actual	%
1	Kirap (Ajmer)	Source wise Area Irrigated (Ha.)						
		(i) Well	86	86	52.80	116.65	63.85	120.93
		(ii) Tube-well						
		(iii) Others			4	6	2	50.00
		Total Pvt.Irri.land (Ha.)	86	86	56.80	122.65	65.85	115.93
2	Sakariya (Chittorgardh)	Source wise Area Irrigated (Ha.)						
		(i) Well	18	26	54	58.50	4.50	8.33
		(ii) Tube-well	4	9	24	27.30	3.30	13.75
		(iii) Others			5	20	15	300.00
		Total Pvt.Irri.land (Ha.)	22	35	83	105.80	22.80	27.47
3	Modak-VI (Kota)	Source wise Area Irrigated (Ha.)						
		(i) Well	12	12	40.60	56.30	15.70	38.67
		(ii) Tube-well	15	15	12	13.10	1.10	9.17
		(iii) Others			4.32	9.60	5.28	122.22
		Total Pvt.Irri.land (Ha.)	27	27	56.92	79.00	22.08	38.79
4	Dhar (Udaipur)	Source wise Area Irrigated (Ha.)						
		(i) Well	18	24	20.64	26.93	6.29	30.47
		(ii) Tube-well	2	3	1	1	0.00	0.00
		(iii) Others				5	5.00	
		Total Pvt.Irri.land (Ha.)	20	27	21.64	32.93	11.29	52.17

Source: - District offices of WD & SC.

Table19: Information regarding cast-wise family size of sample households in selected watersheds

Sl.No.	Caste	Watershed – I (Kirap / Ajmer)								Watershed – II (Sakariya / Chittorgardh)							
		Beneficiary HHs				Non-Beneficiary HHS				Beneficiary HHs				Non-Beneficiary HHS			
		HHs	M	F	T	HHs	M	F	T	HHs	M	F	T	HHs	M	F	T
1	General	37	112	95	207	37	102	104	206	-	-	-	-	-	-	-	-
	%	92.50	54.11	45.89	100.00	92.50	49.51	50.49	100.00	-	-	-	-	-	-	-	-
	Avg. FS	-	3.03	2.57	5.59	-	2.76	2.81	5.57	-	-	-	-	-	-	-	-
2	SC	3	11	9	20	3	6	7	13	1	2	2	4	39	127	99	226
	%	7.50	55.00	45.00	100.00	7.50	46.15	53.85	100.00	2.50	50.00	50.00	100.00	97.50	56.19	43.81	100.00
	Avg. FS	-	3.67	3.00	6.67	-	2.00	2.33	4.33	-	2.00	2.00	4.00	-	3.26	2.54	5.79
3	ST	-	-	-	-	-	-	-	-	39	152	147	299	1	2	3	5
	%	-	-	-	-	-	-	-	-	97.50	50.84	49.16	100.00	2.50	40.00	60.00	100.00
	Avg. FS	-	-	-	-	-	-	-	-	-	3.90	3.77	7.67	-	2.00	3.00	5.00
4	All	40	123	104	227	40	108	111	219	40	154	149	303	40	129	102	231
	%	100.00	54.19	45.81	100.00	100.00	49.32	50.69	100.00	100.00	50.83	49.17	100.00	100.00	55.84	44.16	100.00
	Avg. FS	-	3.08	2.60	5.68	-	2.70	2.78	5.48	-	3.85	3.73	7.58	-	3.23	2.55	5.78
		Watershed – III (Modak-VI / Kota)								Watershed – IV (Dhar / Udaipur)							
1	General	19	73	58	131	17	56	44	100	1	4	4	8	-	-	-	-
	%	47.50	55.73	44.27	100.00	42.50	56.00	44.00	100.00	2.50	50.00	50.00	100.00	-	-	-	-
	Avg. FS	-	3.84	3.05	6.89	-	3.29	2.59	5.88	-	4.00	4.00	8.00	-	-	-	-
2	SC	-	-	-	-	10	33	22	55	-	-	-	-	-	-	-	-
	%	-	-	-	-	25.00	60.00	40.00	100.00	-	-	-	-	-	-	-	-
	Avg. FS	-	-	-	-	-	3.30	2.20	5.50	-	-	-	-	-	-	-	-
3	ST	21	69	57	126	13	32	32	64	39	118	119	237	40	110	99	209
	%	52.50	54.76	45.23	100.00	32.50	50.00	50.00	100.00	97.50	49.79	50.21	100.00	100.00	52.63	47.37	100.00
	Avg. FS		3.29	2.71	6.00	-	2.46	2.46	4.92	-	3.026	3.051	6.08	-	2.75	2.48	5.23
4	All	40	142	115	257	40	121	98	219	40	122	123	245	40	110	99	209
	%	100.00	55.25	44.74	100.00	100.00	55.25	44.749	100.00	100.00	49.80	50.20	100.00	100.00	52.63	47.37	100.00
	Avg. FS	-	3.55	2.88	6.43	-	3.03	2.45	5.48	-	3.05	3.08	6.13	-	2.75	2.48	5.23

Source:- Field survey

Note:- No household of minority & other castes

M=Male, F=Female, T=Total, Ave. FS= Average Family Size

Note:- % denote percentage to all for HHs and percentage to T for M and F

Table 12: Livestock position in the villages under selected watersheds

Livestock	Kirap			Sakariya			Modak-VI			Dhar		
	Number		% Change	Number		% Change	Number		% Change	Number		% Change
	01-02	06-07		01-02	06-07		01-02	06-07		01-02	06-07	
Bullocks	-	-	-	120	122	1.67	100	40	-60.00	180	176	-2.22
Cows	430	575	33.72	56	72	28.57	206	302	46.60	172	190	10.47
Cow calf, he/she	210	219	04.29	45	51	13.33	151	240	58.94	85	92	8.24
Buffalo	350	421	20.29	5	12	140.00	25	45	80.00	92	72	-21.74
Buffalo calf he/she	118	152	28.81	4	5	25.00	20	30	50.00	41	40	-2.44
Goats	210	278	32.38	78	97	24.36	160	210	31.25	391	440	12.53
Sheep	510	535	04.90	0	0	0.00	0	0	0.00	0	0	0.00
Camel	20	27	35.00	4	4	0.00	6	4	-33.33	3	4	33.33

Source:-District office of WD & SC located at zilla parishad.
Note: - % change denotes change in 2006-07 over 2001-02.

Table 13: composition of WC of selected watersheds

Watershed	Kirap	Sakariya	Modak-VI	Dhar
Male members	8	11	5	8
Female member	3	-	3	4
Total member*	11	11	8	12

* Including president and secretary.

Table21: Education level of family member of beneficiary and non-beneficiary households

Name of Watershed	Number of members														
	Beneficiary														
	Illiterate			Primary			Secondary			Higher Secondary			Total		
	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T
Kirap	36	52	88	54	37	91	28	15	43	5	-	5	123	104	227
%	29.27	50.00	38.76	43.90	35.58	40.09	22.76	14.42	18.94	4.07	-	2.20	54.19	45.81	100.00
Sakariya	45	90	135	89	53	142	20	6	26	-	-	-	154	149	303
%	29.22	60.40	44.55	57.79	35.57	46.86	12.99	4.03	8.58	-	-	-	50.83	49.17	100.00
Modak-VI	21	54	75	77	47	124	42	13	55	2	1	3	142	115	257
%	14.79	46.95	29.18	54.23	40.87	48.25	29.58	11.30	21.40	1.41	0.87	1.17	55.25	44.75	100.00
Dhar	52	85	137	59	36	95	10	2	12	-	-	-	121	123	244
%	42.98	69.11	56.15	48.76	29.27	38.93	8.26	1.63	4.92	-	-	-	49.59	5.41	100.00
All	154	281	435	279	173	452	100	36	136	7	1	8	540	491	1031
%	28.52	57.23	42.19	51.67	35.23	43.84	18.52	7.33	13.19	1.30	0.20	0.78	52.38	47.62	100.00
Non-Beneficiary															
Kirap	30	52	82	46	43	89	28	16	44	4	-	4	108	111	219
%	27.78	46.85	37.44	42.59	38.74	4.64	25.93	14.41	2.09	3.70	-	1.83	49.32	50.68	100.00
Sakariya	41	66	107	73	31	104	15	4	19	-	1	1	129	102	231
%	31.78	64.71	46.32	56.59	30.39	45.02	11.63	3.92	8.23	-	0.98	0.43	55.84	44.16	100.00
Modak-VI	26	45	71	64	45	109	21	8	29	10	1	11	121	98	219
%	21.49	45.92	32.42	52.89	45.92	49.77	17.36	8.16	13.24	8.26	1.02	5.2	55.25	44.75	100.00
Dhar	45	69	114	57	30	87	8	1	9	-	-	-	110	99	209
%	40.91	69.70	54.55	51.82	30.30	41.63	7.27	1.01	4.31	-	-	-	52.63	47.37	100.00
All	142	232	374	240	149	389	72	29	101	14	2	16	468	410	878
%	30.34	56.59	42.60	51.28	36.34	44.31	15.38	7.07	11.50	2.99	0.49	1.82	53.30	46.70	100.00

Source:- Field survey
M=Male, F=Female, T=Total
Note:- % denote percentage share of category to total of the watershed

Table 15: Physical and financial target and achievement under NWDPRA programme (2002-07)

Watershed: Kirap (Ajmer)

(Rs. in lakh)

Sr. No.	Components / Activities	Unit	Strategic plan from 2001-02 to 2006-07 (including extended phase, if any)		Cumulative Progress		% of Achievement	
			Physical	Financial (Rs.)	Physical	Financial (Rs.)	Physical	Financial
1	2	3	4	5	6	7		
A	Management Component:							
I	Administration Cost:							
(a)	State/District Hq.		-	0.125	-	-	-	0.00
(b)	Watershed committees		-	0.90	-	0.50	-	55.56
(i)	Salary		-	1.125	-	-	-	0.00
(ii)	Other expenses		-	-	-	-	-	-
	Sub Total (Watershed Committees)		-	2.15	-	0.50	0.00	23.26
(c)	Project Implementation Agencies (PIA)		-	-	-	-	-	-
(i)	Salary		-	-	-	-	-	-
(ii)	Other expenses		-	-	-	-	-	-
	Sub Total (PIA)		-	-	-	-	-	-
	Sub Total (Admn. Cost)		-	2.15	-	0.50	0.00	23.26
II	Community Organizations:							
(a)	Entry point activities of WC	No.	1	0.675	1	0.675	100.00	100.00
(b)	Honorarium to village Based Community	No.	-	0.45	-	0.25	-	55.56
(c)	Expenses at Distt.HQ .for Misc.		-	0.5625	-	0.225	-	40.00
(d)	Corpus for WDP (Rs.)		-	-	-	-	-	-
	Sub Total (Community Org)		1	1.6875	1	1.15	100.00	68.15
III	Training Programme:							
(a)	State/District level training cost	No.	-	0.675	12	0.38	-	56.30
(b)	PIA: Training cost at identified Institutes	No.	-	0.45	1	0.25	-	55.56
	Sub Total (Training)		-	1.125	13	0.63	0.00	56.00
	TOTAL (A)		1	4.9625	14	2.28	1400.00	45.94
B	Development Component:							
I	Natural Resource Management (NRM):							
(a)	Arable Land:							
(i)	Soil & Moisture Conservation Activities	Ha.	45	0.545	-	-	0.00	0.00
(ii)	Contour Bunding /field bunding executed (Cumulative) in RMT	Rmt	3000	0.6	24077	4.975	802.57	829.17
(iii)	Agronomic Conservation Practices	Ha.	-	-	-	-	-	-
(iv)	Others	Ha.	8	2.0	5	0.92	62.50	46.00
	Sub Total (Arable Land)		3053	3.145	24082	5.895	788.80	187.44
(b)	Non Arable Land:							
(i)	Run off Management Structures /CF/ST	Ha.	100	1.94	60	1.23	60.00	63.40
(ii)	Water Harvesting structures (WHS) (Cumulative)	No.	-	-	-	-	-	-
(iii)	Dry Land Horticulture	Ha.	-	-	-	-	-	-
(iv)	Conservation & Development of Bio-Mass/Plantation	No.	5000	2.22	5000	1.13	100.00	50.90
(v)	Others	Ha.	1000	0.486	800	0.21	80.00	43.21
	Sub Total (Non Arable)		6100	4.646	5860	2.57	96.07	55.32
(c)	Drainage Lines (DLT):							
(i)	Upper reaches (No.of Structure)	No.	110	1.17	8	1.60	7.27	136.75
(ii)	Middle reaches (no.of Structure)	No.	12	1.29	8	1.77	66.67	137.21
(iii)	Lower reaches (No. of Structure)	No.	4	1.0	4	1.0	100.00	100.00
	Sub Total (Drainage Line)		126	3.46	20	4.37	15.87	126.30
	sub Total (NRM)		9279	11.251	29962	12.835	322.90	114.08
II	Farm Production system for land owning Families (FPS):							
(a)	Est. of nurseries and production of seedlings	No.	6000	0.12	-	-	0.00	0.00
(b)	Testing and Demonstration of new technologies	No.	530	1.20	15074	3.93	0.00	327.50
(C)	Diversification of Production system	No.	2500	1.50	10	0.02	0.40	1.33
(d)	Adoption of proven technology.	Ha.	100	0.70	-	-	0.00	0.00
(e)	Livestock Management	Ha.	300	0.975	-	-	0.00	0.00
(f)	Others	Ha.	-	-	-	-	-	-
	Sub Total FPS		9430	4.50	15084	3.95	159.96	87.88
III	Livelihood support system for land -less femilies:							
(a)	Household production system	No.	20	0.20	1	0.25	5.00	125.00
(b)	Bio-mass based rural industry activities	No.	10	0.20	1	0.25	10.00	125.00
(c)	Dairy etc.	No.	10	0.50	4.0	1.0	40.00	200.00
(d)	Livestock Management	No.	8	0.7075	-	-	0.00	0.00
(e)	Others	No.	-	-	-	-	-	-
	Sub Total for LSS		48	1.61	6	1.5	12.50	93.31
	Sub Total (B):		18757	17.354	45052	18.285	240.19	105.37
	GRAND TOTAL (A+B)		18758	22.316	45066	20.565	240.25	92.15
	Area Treated	Ha.	500	-	500	-	100.00	-

Source:- District office of WD & SC, Ajmer zilla parishad, Ajmer.

Table 16: Physical and financial target and achievement under NWDPRA programme (2002-07)

Watershed: Sakariya (Chittorgarh)

(Rs. in lakh)

Sr. No.	Components / Activities	Unit	Strategic plan from 2001-02 to 2006-07 (including extended phase, if any)		Cumulative Progress		% of Achievement	
			Physical	Financial (Rs.)	Physical	Financial (Rs.)	Physical	Financial
1	2	3	4	5	6	7		
A	Management Component:							
I	Administration Cost:							
(a)	State/District Hq.	-	0.225	-	0.225	-	100.00	
(b)	Watershed committees	-	-	-	-	-	-	
(i)	Salary	-	0.550	-	0.550	-	100.00	
(ii)	Other expenses	-	-	-	-	-	-	
	Sub Total (Watershed Committees)	-	0.775	-	0.775	-	100.00	
(c)	Project Implementation Agencies (PIA)	-	-	-	-	-	-	
(i)	Salary	-	1.125	-	1.125	-	100.00	
(ii)	Other expenses	-	-	-	-	-	-	
	Sub Total (PIA)	-	1.125	-	1.125	-	100.00	
	Sub Total (Admn. Cost)	-	1.900	-	1.900	-	100.00	
II	Community Organizations:	-				-		
(a)	Entry point activities of WC	1	0.675	1	0.675	100.00	100.00	
(b)	Honorarium to village Based Community	-	0.100	-	0.094	-	94.00	
(c)	Expenses at Distt.HQ .for Misc.	-	-	-	-	-	-	
(d)	Corpus for WDP (Rs.)	-	0.225	-	0.225	-	100.00	
	Sub Total (Community Org)	1	1.000	1	0.994	100.00	99.40	
III	Training Programme:							
(a)	State/District level training cost	-	0.500	-	0.355	-	71.00	
(b)	PIA: Training cost at identified Institutes	-	0.510	-	0.510	-	100.00	
	Sub Total (Training)	-	1.010	-	0.865	-	85.64	
	TOTAL (A)	1	3.910	1	3.759	100.00	96.14	
B	Development Component:							
I	Natural Resource Management (NRM):							
(a)	Arable Land:							
(i)	Soil & Moisture Conservation Activities	8	0.130	8	0.130	100.00	100.00	
(ii)	Contour Bunding /field bunding executed (Cumulative) in RMT	-	-	-	-	-	-	
(iii)	Agronomic Conservation Practices	-	-	-	-	-	-	
(iv)	Others	-	-	-	-	-	-	
	Sub Total (Arable Land)	8	0.130	8	0.130	100.00	100.00	
(b)	Non Arable Land:							
(i)	Run off Management Structures /CF/ST	Ha.	29	1.240	29	1.240	100.00	100.00
(ii)	Water Harvesting structures (WHS) (Cumulative)	No.	7	3.060	7	3.060	100.00	100.00
(iii)	Dry Land Horticulture	Ha.	-	-	-	-	-	-
(iv)	Conservation & Development of Bio-Mass/Plantation	No.	-	-	-	-	-	-
(v)	Others	Ha.	-	-	-	-	-	-
	Sub Total (Non Arable)		36	4.300	36	4.300	100.00	100.00
(c)	Drainage Lines (DLT):							
(i)	Upper reaches (No.of Structure)	No.	5	0.160	5	0.160	100.00	100.00
(ii)	Middle reaches (no.of Structure)	No.						
(iii)	Lower reaches (No. of Structure)	No.	4	8.431	4	8.410	100.00	99.75
	Sub Total (Drainage Line)		9	8.591	9	8.570	100.00	99.76
	sub Total (NRM)		53	13.021	53	13.000	100.00	99.84
II	Farm Production system for land owning Families (FPS):							
(a)	Est. of nurseries and production of seedlings	No.	-	-	-	-	-	-
(b)	Testing and Demonstration of new technologies	No.	270	4.050	268	4.010	99.26	99.01
(C)	Diversification of Production system	No.	-	-	-	-	-	-
(d)	Adoption of proven technology.	Ha.	-	-	-	-	-	-
(e)	Livestock Management	Ha.	-	-	-	-	-	-
(f)	Others	Ha.	-	-	-	-	-	-
	Sub Total FPS		270	4.050	268	4.010	99.26	99.01
III	Livelihood support system for land -less femilies:							
(a)	Household production system	No.	-	-	-	-	-	-
(b)	Bio-mass based rural industry activities	No.	-	-	-	-	-	-
(c)	Dairy etc.	No.	-	-	-	-	-	-
(d)	Livestock Management	No.	-	-	-	-	-	-
(e)	Others	No.	6	1.519	4	1.000	66.67	65.83
	Sub Total for LSS		6	1.52	4	1.000	66.67	65.83
	Sub Total (B):		329	18.590	325	18.010	98.78	96.88
	GRAND TOTAL (A+B)		330	22.500	326	21.769	98.79	96.75
	Area Treated	Ha.	500.00		500.00		100.00	

Source:- District office of WD & SC, Ajmer zilla parishad, Ajmer.

Table 17: Physical and financial target and achievement under NWDPRA programme (2002-07)

Watershed: Modak-VI (Kota)

(Rs. in lakh)

Sr. No	Components / Activities	Unit	Strategic plan from 2001-02 to 2006-07 (including extended phase, if any)		Cumulative Progress		% of Achievement	
			Physical	Financial(Rs.)	Physical	Financial(Rs.)	Physical	Financial
1	2	3	4	5	6	7	8	9
A	Management Component:							
I	Administration Cost:							
(a)	State/District Hq		-	-	-	-	-	-
(b)	Watershed committees		-	0.47	-	0.64	-	136.17
(i)	Salary	No.	-	-	-	-	-	-
(ii)	Other expenses		-	-	-	-	-	-
	Sub Total (Watershed Committees):		-	0.47	-	0.64	-	136.17
(c)	Project Implementation Agencies (PIA)		-	0.20	-	0.19	-	95.00
(i)	Salary		-	-	-	-	-	-
(ii)	Other expenses		-	-	-	-	-	-
	Sub Total (PIA):		-	0.20	-	0.19	-	95.00
	Sub Total (Admn. Cost):		-	0.67	-	0.83	-	123.88
II	Community Organizations:							
(a)	Entry point activities of WC	No.	2	0.45	1	0.65	50.00	144.44
(b)	Honorarium to village. Based Community	No.	-	-	-	-	-	-
(c)	Expenses at Distt.HQ .for Misc.		-	0.17	-	0.16	-	94.12
(d)	Corpus for WDP	No.	-	0.17	-	0.15	-	88.24
(e)	Publicity	No.	50	0.15	40	0.20	80.00	133.33
	Sub Total (Community Org):		52	0.94	41	1.16	78.85	123.40
III	Training Programme:							
(a)	State/District level training cost	No.	10	0.10	3	0.03	30.00	30.00
(b)	PIA: Training cost at identified Institutes	No.	14	0.34	12	0.56	85.71	164.71
	Sub Total (Training)		24	0.44	15	0.59	62.50	134.09
	TOTAL (A)		76	2.05	56	2.58	73.68	125.85
B	Development Component:							
I	Natural Resource Management(NRM)							
(a)	Arable Land:							
(i)	Soil & Moisture Conservation Activities	Ha.	250	2.90	100	0.70	40.00	24.14
(ii)	Contour Bunding /field bunding executed Cumulative) in RMT	Rmt	-	-	-	-	-	-
(iii)	Agronomic Conservation Practices	Ha.	12	0.20	-	-	-	-
(iv)	Others	Ha.	-	-	-	-	-	-
	Sub Total (Arable Land):		262	3.10	100	0.70	38.17	22.58
(b)	Non Arable Land:							
(i)	Run off Management Structures /CF/ST	No.	-	-	-	-	-	-
(ii)	Water Harvesting structures (Cumulative)	No.	2	1.60	1	0.62	50.00	38.75
(iii)	Dry Land Horticuture	No.	-	-	-	-	-	-
(iv)	Conservation & Development of Bio- Mass/Plantation	No.	2000	0.30	3000	0.34	150.00	113.33
(v)	Fancing	Ha.	1.5	1.50	1.30	1.32	86.67	88.00
(vi)	Others (Plantation)	Ha.	2000	0.20	4000	0.26	200.00	130.00
	Sub Total (Non Arable):		4003.5	3.60	7002.3	2.54	174.90	70.56
(c)	Drainage Lines:							
(i)	Upper reaches (No. of Structure)	No.	10	0.20	25	0.26	250.00	130.00
(ii)	Middle reaches (No. of Structure)	No.	1	1.52	1	2.49	100.00	163.82
(iii)	Lower reaches (No. of Structure)	No.	1	2.00	1	4.10	100.00	205.00
	Sub Total (Drainage Line):		12	3.72	27	6.85	225.00	184.14
	Sub Total (NRM):		4277.5	10.42	7129.3	10.09	166.67	96.83
II	Farm Production system (FPS) for land owning Families :							
(a)	Est. of nurseries and production of seedlings	No.	-	-	-	-	-	-
(b)	Testing and Demonstration of new technologies	No.	85	0.70	90	0.72	105.88	102.86
(C)	Diversification of Production system	No.	150	1.00	-	-	0.00	0.00
(d)	Adoption of proven technology.	Ha.	50	0.50	-	-	0.00	0.00
(e)	Livestock Management	Ha.	5	0.33	-	-	0.00	0.00
(f)	Others (Vermi Compost)	Ha.	100	0.50	12	0.23	12.00	46.00
	Sub Total FPS		390	3.03	102	0.95	26.15	31.35
III	Livelihood support system (LSS)for land -less femilies:							
	a- Household production system	No.	40	0.40	-	-	0.00	0.00
	b-Bio-mass based rural industry activities	No.	-	-	-	-	-	-
	c- Dairy etc.	No.	5	0.50	-	-	0.00	0.00
	d- Livestock Management	No.	5	0.25	1	0.07	20.00	28.00
	e- Others (SHG for Agri.)	No.	-	-	-	-	-	-
	Sub Total for LSS:		50	1.15	1	0.07	2.00	6.09
	Sub Total (B):		4717.50	14.60	7232.30	11.11	153.31	76.10
	GRAND TOTAL (A+B):		4793.50	16.65	7288.30	13.69	152.05	82.22
	Area Treated:	Ha.	370.00		370.00		100.00	

Source:- District office of WD & SC, Kota zilla parishad, Kota.

Table 18: Physical and financial target and achievement under NWDPRA programme (2002-07)

Watershed: Dhar (Udaipur)

(Rs. in lakh)

Sr. No.	Components / Activities	Unit	Strategic plan from 2001-02 to 2006-07 (including extended phase, if any)		Cumulative Progress		% of Achievement	
			Physical	Financial (Rs.)	Physical	Financial (Rs.)	Physical	Financial (Rs.)
1	2	3	4	5	6	7		
A	Management Component:							
I	Administration Cost:							
(a)	State/District Hq.		-	0.23	-	-	-	0.00
(b)	Watershed committees		-	-	-	-	-	-
(i)	Salary		-	0.90	-	0.90	-	100.00
(ii)	Other expenses		-	-	-	-	-	-
	Sub Total (Watershed Committees)		-	1.13	-	0.90	-	79.65
(c)	Project Implementation Agencies (PIA)		-	1.23	-	-	-	0.00
(i)	Salary		-	-	-	-	-	-
(ii)	Other expenses		-	-	-	-	-	-
	Sub Total (PIA)		-	1.23	-	-	-	-
	Sub Total (Admn. Cost)		-	2.36	-	0.90	-	38.14
II	Community Organizations:							
(a)	Entry point activities of WC	No.	2	0.68	2	0.68	100.00	100.00
(b)	Honorarium to village Based Community	No.	1	0.29	1	0.29	100.00	100.00
(c)	Expenses at Distt.HQ .for Misc.		-	0.03	1	0.02	-	66.67
(d)	Corpus for WDP (Rs.)		-	0.225	-	0.225	-	100.00
	Sub Total (Community Org)		3	1.225	4	1.215	133.33	99.18
III	Training Programme:							
(a)	State/District level training cost	No.	4	0.675	4	0.06	100.00	8.89
(b)	PIA: Training cost at identified Institutes	No.	10	0.45	10	0.42	100.00	93.33
	Sub Total (Training)		14	1.125	14	0.48	100.00	42.67
	TOTAL (A)		17	4.71	18	2.595	105.88	55.10
B	Development Component:							
I	Natural Resource Management (NRM):							
(a)	Arable Land:							
(i)	Soil & Moisture Conservation Activities	Ha.	100	1.63	100	1.58	100.00	96.93
(ii)	Contour Bunding /field bunding executed (Cumulative) in RMT	Rmt	-	-	-	-	-	-
(iii)	Agronomic Conservation Practices	Ha.	40	0.40	40	0.40	100.00	100.00
(iv)	Others	Ha.	-	0.32	-	-	-	0.00
	Sub Total (Arable Land)		140	2.35	140	1.98	100.00	84.26
(b)	Non Arable Land:							
(i)	Run off Management Structures /CF/ST	Ha.	140	3.93	604	3.12	431.43	79.39
(ii)	Water Harvesting structures (WHS) (Cumulative)	No.	-	-	-	-	-	-
(iii)	Dry Land Horticuture	Ha.	-	-	-	-	-	-
(iv)	Conservation & Development of Bio- Mass/Plantation	No.	40	0.71	40	0.90	100.00	126.76
(v)	Others	Ha.	-	-	-	-	-	-
	Sub Total (Non Arable)		180	4.64	644	4.02	357.78	86.64
(c)	Drainage Lines (DLT):							
(i)	Upper reaches (No. of Structure)	No.	676	4.00	676	4.00	100.00	100.00
(ii)	Middle reaches (No. of Structure)	No.	4	0.25	4	0.25	100.00	100.00
(iii)	Lower reaches (No. of Structure)	No.	1	1.00	1	1.00	100.00	100.00
	Sub Total (Drainage Line)		681	5.25	681	5.25	100.00	100.00
	sub Total (NRM)		1001	12.24	1465	11.25	146.35	91.91
II	Farm Production system for land owning Families (FPS):							
(a)	Est. of nurseries and production of seedlings	No.	-	-	-	-	-	-
(b)	Testing and Demonstration of new technologies	No.	500	0.84	800	0.84	160.00	100.00
(C)	Diversification of Production system	No.	32000	1.95	38000	2.76	118.75	141.54
(d)	Adoption of proven technology.	Ha.	10	1.26	0	0.32	-	25.40
(e)	Livestock Management	Ha.	-	-	-	-	-	-
(f)	Others	Ha.	-	-	-	-	-	-
	Sub Total FPS		32510	4.05	38800	3.92	119.35	96.79
III	Livelihood support system for land -less femilies:							
	a- Household production system	No.	-	-	-	-	-	-
	b-Bio-mass based rural industry activities	No.	10	0.45	10	0.45	100.00	100.00
	c- Dairy etc.	No.	5	0.63	5	0.40	100.00	63.49
	d- Livestock Management	No.	-	0.42	-	-	-	0.00
	e- Others	No.	-	-	-	-	-	-
	Sub Total for LSS		15	1.50	15	0.85	100.00	56.67
	Sub Total (B):		33526	17.79	40280	16.02	120.15	90.05
	GRAND TOTAL (A+B)		33543	22.50	40298	18.615	120.14	82.73
	Area Treated	Ha.	500		500		100.00	

Source:- District office of WD & SC, Udaipur zilla parishad, Udaipur

Table29: Changes in 2006-07 crop-pattern over 201-02-beneficiary HHs

Area in Ha

Cropping pattern	Changes in Area over 2001-02 (Ha)															
	Kirap				Sakariya				Modak-VI				Dhar			
	Area		Irri. Area		Area		Irri. Area		Area		Irri. Area		Area		Irri. Area	
	Actual	%	Actual	%	Actual	%	Actual	%	Actual	%	Actual	%	Actual	%	Actual	%
Kharif crops																
Maize	-4.13	-15.18	0.00	-	-1.01	-6.54	0.00	-	-1.94	-7.74	0.00	-	-1.67	-6.21	0.61	13.12
Jowar	5.18	45.07	0.00	-	0.00	-	0.00	-	-0.65	-16.00	0.00	-	0.00	-	0.00	-
Bajra	-1.54	-5.04	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-
Udad	-0.65	-16.67	0.00	-	-1.01	-22.73	0.00	-	1.21	17.65	0.00	-	1.42	58.33	0.41	410.00
Moong	0.65	26.67	0.16	100.00	0.00	-	0.00	-	0.00	-	0.00	-	0.46	0.00	0.00	-
Soyabean	0.00	-	0.00	-	2.93	6.49	0.30	100.00	2.75	7.00	0.00	-	0.00	-	0.00	-
Groundnut	0.00	-	0.00	-	2.33	88.46	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-
Sesamum	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.71	73.68	0.41	410.00
Jowar fodder	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-
Other crops	1.13	0.00	0.00	-	0.00	-	0.00	-	3.56	0.00	0.00	-	-0.20	-12.50	-0.20	-12.35
Total kharif	0.65	0.86	0.16	100.00	3.24	4.78	0.30	100.00	4.94	6.52	0.00	-	0.71	2.34	1.23	19.01
Rabi crops																
Wheat	1.70	16.67	1.70	16.67	3.64	28.80	3.65	28.88	4.13	46.79	4.13	46.83	3.69	49.32	3.69	49.27
Barley	0.89	61.11	0.89	60.96	0.00	-	0.00	-	0.00	-	0.00	-	0.05	0.00	0.00	-
Gram	0.49	8.82	-0.16	-100.00	1.42	14.14	0.00	-	3.72	287.50	0.00	-	0.46	6.92	0.00	-
Rapeseed	0.00	-	0.00	-	2.43	85.71	2.43	85.87	3.08	111.76	3.08	112.00	1.06	52.50	0.25	24.75
Coriander	0.00	-	0.00	-	0.00	-	0.00	-	2.67	16.26	5.91	208.83	0.00	-	0.00	-
Other crops	0.00	-	0.00	-	2.53	92.59	2.53	92.67	0.00	-	0.00	-	0.00	-	0.00	-
Total rabi	3.08	17.92	2.43	20.56	10.01	35.48	8.61	47.31	13.60	46.41	13.12	91.11	5.26	32.70	3.94	44.27
Gross Cropped Area (GCA)	3.72	4.02	2.59	21.91	13.25	13.80	8.91	48.16	18.53	17.66	13.12	91.11	5.97	12.88	5.17	33.64

Source:- Field Survey

Table30: Changes in 2006-07 crop-pattern over 201-02-non-beneficiary HHs

Area in Ha

Cropping pattern	Changes in Area over 2001-02 (Ha)															
	Kirap				Sakariya				Modak-VI				Dhar			
	Area		Irri. Area		Area		Irri. Area		Area		Irri. Area		Area		Irri. Area	
	Actual	%	Actual	%	Actual	%	Actual	%	Actual	%	Actual	%	Actual	%	Actual	%
Kharif crops																
Maize	-0.81	-3.52	0.00	-	-2.12	-8.43	0.00	-	1.29	4.95	0.00	-	-0.91	-3.47	0.00	-
Jowar	1.62	22.22	0.00	-	0.10	0.00	0.00	-	-1.62	-12.66	0.00	-	0.00	-	0.00	-
Bajari	0.00	0.00	0.00	-	0.00	0.00	0.00	-	0.00	0.00	0.00	-	0.00	-	0.00	-
Udad	0.32	10.00	0.00	-	1.11	183.33	0.00	-	5.34	42.31	0.00	-	0.81	133.33	0.00	-
Moong	-1.13	-19.72	0.00	-	0.00	0.00	0.00	-	0.00	0.00	0.00	-	0.00	-	0.00	-
Soyabean	0.00	0.00	0.00	-	-0.10	-0.25	0.00	-	-3.24	-7.02	0.00	-	0.00	-	0.00	-
Groundnut	0.00	0.00	0.00	-	-0.30	-9.68	0.00	-	-1.78	-57.89	0.00	-	0.00	-	0.00	-
Sesamum	0.00	0.00	0.00	-	-0.10	-12.50	0.00	-	0.00	0.00	0.00	-	0.00	-	0.00	-
Jowar fodder	0.00	0.00	0.00	-	0.81	50.00	0.00	-	0.00	0.00	0.00	-	0.00	-	0.00	-
Other crops	0.00	0.00	0.00	-	0.00	0.00	0.00	-	0.32	0.00	0.00	-	0.00	-	0.00	-
Total kharif	0.00	0.00	0.00	-	-0.61	-0.84	0.00	-	0.32	0.32	0.00	-	-0.10	-0.38	0.00	-
Rabi crops																
Wheat	0.81	8.40	1.81	18.80	-0.81	-8.89	-0.81	-8.90	0.97	10.53	0.97	10.51	1.62	57.14	1.62	57.24
Barley	1.62	0.00	1.62	100.00	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-
Gram	1.13	53.85	0.00	-	0.30	2.31	0.00	-	0.00	-	0.00	-	-0.20	-50.00	0.00	-
Rapeseed	0.00	-	0.00	-	1.82	900.00	1.82	910.00	1.62	35.71	1.62	35.76	0.00	-	0.00	-
Coriander	0.00	-	0.00	-	0.00	-	0.00	-	0.65	4.88	1.62	33.40	0.00	-	0.00	-
Other crops	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.00	-	0.10	0.00	0.00	-
Total rabi	3.56	30.34	3.43	35.62	1.31	5.80	1.01	10.63	3.24	11.76	4.21	22.04	1.52	46.88	1.62	57.24
Gross Cropped Area (GCA)	3.56	4.55	3.43	35.62	0.71	0.75	1.01	10.63	3.56	2.78	4.41	22.04	1.42	4.71	1.62	44.51

Source:- Field Survey

Table 20: Information regarding working population in sample households

Name of Watershed	Beneficiary						Non-Beneficiary					
	No. of working members			Total population			No. of working members			Total population		
	M	F	T	M	F	T	M	F	T	M	F	T
Kirap	79	65	144	123	104	227	74	67	141	108	111	219
%	64.23	62.50	63.44	100.00	100.00	100.00	68.52	60.36	64.38	100.00	100.00	100.00
Sakariya	92	91	183	154	149	303	81	68	149	129	102	231
%	59.74	61.07	60.40	100.00	100.00	100.00	62.79	66.67	64.50	100.00	100.00	100.00
Modak-VI	93	73	166	142	115	257	75	67	142	121	98	219
%	65.49	63.48	64.59	100.00	100.00	100.00	61.98	68.37	64.84	100.00	100.00	100.00
Dhar	79	80	159	121	123	244	62	58	120	110	99	209
%	65.29	65.04	65.16	100.00	100.00	100.00	56.36	58.59	57.42	100.00	100.00	100.00
Total	343	309	652	540	491	1031	292	260	552	468	410	878
%	63.52	62.93	63.24	100.00	100.00	100.00	62.39	63.41	62.87	100.00	100.00	100.00

Source:- Field survey. Note:- % denote percentage of working members to total population.
M=Male, F=Female, T=Total

Table 22: Occupational pattern of economically active members of sample households

(Number in %)

Watershed Name	Ben.(B)/ Non.Ben. (NB)	Principal Occupation						Subsidiary Occupation					
		Agri.	Dairy	Agri. Labour	Service	Busi./ Prof.	Others	Agri.	Dairy	Agri. Labour	Service	Busi/ Prof.	Others
Kirap	B	62.50	3.47	18.06	2.08	2.78	11.11	3.47	48.61	9.03	1.39	1.39	18.06
	NB	63.12	2.13	16.31	2.13	4.96	11.35	2.13	45.39	9.22	2.13	2.13	17.02
Sakariya	B	53.55	4.37	11.48	3.28	3.83	23.50	4.37	44.81	15.30	1.64	3.28	11.48
	NB	54.36	4.03	12.75	1.34	2.68	24.83	4.03	50.34	15.44	1.34	3.36	10.74
Modak-VI	B	56.02	3.61	8.43	1.81	4.82	25.30	3.61	51.81	11.45	0.60	2.41	12.05
	NB	59.15	1.41	12.68	2.82	2.11	21.83	3.52	45.77	12.68	0.70	2.11	14.08
Dhar	B	54.09	5.66	10.06	1.89	0.63	27.67	2.52	44.03	9.43	3.77	2.52	20.13
	NB	50.00	3.33	13.33	0.83	2.50	30.00	2.50	50.00	11.67	1.67	1.67	22.50
All	B	56.29	4.29	11.81	2.30	3.07	22.24	3.53	47.24	11.50	0.77	2.45	15.18
	NB	56.88	2.72	13.77	1.81	3.08	21.74	3.08	47.83	12.32	1.45	2.36	15.76

Note:- Figure denote percentage of Economical Active Population engaged in concern occupation.
EAM= Economical Active Members.
Source:- Field Survey. B= Beneficiary, NB= Non-beneficiary.

Table 23: Category-wise average size of land holding/sample households (2006-07)

(Area in ha)

Category of HHs	B/ NB	Total/ Avg.*OA	Kirap			Sakariya			Modak-VI			Dhar		
			I	U	T	I	U	T	I	U	T	I	U	T
M.F	B	Total	1.46	4.61	6.07	1.01	4.45	5.46	3.88	2.59	6.47	1.11	2.53	3.64
		Avg* OA	0.18	0.58	0.76	0.13	0.56	0.68	0.49	0.32	0.81	0.14	0.32	0.46
	NB	Total	0.32	3.56	3.88	1.11	3.84	4.96	0.16	5.18	5.34	0.91	1.72	2.63
		Avg* OA	0.04	0.45	0.49	0.14	0.48	0.62	0.02	0.65	0.67	0.11	0.21	0.33
S.F	B	Total	2.91	6.80	9.71	4.25	5.46	9.71	5.34	7.61	12.95	7.18	15.68	22.86
		Avg* OA	0.36	0.85	1.21	0.53	0.68	1.21	0.67	0.95	1.62	0.45	0.98	1.43
	NB	Total	1.94	9.06	11.01	2.23	9.91	12.14	2.27	8.66	10.93	2.43	22.25	24.68
		Avg* OA	0.24	1.13	1.38	0.28	1.24	1.52	0.28	1.08	1.37	0.15	1.39	1.54
Med. F	B	Total	5.99	13.43	19.42	6.88	12.95	19.83	7.28	17.16	24.44	7.49	12.34	19.83
		Avg* OA	0.75	1.68	2.43	0.86	1.62	2.48	0.91	2.14	3.06	0.94	1.54	2.48
	NB	Total	5.10	12.95	18.05	2.23	21.24	23.47	5.18	22.01	27.19	3.03	15.93	18.97
		Avg* OA	0.64	1.62	2.26	0.28	2.66	2.93	0.65	2.75	3.40	0.38	1.99	2.37
Big.F	B	Total	9.06	33.18	42.25	16.18	22.25	38.44	12.46	25.25	37.71	-	-	-
		Avg* OA	1.13	4.15	5.28	2.02	2.78	4.80	1.56	3.16	4.71	-	-	-
	NB	Total	6.80	26.87	33.67	6.47	31.36	37.83	17.80	43.05	60.86	-	-	-
		Avg* OA	0.85	3.36	4.21	0.81	3.92	4.73	2.23	5.38	7.61	-	-	-
All	B	Total	19.42	58.03	77.45	28.32	45.11	73.43	28.97	52.60	81.58	15.78	30.55	46.33
		Avg* OA	0.61	1.81	2.42	0.89	1.41	2.29	0.91	1.64	2.55	0.49	0.95	1.45
	NB	Total	14.16	52.44	66.61	12.04	66.35	78.39	25.41	78.91	104.32	6.37	39.90	46.28
		Avg* OA	0.44	1.64	2.08	0.38	2.07	2.45	0.79	2.47	3.26	0.20	1.25	1.45

Avg*= Average operated Area per HHs.
B=Beneficiary, NB=Non-beneficiary.
M.F=Marginal farmers (Below 1Ha.),S.F=Small farmers(1-2 Ha.),Med.F=Mediumfarmers (2-4 Ha.),
Big.F =Big farmers(4 Ha.& Above),LL=Landless farmers. I=Irrigable,U=Unirrigable,T=I+U.
Note:-Data for 32 sample HHs (Excluding LL HHs.) for each sample watershed.
Source:-Field Survey

Table 24: Land use pattern of sample households in selected watersheds

Source:-Field Survey. Name of watersheds	B/NB	% of Land Holding Size					Avg.Land holding per HHs. (Ha.)
		Own Land			LI/MI	Leased out	
		Culti. Land	Fallow Per.	Culti. Fallow			
Kirap	B	97.70	0.21	-	2.09	-	2.42
	NB	96.84	-	-	3.16	-	2.08
Sakariya	B	97.80	1.10	1.10	-	-	2.29
	NB	90.97	-	9.03	-	-	2.45
Modak-VI	B	97.22	-	0.79	1.98	-	2.55
	NB	100.00	-	-	-	-	3.26
Dhar	B	70.09	29.91	-	-	-	1.45
	NB	59.67	40.33	-	-	-	1.45
All	B	93.00	5.32	0.52	1.16	-	2.18
	NB	90.58	6.31	2.40	0.71	-	2.31

B= Beneficiary, NB=Non beneficiary
LI= Leased in,MI=Mortgaged in.

Table 25: Crop pattern of sample households in Kirap watershed (2001-02 and 2006-07)

Crop pattern	Beneficiary						Non-Beneficiary					
	2001-02			2006-07			2001-02			2006-07		
	Area (Ha.)	% to GCA	Irri. %	Area (Ha.)	% to GCA	Irri. %	Area (Ha.)	% to GCA	Irri. %	Area (Ha.)	% to GCA	Irri. %
Maize	27.19	29.34	-	23.07	23.93	-	22.98	29.34	-	22.17	27.08	-
Jowar	11.49	12.40	-	16.67	17.30	-	7.28	9.30	-	8.90	10.87	-
Bajra	30.51	32.93	-	28.97	30.06	-	27.35	34.92	-	27.35	33.40	-
Udad	3.88	4.19	-	3.24	3.36	-	3.24	4.13	-	3.56	4.35	-
Moong	2.43	2.62	-	3.08	3.19	5.20	5.75	7.33	-	4.61	5.63	-
Soyabean	-	-	-	-	-	-	-	-	-	-	-	-
Ground nut	-	-	-	-	-	-	-	-	-	-	-	-
Sesamum	-	-	-	-	-	-	-	-	-	-	-	-
Jowar fodder	-	-	-	-	-	-	-	-	-	-	-	-
Other Crops	-	-	-	1.13	1.18	-	-	-	-	-	-	-
Total Kharif	75.51	81.48	-	76.16	79.01	0.21	66.61	85.02	-	66.61	81.32	-
Rabi crops												
Wheat	10.20	11.00	100.00	11.90	12.34	100.00	9.63	12.29	100.00	10.44	12.75	100.00
Barley	1.46	1.57	100.00	2.35	2.43	100.00	-	-	-	1.62	1.98	100.00
Gram	5.50	5.94	2.94	5.99	6.21	-	2.10	2.69	-	3.24	3.95	-
Rapeseed	-	-	-	-	-	-	-	-	-	-	-	-
Coriander	-	-	-	-	-	-	-	-	-	-	-	-
Other Crops	-	-	-	-	-	-	-	-	-	-	-	-
Total Rabi	17.16	18.52	68.87	20.23	20.99	70.40	11.73	14.98	82.07	15.30	18.68	78.84
Gross Cropped Area (GCA)	92.66	100.00	12.75	96.39	100.00	14.94	78.34	100.00	12.29	81.90	100.00	14.72

Table 26: Crop pattern of sample households in Sakariya watershed (2001-02 and 2006-07)

Crop pattern	Beneficiary						Non-Beneficiary					
	2001-02			2006-07			2001-02			2006-07		
	Area (Ha.)	% to GCA	Irri. %	Area (Ha.)	% to GCA	Irri. %	Area (Ha.)	% to GCA	Irri. %	Area (Ha.)	% to GCA	Irri. %
Kharif crops												
Maize	15.48	16.12	-	14.46	13.24	-	25.19	26.57	-	23.06	24.15	-
jowar	-	-	-	-	-	-	-	-	-	0.10	0.11	-
Bajra	-	-	-	-	-	-	-	-	-	-	-	-
Udad	4.45	4.64	-	3.44	3.15	-	0.61	0.64	-	1.72	1.80	-
Moong	-	-	-	-	-	-	-	-	-	-	-	-
soyabean	45.21	47.10	0.67	48.15	44.07	1.25	40.76	43.01	-	40.66	42.58	-
Ground nut	2.63	2.74	-	4.96	4.54	-	3.14	3.31	-	2.83	2.97	-
Sesamum	-	-	-	-	-	-	0.81	0.85	-	0.71	0.74	-
Jowar fodder	-	-	-	-	-	-	1.62	1.71	-	2.43	2.54	-
Other Crops	-	-	-	-	-	-	-	-	-	-	-	-
Total Kharif	67.77	70.60	0.45	71.01	65.00	0.84	72.12	76.09	-	71.51	74.89	-
Rabi crops												
Wheat	12.64	13.17	100.00	16.29	14.91	100.00	9.10	9.61	100.00	8.29	8.69	100.00
Barley	-	-	-	-	-	-	-	-	-	-	-	-
Gram	10.01	10.43	-	11.43	10.46	-	13.15	13.87	-	13.45	14.09	-
Rapeseed	2.83	2.95	100.00	5.26	4.81	100.00	0.20	0.21	100.00	2.02	2.12	100.00
Coriander	-	-	-	-	-	-	-	-	-	-	-	-
Other Crops	2.73	2.85	100.00	5.26	4.81	100.00	0.20	0.21	100.00	0.20	0.21	100.00
Total Rabi	28.22	29.40	64.52	38.23	35.00	70.11	22.66	23.91	41.96	23.97	25.11	43.88
Gross Cropped Area (GCA)	95.99	100.00	19.28	109.24	100.00	25.09	94.78	100.00	10.03	95.49	100.00	11.02

Source:- Field survey.

Table 27: Crop pattern of sample households in Modak-VI watershed (2001-02 and 2006-07)

Crop pattern	Beneficiary						Non-Beneficiary					
	2001-02			2006-07			2001-02			2006-07		
	Area (Ha.)	% to GCA	Irri. %	Area (Ha.)	% to GCA	Irri. %	Area (Ha.)	% to GCA	Irri. %	Area (Ha.)	% to GCA	Irri. %
Kharif crops												
Maize	25.09	23.90	-	23.15	19.30	-	26.14	20.38	-	27.44	20.86	-
Jowar	4.05	3.86	-	3.40	2.83	-	12.79	9.97	-	11.17	8.49	-
Bajra			-			-			-			-
Udad	6.88	6.55	-	8.09	6.75	-	12.63	9.84	-	17.97	13.66	-
Moong	-	-	-	-	-	-	-	-	-	-	-	-
Soyabean	39.33	37.47	-	42.08	35.09	-	46.13	35.96	-	42.89	32.62	-
Ground nut	0.32	0.31	-	0.32	0.27	-	3.08	2.40	-	1.29	0.98	-
Sesamum	-	-	-	-	-	-	-	-	-	-	-	-
Jowar fodder	-	-	-	-	-	-	-	-	-	-	-	-
Other Crops	-	-	-	3.56	2.97	-	-	-	-	0.32	0.25	-
Total Kharif	75.67	72.09	-	77.05	64.24	-	100.76	78.55	-	100.76	76.62	-
Rabi crops												
Wheat	8.82	8.40	100.00	12.95	10.80	100.00	9.23	7.19	100.00	10.20	7.75	100.00
Barley	-	-	-	-	-	-	-	-	-	-	-	-
Gram	1.29	1.23	-	5.02	4.18	-	-	-	-	-	-	-
Rapeseed	2.75	2.62	100.00	5.83	4.86	100.00	4.53	3.53	100.00	6.15	4.68	100.00
Coriander	16.43	15.65	17.24	19.10	15.92	45.76	13.27	10.35	36.59	13.92	10.58	46.51
Other Crops	-	-	-	-	-	-	0.49	0.38	100.00	0.49	0.37	100.00
Total Rabi	29.30	27.91	49.17	42.89	35.76	64.15	27.52	21.45	69.41	30.75	23.38	75.79
Gross Cropped Area (GCA)	104.97	100.00	13.72	119.94	100.00	22.94	128.27	100.00	14.89	131.51	100.00	17.72

Source:- Field survey.

Table 28: Crop pattern of sample households in Dhar watershed (2001-02 and 2006-07)

Crop pattern	Beneficiary						Non-Beneficiary					
	2001-02			2006-07			2001-02			2006-07		
	Area (Ha.)	% to GCA	Irri. %	Area (Ha.)	% to GCA	Irri. %	Area (Ha.)	% to GCA	Irri. %	Area (Ha.)	% to GCA	Irri. %
Kharif crops												
Maize	26.86	57.97	17.33	25.19	47.98	20.88	26.20	87.21	3.09	25.29	80.39	3.20
Jowar	-	-	-	-	-	-	-	-	-	-	-	-
Bajra	-	-	-	-	-	-	-	-	-	-	-	-
Udad	2.43	5.24	4.17	3.84	7.32	13.27	0.61	2.02	-	1.42	4.50	-
Moong	-	-	-	0.46	0.87	-	-	-	-	-	-	-
Soyabean	-	-	-	-	-	-	-	-	-	-	-	-
Ground nut	-	-	-	-	-	-	-	-	-	-	-	-
Sesamum	0.96	2.07	10.53	1.67	3.18	30.56	-	-	-	-	-	-
Jowar fodder	-	-	-	-	-	-	-	-	-	-	-	-
Other Crops	1.62	3.49	100.00	1.42	2.70	100.00	-	-	-	-	-	-
Total Kharif	30.24	65.28	16.05	31.15	59.34	20.13	26.80	89.23	3.02	26.70	84.89	3.03
Rabi crops												
Wheat	7.49	16.16	100.00	11.18	21.29	100.00	2.83	9.43	100.00	4.45	14.15	100.00
Barley	-	-	-	0.05	0.10	-	-	-	-	-	-	-
Gram	6.57	14.19	6.15	7.03	13.39	5.76	0.40	1.35	-	0.20	0.64	-
Rapeseed	2.02	4.37	50.00	3.09	5.88	40.98	-	-	-	-	-	-
Coriander	-	-	-	-	-	-	-	-	-	-	-	-
Other Crops	-	-	-	-	-	-	-	-	-	0.10	0.32	-
Total Rabi	16.08	34.72	55.35	21.34	40.66	60.19	3.24	10.77	87.50	4.75	15.11	93.62
Gross Cropped Area (GCA)	46.33	100.00	29.69	52.50	100.00	36.41	30.04	100.00	12.12	31.46	100.00	16.72

Source:- Field survey.

Table 31: Cropping intensity of sample households in selected watersheds

(Area in ha)

Items	B/ NB	Kirap		Sakeriya		Modak-VI		Dhar	
		2001-02	2006-07	2001-02	2006-07	2001-02	2006-07	2001-02	2006-07
Net cropped Area	B	75.67	75.67	71.81	71.81	79.71	79.71	32.37	32.47
	NB	64.51	64.51	71.31	71.31	104.32	104.32	27.51	27.61
Gross Cropped Area	B	92.66	96.39	95.99	109.24	104.97	119.94	46.33	52.50
	NB	78.34	81.90	94.78	95.49	128.27	131.51	30.04	31.46
Cropping Intensity (%)	B	122.45	127.38	133.67	152.12	131.69	150.47	143.13	161.69
	NB	121.44	126.96	132.91	133.91	122.96	126.06	109.20	113.94

B=Beneficiary,NB=Non-beneficiary
Source:- Field Survey

Table 32: Crop-wise changes in cost of cultivation in Kirap watershed

(Cost of cultivation Rs. /ha.)

Crops	Beneficiary			Non-Beneficiary		
	2001-02	2006-07	Change in %	2001-02	2006-07	Change in %
Maize	5193.69	8808.40	69.60	5408.81	7642.89	41.30
Jowar	5485.60	7064.79	28.79	5412.37	7763.45	43.44
Wheat	8092.63	12749.79	57.55	8022.68	10733.60	33.79
Barley	7460.13	11725.18	57.17	-	8946.80	N.A
Udad	4343.56	6737.59	55.12	4488.22	7571.83	68.70
Moong	5856.62	8424.02	43.84	5357.38	8234.56	53.71
Gram	5489.04	8435.97	53.69	5728.31	7341.78	28.17
Bajra	4879.05	7827.65	60.43	5029.15	7289.45	44.94
Cotton	-	13820.79	N.A	-	-	N.A
All Crops	5488.74	8716.00	58.80	5567.92	7976.03	43.25

Change in percentage denote change in 2006-07 over 2001-02.
N.A=Not applicable. Source:- Field Survey

Table 33: Crop-wise changes in cost of cultivation in Sakariya watershed

(Cost of cultivation Rs. /ha.)

Crops	Beneficiary			Non-Beneficiary		
	2001-02	2006-07	Change in %	2001-02	2006-07	Change in %
Maize	4905.77	8701.31	77.37	4339.89	7821.46	80.22
Wheat	6460.53	7938.99	22.88	6785.78	9919.90	46.19
Udad	4663.17	5896.60	26.45	5700.12	6323.24	10.93
Gram	4283.08	5584.80	30.39	3558.46	5059.00	42.17
Soyabean	5822.94	8908.91	53.00	4630.80	9499.54	105.14
Groundnut	5101.02	8246.07	61.66	5238.84	9831.64	87.67
Rapseed	7920.86	6631.71	-16.28	6857.44	7660.56	11.71
Sesamum	-	-	-	2502.04	4726.96	88.92
Methi	4759.14	5440.83	14.32	-	-	N.A
Garlic	-	12138.29	N.A	-	-	N.A
Isabgul	6113.62	4790.23	-21.65	7215.76	6585.61	-8.73
Jowar	-	-	N.A	-	10625.94	N.A
Jowar Fodder	-	-	N.A	4170.06	5644.52	35.36
All Crops	5568.00	7993.66	43.56	4622.90	8332.90	80.25

Change in percentage denote change in 2006-07 over 2001-02
N.A=Not applicable. Source:- Field Survey.

Table 34: Crop-wise changes in cost of cultivation in Modak-VI watershed

(Cost of cultivation Rs. /Ha.)

Crops	Beneficiary			Non-Beneficiary		
	2001-02	2006-07	Change in %	2001-02	2006-07	Change in %
Maize	5328.04	7941.38	49.05	4790.28	7752.05	61.83
Jowar	5047.08	6419.50	27.19	4281.19	6828.87	59.51
Wheat	7006.05	11288.21	61.12	7096.10	11220.78	58.13
Udad	5012.01	8598.12	71.55	4912.99	6932.51	41.11
Gram	4957.74	5436.53	9.66	-	-	N.A
Soyabean	6181.63	9283.15	50.17	5580.64	8837.20	58.35
Groundnut	5875.84	8957.92	52.45	5272.65	9041.32	71.48
Sesamum	-	9711.62	N.A	-	-	N.A
Rapseed	5250.47	6484.36	23.5	4741.08	6330.37	33.52
Coriander	4456.22	7037.40	57.92	4538.48	7218.05	59.04
Ashwagandha	-	7733.57	N.A	-	8377.20	N.A
Other Crops	-	-	N.A	4703.42	7479.35	59.02
All Crops	5630.86	8349.89	48.29	5185.13	8088.83	56.00

Change in percentage denote change in 2006-07 over 2001-02
N.A=Not applicable. Source:- Field Survey.

Table 35: Crop-wise changes in cost of cultivation in Dhar watershed

(Cost of cultivation Rs./ ha.)

Crops	Beneficiary			Non-Beneficiary		
	2001-02	2006-07	Change in %	2001-02	2006-07	Change in %
Maize	4647.10	8018.55	72.55	4584.60	8510.27	85.63
Peddy	5816.47	9268.58	59.35	-	-	N.A
Wheat	5551.40	9616.30	73.22	4400.41	8658.01	96.75
Berley	-	7512.29	N.A	-	-	N.A
Udad	4573.69	9358.50	104.62	5312.97	8709.04	63.92
Moong	-	7375.01	N.A	-	-	N.A
Gram	3901.75	8143.32	108.71	4262.73	6424.99	50.72
Sesamum	5082.76	10219.40	101.06	-	-	N.A
Rapseed	3756.15	8016.25	113.42	-	-	N.A
Other Crops	-	-	N.A	-	6177.87	N.A
All Crops	4691.92	8538.09	81.97	4577.66	8519.15	86.10

Change in percentage denote change in 2006-07 over 2001-02
N.A=Not applicable. Source:- Field Survey.

Table 36: Input-wise cost/ha of cropped area (Kirap)

(Cost in Rs./ha)

Sr.No.	Items	2001-02		2006-07		Change over 2001-02	
		B	NB	B	NB	B	NB
1	Seed	243	229	404	338	161	109
	%	4.43	4.11	4.63	4.24	4.98	4.53
2	Fym	519	627	599	749	80	122
	%	9.47	11.26	6.87	9.39	2.47	5.07
3	Chem. Fert.	101	134	270	289	169	155
	%	1.84	2.41	3.10	3.62	5.22	6.44
4	Pesti cides	34	65	89	101	55	36
	%	0.62	1.17	1.02	1.27	1.70	1.50
5	Irri.(Inclu.own)	89	113	139	139	50	26
	%	1.62	2.03	1.59	1.74	1.55	1.08
6	Hired/own machinery	875	958	1170	1226	295	268
	%	15.96	17.21	13.42	15.37	9.12	11.13
7	Bullock Labour	971	1162	1187	1346	216	184
	%	17.72	20.87	13.62	16.88	6.67	7.64

Note:- % denote percentage share of respective items in total cost.
B= Beneficiary, NB=Non-beneficiary
Source:- Field Survey

Table 37: Input-wise cost/ha of cropped area (Sakariya)

(Cost in Rs./ha)

Sr.No.	Items	2001-02		2006-07		Change over 2001-02	
		B	NB	B	NB	B	NB
1	Seed	473	413	860	1143	387	730
	%	8.49	8.93	10.76	13.72	15.95	19.69
2	Fym	465	399	524	618	59	219
	%	8.36	8.64	6.56	7.42	2.43	5.91
3	Chem. Fert.	148	208	512	379	364	171
	%	2.66	4.50	6.41	4.55	15.00	4.61
4	Pesti cides	121	83	164	129	43	46
	%	2.17	1.80	2.05	1.54	1.78	1.23
5	Irri.(Inclu.own)	127	78	158	121	31	42
	%	2.28	1.69	1.97	1.45	1.28	1.14
6	Hired/own Machinery	419	347	475	474	56	127
	%	7.52	7.51	5.94	5.69	2.32	3.43
7	Bullock Labour	1199	916	1603	1145	404	229
	%	21.53	19.82	20.05	13.74	16.67	6.17
8	Human Labour						
	I) Own Value	1735	1331	2011	2675	275	1344
	%	31.17	28.79	25.15	32.10	11.35	36.23
	II) Hired Value	881	847	1687	1649	806	802
	%	15.82	18.32	21.10	19.78	33.22	21.61
9	Total Cost	5568	4623	7994	8333	2426	3710
	%	100.00	100.00	100.00	100.00	100.00	100.00

Note:- % denote percentage share of respective items in total cost.
B= Beneficiary, NB=Non-beneficiary
Source:- Field Survey

Table 38: Input-wise cost/ha of cropped area (Modak-VI)

(Cost in Rs./ha)

Sr.No.	Items	2001-02		2006-07		Change over 2001-02	
		B	NB	B	NB	B	NB
1	Seed	423	433	676	567	253	134
	%	7.51	8.35	8.09	7.01	9.30	4.62
2	Fym	476	333	556	545	80	212
	%	8.46	6.42	6.66	6.74	2.93	7.31
3	Chem. Fert.	244	275	389	369	145	94
	%	4.34	5.30	4.66	4.56	5.32	3.23
4	Pesti cides	4	25	106	94	102	68
	%	0.08	0.49	1.27	1.16	3.74	2.36
5	Irri.(Inclu.own)	108	108	186	144	78	35
	%	1.92	2.09	2.22	1.78	2.85	1.22
6	Hired/own Machinery	592	618	633	769	41	151
	%	10.51	11.93	7.58	9.51	1.51	5.20
7	Bullock Labour	1473	1257	2132	1790	659	534
	%	26.16	24.24	25.53	22.13	24.24	18.37
8	Human Labour						
	I) Own Value	1568	1362	2389	2408	821	1047
	%	27.84	26.26	28.61	29.77	30.20	36.05
	II) Hired Value	742	774	1284	1403	541	628
	%	13.18	14.93	15.37	17.34	19.91	21.64
9	Total Cost	5631	5185	8350	8089	2719	2904
	%	100.00	100.00	100.00	100.00	100.00	100.00

Note:- % denote percentage share of respective items in total cost.
B= Beneficiary, NB=Non-beneficiary
Source:- Field Survey

Table 39: Input-wise cost/ha of cropped area (Dhar)

(Cost in Rs./ha)

Sr.No.	Items	2001-02		2006-07		Change over 2001-02	
		B	NB	B	NB	B	NB
1	Seed	308	201	398	255	90	54
	%	6.56	4.40	4.66	3.02	2.34	1.39
2	Fym	591	798	577	955	-14	156
	%	12.60	17.44	6.76	11.28	-0.36	4.02
3	Chem. Fert.	86	60	261	122	175	61
	%	1.82	1.32	3.05	1.44	4.56	1.58
4	Pesti cides	N.A	N.A	N.A	N.A	N.A	N.A
	%						
5	Irri.(Inclu.own)	108	18	228		120	-18
	%	2.30	0.40	2.67	0.00	3.12	-0.47
6	Hired/own Machinery	29		81	3	53	3
	%	0.61	0.00	0.95	0.04	1.37	0.08
7	Bullock Labour	1450	1433	2858	3085	1408	1652
	%	30.90	31.31	33.47	36.46	36.61	42.53
8	Human Labour						
	I) Own Value	1403	1468	2739	2860	1336	1393
	%	29.90	32.06	32.08	33.80	34.74	35.85
	II) Hired Value	718	598	1397	1182	678	584
	%	15.31	13.07	16.36	13.97	17.63	15.02
9	Total Value	4692	4578	8538	8462	3846	3885
	%	100.00	100.00	100.00	100.00	100.00	100.00

Note:- % denote percentage share of respective items in total cost.
B= Beneficiary, NB=Non-beneficiary
Source:- Field Survey

Table40: Yield of main crops in selected watersheds

Yield in Qtl/Ha

Crop	B / NB	Kirap				Sakariya				Modak-VI				Dhar			
		Yield (Qtl. / Ha)				Yield (Qtl. / Ha)				Yield (Qtl. / Ha)				Yield (Qtl. / Ha)			
		2001-02	2006-07	Change over 2001-02		2001-02	2006-07	Change over 2001-02		2001-02	2006-07	Change over 2001-02		2001-02	2006-07	Change over 2001-02	
				Actual	%			Actual	%			Actual	%			Actual	%
Maize	B	21.55	26.66	5.11	23.73	12.92	19.77	6.85	53.00	23.50	30.24	6.75	28.71	15.77	20.80	5.04	31.93
	NB	21.95	26.11	4.16	18.96	10.94	15.65	4.71	43.10	22.57	26.39	3.82	16.92	15.08	17.02	1.95	12.91
Jowar	B	12.79	16.02	3.22	25.20	-	-	-	-	12.85	24.42	11.57	90.02	-	-	-	-
	NB	12.63	17.52	4.89	38.74	-	4.94	4.94	NA	13.76	13.07	-0.69	-5.02	-	-	-	-
Bajra	B	27.01	33.24	6.23	23.07	-	-	-	-	-	-	-	-	-	-	-	-
	NB	26.58	30.89	4.31	16.23	-	-	-	-	-	-	-	-	-	-	-	-
Udad	B	5.66	8.96	3.33	58.18	11.23	15.56	4.32	38.47	6.25	9.33	3.08	49.24	5.66	8.77	3.10	54.79
	NB	6.18	7.86	1.66	27.27	9.89	12.21	2.33	23.53	5.41	9.07	3.66	67.70	9.89	10.59	0.71	7.14
Moong	B	5.77	7.80	2.04	35.34	-	-	-	-	-	-	-	-	0.00	12.08	12.08	NA
	NB	6.53	7.37	0.84	12.94	-	-	-	-	-	-	-	-	-	-	-	-
Soyabean	B	-	-	-	-	8.46	11.98	3.52	41.66	11.14	12.81	1.67	15.01	-	-	-	-
	NB	-	-	-	-	8.91	10.78	1.87	21.02	9.71	12.17	2.46	25.21	-	-	-	-
Groundnut	B	-	-	-	-	9.13	12.61	3.48	38.18	7.55	12.36	4.81	63.64	-	-	-	-
	NB	-	-	-	-	11.48	12.71	1.33	10.71	7.64	10.43	2.78	36.44	-	-	-	-
Wheat	B	45.99	56.65	10.66	23.18	18.59	26.22	7.63	41.07	29.81	41.39	11.58	38.84	13.89	17.85	3.95	28.46
	NB	38.63	45.02	6.39	16.55	15.60	22.67	7.07	45.31	28.94	37.85	8.91	30.80	11.82	14.04	2.21	18.72
Gram	B	9.45	17.53	8.08	85.55	9.14	12.42	3.29	35.96	10.43	12.36	1.93	18.52	9.81	12.82	3.01	30.65
	NB	12.36	9.58	-2.78	-22.50	8.94	9.29	0.36	3.98	-	-	-	-	4.94	9.89	4.94	100.00
Barley	B	35.35	54.96	19.61	55.47	-	-	-	-	-	-	-	-	0.00	4.94	4.94	NA
	NB	0.00	46.91	46.91	NA	-	-	-	-	-	-	-	-	-	-	-	-
Rapeseed	B	-	-	-	-	7.59	13.88	6.29	82.83	26.53	30.72	4.19	15.79	9.39	8.49	-0.90	-9.58
	NB	-	-	-	-	4.94	8.90	3.95	80.00	25.82	26.83	1.01	3.91	-	-	-	-
Coriander	B	-	-	-	-	-	-	-	-	13.51	22.78	9.26	68.55	-	-	-	-
	NB	-	-	-	-	-	-	-	-	13.11	17.03	3.92	29.90	-	-	-	-
Isabgul	B	-	-	-	-	4.94	14.26	9.32	188.46	-	-	-	-	-	-	-	-
	NB	-	-	-	-	4.94	9.89	4.94	100.00	-	-	-	-	-	-	-	-

Source:- Field Survey, B=Beneficiary, NB=Non-beneficiary

Table41: Crop-wise production / ha of by-product of major crops

Yield in Qtl/Ha

Crop	B / NB	Production per Hec in Qtl															
		Kirap				Sakariya				Modak-VI				Dhar			
		2001-02	2006-07	Change*		2001-02	2006-07	Change*		2001-02	2006-07	Change*		2001-02	2006-07	Change*	
				Actual	%			Actual	%			Actual	%			Actual	%
Maize	B	26.85	32.78	5.93	22.09	30.98	38.44	7.46	24.06	33.88	45.36	11.48	33.90	31.43	40.08	8.65	27.53
	NB	28.00	32.02	4.02	14.36	22.59	28.01	5.42	23.99	31.45	37.91	6.46	20.55	29.09	35.12	6.03	20.73
Jowar	B	38.90	52.54	13.65	35.09	-	-	-	-	21.75	45.01	23.27	106.98	-	-	-	-
	NB	38.85	51.45	12.59	32.41	-	14.83	14.83	NA	23.77	22.30	-1.48	-6.24	-	-	-	-
Bajra	B	36.35	45.15	8.80	24.20	-	-	-	-	-	-	-	-	-	-	-	-
	NB	35.86	39.63	3.77	10.50	-	-	-	-	-	-	-	-	-	-	-	-
Barley	B	41.19	63.49	22.30	54.14	-	-	-	-	-	-	-	-	-	29.66	29.66	NA
	NB	-	58.07	58.07	NA	-	-	-	-	-	-	-	-	-	-	-	-
Wheat	B	52.56	63.80	11.24	21.38	24.91	34.48	9.75	38.40	36.73	45.33	8.60	23.42	22.11	28.13	6.02	27.22
	NB	46.73	52.39	5.67	12.13	23.89	33.40	9.50	39.78	37.50	40.60	3.10	8.26	20.66	23.70	3.05	14.76
Soyabean	B	-	-	-	-	12.78	16.45	3.67	28.68	13.93	14.54	0.61	4.38	-	-	-	-
	NB	-	-	-	-	12.29	14.62	2.33	18.96	12.14	13.80	1.66	13.69	-	-	-	-
Groundnut	B	-	-	-	-	16.73	20.38	3.65	21.80	10.98	9.27	-1.72	-15.63	-	-	-	-
	NB	-	-	-	-	20.09	21.89	1.80	8.96	9.43	9.27	-0.16	-1.72	-	-	-	-
Gram	B	9.81	15.36	5.55	56.56	-	-	-	-	-	-	-	-	-	-	-	-
	NB	12.36	10.19	-2.16	-17.50	-	-	-	-	-	-	-	-	-	-	-	-
All Crops	B	32.34	41.77	9.43	29.17	15.50	19.07	3.58	23.08	14.75	19.42	4.68	31.71	23.01	27.29	4.29	18.63
	NB	31.31	36.60	5.29	16.91	14.41	16.99	2.58	17.94	16.07	17.51	1.45	9.01	27.61	32.36	4.75	17.20

Source:- Field Survey, B=Beneficiary, NB=Non-beneficiary

*Change denote change in production in 2006-07 over 2001-02

Table 42: Average farm harvest price (Rs./Qt.) of main product of the major crops (2001-02 and 2006-07)

Crop	Kirap			Sakariya			Modak-VI			Dhar		
	2001-02	2006-07	Change Actual	2001-02	2006-07	Change Actual	2001-02	2006-07	Change Actual	2001-02	2006-07	Change Actual
Maize												
Jowar	613	732	119 (19.41)	-	-	-	696	970	274 (39.37)	-	-	-
Bajra	554	673	119 (21.48)	-	-	-	-	-	-	-	-	-
Barley	909	1200	291 (32.01)	-	-	-	-	-	-	0	1100	1100 (N.A)
Wheat	820	1146	326 (39.76)	675	941	266 (39.41)	671	1054	383 (57.08)	825	1014	189 (22.91)
Soyabean	-	-	-	943	1465	522 (55.36)	1456	2235	779 (53.50)	-	-	-
Groundnut	-	-	-	1273	1879	606 (47.60)	1414	2000	586 (41.44)	-	-	-
Gram	2121	2549	428 (20.18)	-	-	-	1500	2187	687 (45.80)	1444	1619	175 (12.12)

Source:- Field survey
Note:-Figures in bracket denote percentage change in 2006-07 over 2001-02.

Table 45: Disposal of main product of major crops in selected watersheds

(% of disposal)

Crops	B/NB	Kirap		Sakariya		Modak-VI		Dhar	
		2001-02	2006-07	2001-02	2006-07	2001-02	2006-07	2001-02	2006-07
Maize	B	54.10	55.28	12.00	17.83	35.11	42.00	58.80	64.69
	NB	57.88	56.65	27.95	25.35	44.41	46.69	57.97	64.00
Jowar	B	63.27	64.79	-	-	48.08	39.76	-	-
	NB	70.65	67.31	-	-	46.02	56.16	-	-
Bajra	B	59.47	65.11	-	-	-	-	-	-
	NB	62.45	62.37	-	-	-	-	-	-
Barley	B	54.37	35.66	-	-	-	-	-	80.00
	NB	-	48.68	-	-	-	-	-	-
Wheat	B	47.33	54.30	18.72	28.57	12.55	36.19	36.54	41.10
	NB	43.55	50.43	27.11	22.61	35.21	33.16	35.82	25.60
Soyabean	B	-	-	84.05	86.31	85.16	89.98	-	-
	NB	-	-	87.13	92.70	92.86	89.85	-	-
Groundnut	B	-	-	72.92	77.60	54.55	75.00	-	-
	NB	-	-	75.00	86.11	72.34	74.07	-	-
Gram	B	71.15	80.00	87.98	85.56	51.85	90.32	68.22	84.91
	NB	76.92	87.10	93.19	93.20	-	-	50.00	75.00
All Crops	B	55.96	59.66	54.69	60.42	56.77	66.43	55.43	61.28
	NB	58.43	59.13	57.21	55.69	64.63	65.76	56.47	59.86

Note:- Disposal is shown as % to total production, B=Beneficiary, NB=Non-beneficiary.
Source:- Field Survey

Table43: The value of gross produce (MP + BP) / hectare

Value in Rs.

Crop	B / NB	The value (Rs / Hect.) of Gross Produce (MP + BP)															
		Kirap				Sakariya				Modak-VI				Dhar			
		2001-02	2006-07	Change		2001-02	2006-07	Change		2001-02	2006-07	Change		2001-02	2006-07	Change	
				Actual	%			Actual	%			Actual	%			Actual	%
Maize	B	17573	28251	10768	60.76	10420	25095	14675	140.84	18545	30501	11956	64.47	15418	27272	11855	76.89
	NB	17984	27651	9667	53.75	8387	19393	11006	131.24	17695	26347	8652	48.89	14617	22701	8085	55.31
Jowar	B	13618	22235	8617	63.28	-	-	-	-	13295	34635	21339	160.50	-	-	-	-
	NB	13493	23117	9624	71.32	-	7785	NA	NA	14335	18098	3764	26.26	-	-	-	-
Bajra	B	18516	27781	9265	50.04	-	-	-	-	-	-	-	-	-	-	-	-
	NB	18238	25547	7309	40.08	-	-	-	-	-	-	-	-	-	-	-	-
Barley	B	37275	75591	38316	102.79	-	-	-	-	-	-	-	-	-	10183	NA	NA
	NB	-	65172	NA	NA	-	-	-	-	-	-	-	-	-	-	-	-
Wheat	B	43975	74073	30098	68.44	15589	30145	14556	93.37	24276	50846	26570	109.45	14641	23046	8405	57.41
	NB	37234	59085	21850	58.68	13444	26639	13195	98.15	23769	46353	22584	95.01	12733	18412	5679	44.6
Soyabean	B	-	-	-	-	9456	20217	10761	113.80	18390	31489	13100	71.24	-	-	-	-
	NB	-	-	-	-	9829	18167	8338	84.83	16034	29919	13885	86.60	-	-	-	-
Groundnut	B	-	-	-	-	14598	28434	13837	94.79	12116	26103	13987	115.44	-	-	-	-
	NB	-	-	-	-	18191	28963	10771	59.21	12043	22473	10431	86.61	-	-	-	-
Gram	B	20659	45969	25310	122.52	15214	29536	14323	94.14	15639	27025	11386	72.81	14168	20754	6586	46.49
	NB	26986	25266	-1720	-6.37	14878	22086	7208	48.45	-	-	-	-	7138	16006	8868	124.2
All Crops	B	20633	35788	15155	73.45	11842	25013	13170	111.21	20962	57778	36815	175.62	14751	24180	9429	63.92
	NB	20167	30638	10471	51.92	10854	20318	9464	87.20	18307	39865	21558	117.76	14402	22197	7796	54.13

Source:- Field Survey, N.A= Not Applicable, B=Beneficiary, NB=Non-beneficiary

Table44: Net farm income per hectare and output-input value rastios for selected watersheds

Sl.No	Particulars	B / NB	Kirap			Sakariya			Modak-VI			Dhar		
			2001-02	2006-07	% increase over 2001-02	2001-02	2006-07	% increase over 2001-02	2001-02	2006-07	% increase over 2001-02	2001-02	2006-07	% increase over 2001-02
1	Per Hect. Of GCA i)Gross Value of Production (Rs) (MP + BP)	B	20633	35788	70.45	11482	25013	111.21	20962	57778	175.62	14751	24180	63.92
		NB	20167	30638	51.92	10854	20318	87.20	18307	39865	117.76	14402	22197	54.13
	ii)Cost of Cultivation (Rs)	B	5489	8716	58.80	5568	7994	43.56	5631	8350	48.29	4692	8538	81.97
		NB	5568	7976	43.25	4623	8333	80.45	5185	8089	56.00	4578	8519	86.10
	iii)Net Farm Income (Rs) [(i) – (ii)]	B	15144	27072	78.76	5914	17019	187.77	15331	49428	222.41	10059	15642	55.51
		NB	14599	22662	55.23	6231	11985	92.30	13122	31776	142.16	9824	13678	39.23
2	Net Farm Income Per Hect. of NCA (Rs)	B	18544	34484	85.96	7905	25889	227.50	20189	74374	268.39	14397	25292	75.68
		NB	17729	28772	62.29	8282	16049	93.78	16135	40057	148.26	10728	15585	45.27
3	Output-Input Ratio	B	3.76 : 1	4.11 : 1	9.30	2.06 : 1	3.13 : 1	51.95	3.72 : 1	6.92 : 1	86.02	3.14 : 1	2.83 : 1	-9.87
		NB	3.62 : 1	3.84 : 1	6.08	2.35 : 1	2.44 : 1	3.83	3.55 : 1	4.93 : 1	39.66	3.15 : 1	2.61 : 1	-17.14

Source:- Field Survey, N.A= Not Applicable, B=Beneficiary, NB=Non-beneficiary

Table 46: Average increase in well's water level in 2006-07 over 2001-02 in selected watersheds

(Increase in feet)

Watersheds	Beneficiary (B)			Non-Beneficiary (NB)			Increase in water level of B Wells over NB (Feet)		
	Increase over 2001-02 (Feet)			Increase over 2001-02 (Feet)					
	Kharif	Rabi	Summer	Kharif	Rabi	Summer	Kharif	Rabi	Summer
Kirap	8.55	6.65	2.16	3.10	2.50	1.43	5.45	4.15	0.73
Sakariya	7.69	6.29	2.66	3.05	2.71	1.73	4.64	3.58	0.93
Modak-VI	7.63	6.16	2.56	3.20	2.96	1.80	4.43	3.20	0.76
Dhar	7.03	4.38	1.88	2.17	2.50	1.27	4.87	1.88	0.62

Source:- Field Survey

Table 47: Activities undertaken by beneficiary on own land under NWDPRA

Items	Unit	Kirap					Sakariya				
		No. of Farmers	Size of work done	Labour contribution (Man-days)	Present position		No. of Farm-ers	Size of work done	Labour cont. (Man-days)	Present position	
					V.G	P.D/ F.D				V.G	P.D/ F.D
Soil bunds	Mtr.	17	900	179	16	1	11	580	165	10	1
Soil stone bunds	Mtr.	7	340	80	7	-	-	-	-	-	-
Farm ponds	Nos.	2	95	40	2	-	-	-	-	-	-
Planting of horticulture tree	Nos.	5	280	19	3	2	3	45	9	2	1
Planting of Agro.Forestry trees	Nos.	18	2345	158	12	6	25	698	182	17	8
Items	Unit	Modak-VI					Dhar				
		No. of Farmers	Size of work done	Labour contribution (Man-days)	Present position		No. of Farmer s	Size of work done	Labour cont. (Man-days)	Present position	
					V.G	P.D/ F.D				V.G	P.D/ F.D
Soil bunds	Mtr.	-	-	-	-	-	-	-	-	-	-
Soil stone bunds	Mtr.	5	230	47	5		31	1650	330	29	2
Farm ponds	Nos.	-	-	-	-	-	-	-	-	-	-
Planting of horticulture tree	Nos.	2	45	12	2		5	115	22	2	3
Planting of Agro.Forestry trees	Nos.	26	865	213	26		15	390	107	10	5

Note:- V.G:-Very good, F.D:-Fully damaged, P.D:-partly damaged, Cont. = Contribution
Source:- Field Survey

Table 48: Survival rate of horticulture plants and trees under NWDPRA

Items	Planted (Nos.)	Survival (Nos.)	Survival Rate (%)	Total Cost (Rs.)	Benefit (Rs.)	Income during 2002-07
Watershed Kirap						
Horticulture						
Amla	180	84	46.67	1980	*	**
Mango	30	1	3.33	360	*	**
Lemon	70	22	31.43	770	*	**
Agro forestry						
Ratanjyot	2345	1179	50.28	14070	*	**
Watershed Sakariya						
Horticulture						
Amla	40	19	47.50	440	*	**
Mango	5	2	40.00	60	*	**
Agro forestry						
Ratanjyot	698	433	62.03	4188	*	**
Watershed Modak-VI						
Horticulture						
Amla	30	17	56.67	330	*	**
Mango	10	7	70.00	120	*	**
Lemon	5	4	80.00	55	*	**
Agro forestry						
Ratanjyot	865	612	70.75	5190	*	**
Watershed Dhar						
Horticulture						
Amla	75	26	34.67	825	*	**
Mango	15	2	13.33	180	*	**
Papita	25	9	36.00	250	*	**
Agro forestry						
Ratanjyot	332	243	73.19	1992	*	**
Neem	14	6	42.86	112	*	**
Bambu	17	8	47.06	119	*	**
Hukashi	14	9	64.29	140	*	**
Others	13	6	46.15	78	*	**

Note:-* Received plant free of cost under NWDPRA.
** Due to gestations period, the production not realised.Hence, no income.
Source:-Field survey.

Table 49: Adoption of improved farming practices by sample households in Kirap watershed

(% of adoption)

Sr. No.	Type of farming practices	Beneficiary			Non Beneficiary		
		Pre-Project 2001-02 %	Post-Project 2006-07 %	Change in % over 2001-02	Pre-Project 2001-02 %	Post-Project 2006-07 %	Change in % over 2001-02
1	Improved /H.Y.V /HB Seed						
2	Seed Treatment	31.25	56.25	25.00	31.25	46.88	15.63
3	F.Y.M use	100.00	100.00	0.00	100.00	100.00	0.00
4	Chem. Fert. Use	68.75	100.00	31.25	56.25	84.38	28.13
5	Bio-Fert. Use	6.25	65.63	59.38	0.00	0.00	0.00
6	Pesticides	37.50	90.63	53.13	31.25	59.38	28.13
7	Improved method for threshing	81.25	93.75	12.50	71.88	81.25	9.38
8	Planting of Horticulture	12.50	31.25	18.75	8.50	13.00	4.50
9	Bunds for Soil-water conservation	9.38	90.63	81.25	10.00	31.00	21.00

Source:-Field Survey
Note:- Figure denote percentage of households who adopted farming practices

Table 50: Adoption of improved farming practices by sample households in Sakariya watershed

(% of adoption)

Sr. No.	Type of farming practices	Beneficiary			Non Beneficiary		
		Pre-Project 2001-02 %	Post-Project 2006-07 %	Change in % over 2001-02	Pre-Project 2001-02 %	Post-Project 2006-07 %	Change in % over 2001-02
1	Improved /H.Y.V /HB Seed	62.50	87.50	25.00	65.63	78.13	12.50
2	Seed Treatment	71.88	84.38	12.50	68.75	78.13	9.38
3	F.Y.M use	100.00	100.00	0.00	100.00	100.00	0.00
4	Chem. Fert. Use	65.63	100.00	34.38	50.00	78.13	28.13
5	Bio-Fert. Use	0.00	40.63	40.63	0.00	0.00	0.00
6	Pesticides	56.25	75.00	18.75	40.63	53.13	12.50
7	Improved method for threshing	78.13	96.88	18.75	56.25	62.50	6.25
8	Planting of Horticulture	28.13	56.25	28.13	25.00	37.50	12.50
9	Bunds for Soil-water conservation	37.50	78.13	40.63	31.25	56.25	25.00

Source:-Field Survey
Note:- Figure denote percentage of households who adopted farming practices

Table 51: Adoption of improved farming practices by sample households in Modak-VI watershed

(% of adoption)

Sr. No.	Type of farming practices	Beneficiary			Non Beneficiary		
		Pre-Project 2001-02 %	Post-Project 2006-07 %	Change in % over 2001-02	Pre-Project 2001-02 %	Post-Project 2006-07 %	Change in % over 2001-02
1	Improved /H.Y.V /HB Seed	71.88	96.88	25.00	65.63	81.25	15.63
2	Seed Treatment	81.25	100.00	18.75	81.25	93.75	12.50
3	F.Y.M use	100.00	100.00	0.00	100.00	100.00	0.00
4	Chem. Fert. Use	84.38	100.00	15.63	81.25	87.50	6.25
5	Bio-Fert. Use	0.00	28.13	28.13	0.00	21.88	21.88
6	Pesticides	40.63	100.00	59.38	43.75	78.13	34.38
7	Improved method for threshing	90.63	100.00	9.38	65.63	68.75	3.13
8	Planting of Horticulture	18.75	50.00	31.25	12.50	25.00	12.50
9	Bunds for Soil-water conservation	37.50	62.50	25.00	31.25	50.00	18.75

Source:-Field Survey
Note:- Figure denote percentage of households who adopted farming practices

Table 52: Adoption of improved farming practices by sample households in Dhar watershed

(% of adoption)

Sr. No.	Type of farming practices	Beneficiary			Non Beneficiary		
		Pre-Project 2001-02 %	Post-Project 2006-07 %	Change in % over 2001-02	Pre-Project 2001-02 %	Post-Project 2006-07 %	Change in % over 2001-02
1	Improved /H.Y.V /HB Seed	43.75	56.25	12.50	37.50	46.88	9.38
2	Seed Treatment	75.00	90.63	15.63	65.63	78.13	12.50
3	F.Y.M use	100.00	100.00	0.00	100.00	100.00	0.00
4	Chem. Fert. Use	37.50	53.13	15.63	12.50	25.00	12.50
5	Bio-Fert. Use	0.00	0.00	0.00	0.00	0.00	0.00
6	Pesticides	0.00	0.00	0.00	0.00	0.00	0.00
7	Improved method for threshing	0.00	0.00	0.00	0.00	0.00	0.00
8	Planting of Horticulture	25.00	46.88	21.88	28.13	31.25	3.12
9	Bunds for Soil-water conservation	9.38	81.25	71.88	6.25	56.25	50.00

Source:-Field Survey

Note:- Figure denote percentage of households who adopted farming practices

Table 53: Changes in livestock position

Type of livestock	Nos. of animals with Beneficiary households															
	Kirap				Sakariya				Modak-VI				Dhar			
	2001-02	2006-07	Change		2001-02	2006-07	Change		2001-02	2006-07	Change		2001-02	2006-07	Change	
			No.	%			No.	%			No.	%			No.	%
Bullocks	17	17	0	0.00	50	51	1	2.00	39	35	-4	-10.26	42	46	4	9.52
Cows	30	36	6	20.00	32	34	2	6.25	42	46	4	9.52	31	36	5	16.13
Cow calf	13	15	2	15.38	11	14	3	27.27	13	21	8	61.54	7	21	14	200.00
Buffaloes	62	66	4	6.45	41	42	1	2.44	38	42	4	10.53	9	12	3	33.33
Buffalo calf	23	28	5	21.74	18	24	6	33.33	14	18	4	28.57	5	7	2	40.00
Goats	219	193	-26	-11.87	65	67	2	3.08	2	2	0	0.00	108	107	-1	-0.93
Sheep	38	45	7	18.42	1	1	0	0.00	-	-	-	-	-	-	-	-
Nos. of animals with Non-beneficiary households																
Bullocks	13	13	0	0.00	44	42	-2	-4.55	26	26	0	0	44	43	-1	-2.27
Cows	20	20	0	0.00	32	34	2	6.25	40	40	0	0	31	36	5	16.13
Cow calf	7	7	0	0.00	8	11	3	37.50	11	19	8	72.73	12	18	6	50.00
Buffaloes	43	46	3	6.98	19	20	1	5.26	32	34	2	6.25	7	7	0	0.00
Buffalo calf	19	23	4	21.05	9	10	1	11.11	14	17	3	21.43	3	5	2	66.67
Goats	112	109	-3	-2.68	63	65	2	3.17	-	-	-	-	91	94	3	3.30
Sheep	30	30	0	0.00	-	-	-	-	-	-	-	-	-	-	-	-

Source:-Field survey

Note:- Change denote change in 2006-07 over 2001-02

Table 54: Changes in stall feeding days in 2006-07 over 2001-02

(per HHs./year days)

Watershed Name	Per Household/Year		After NWDPRA % of Ben. HHs. reporting improvement in		
	Open/Forest Grazing	Stall Feeding	Fodder avail.	Access to CGL.	Livestock health
Kirap					
Beneficiary	-29	29	45.00	42.50	50.00
Non Beneficiary	-12	12	N.A	N.A	N.A
Sakariya					
Beneficiary	-30	30	45.00	47.50	40.00
Non Beneficiary	-10	10	N.A	N.A	N.A
Modak-VI					
Beneficiary	-67	67	52.50	50.00	50.00
Non Beneficiary	-20	20	N.A	N.A	N.A
Dhar					
Beneficiary	-17	17	37.50	35.00	40.00
Non Beneficiary	-10	10	N.A	N.A	N.A

Note:- Avail.=Availability, CGL.=Common Grazing Land.

Note:-N.A.=Not Applicable

Source:-Field Survey

BIHAR

Table 1: Area, population, workers etc. of sample districts

Sl No.	Particulars	Nawada (WS-I)	Kaimur (WS-II)	Aurangabad (WS - III)	Rohtas (WS - IV)	Bihar
1.	Total Geographical Area (Sq. Kms)	2494 (2.65%)	3362 (3.57%)	3305 (3.51%)	3851 (4.09%)	94163 (100.00)
2.	Population	1809696 (2.18%)	1289074 (1.55%)	2013055 (2.43%)	2450748 (2.95%)	82998509 (100.00)
3.	Dencity/Sq Km	726.00	382.00	607.00	636.00	880.00
4.	Rural Population (%)	92.60	96.80	91.60	86.70	89.50
5.	Sex Ratio	946.00	902.00	934.00	909.00	919.00
6.	% of SC Population	24.10	22.20	23.50	18.10	15.70
7.	% of ST Population	0.10	2.80	0.10	1.00	0.90
8.	% of Ministry Population	11.30	9.50	9.70	10.10	16.60
9.	Literacy (%)	46.80	55.10	57.00	61.30	47.00
10.	Male Literacy (%)	60.60	69.70	71.10	75.30	59.70
11.	Female Literacy (%)	32.20	38.80	41.90	45.70	33.60
12.	Total Workers (%)	37.36	34.41	33.74	30.48	33.88
13.	Cultivator (%)	40.09	33.86	35.56	34.37	29.17
14.	Agril. Lab (%)	40.58	49.02	43.25	39.18	48.18
15.	Workers in Hh Industry (%)	3.67	3.34	4.00	3.69	3.87
16.	Other Workers (%)	15.66	13.77	17.09	22.76	18.78
17.	Annual Rainfall (In mm) 2007	1133.10	1045.60	1092.70	977.10	1506.10
18.	Per capita GDDP (Rs.), 2004-05 at 1999-00 prices, (rank in the state)	4857 (34)	5766 (14)	5463 (19)	7056 (06)	7168

Source: Census 2001 & Bihar through figures -2003, Directorate of Statistics & Evaluation and Economic Survey – 2008-09, Govt. of Bihar

N.B. In parenthesis percentage figures are shown.

Table 2: Land use classification of sample districts 2002-03

(In '000 ha)

Sl No.	Classification of Land	Nawada (WS-I)	Kaimur (WS-II)	Aurangabad (WS - III)	Rohtas (WS - IV)	Bihar
1.	Total Area	249 (100.00)	342 (100.00)	330 (100.00)	391 (100.00)	9360 (100.00)
2.	Forest	64 (25.70)	113 (33.04)	13 (3.94)	67 (17.14)	616 (6.58)
3.	Barren and Uncultivable Land	11	19	17	17	436
4.	Land put to non-agi. Uses	35	33	54	47	1643
	Sub Total	110 (44.18)	165 (48.25)	84 (25.45)	131 (33.50)	2695 (28.79)
5.	Permanent Pasture & other Grazing Land	1 (0.40)	0 (0.00)	1 (0.30)	0 (0.00)	18 (0.19)
6.	Cultivable Waste Other than Fallow Land	1	1	2	1	46
7.	Land Under Miscellaneous tree & groves not including in NAS	0	1	1	3	237
8.	Other Fallow Land	3	6	7	1	133
9.	Current Fallow	22	16	32	1	499
	Sub Total	26 (10.44)	24 (7.02)	42 (12.73)	6 (1.53)	915 (9.78)
10.	Net Area Sown	112 (44.98)	153 (44.73)	199 (6030)	254 (64.96)	5726 (61.18)
11.	Area sown than Once	40	132	87	103	2232
12.	Gross cropped Area	152	185	286	357	7958
13.	Gross Area Irrigated (%)	124 (81.58)	149 (80.54)	229 (80.06)	329 (92.16)	4571 (57.44)
14.	Cropping Intensity (%)	135.71	120.92	143.72	140.55	138.98

Source : Bihar through figures -2003, Directorate of Statistics & Evaluation and Economic Survey – 2008-09, Govt. of Bihar.
N.B. In parenthesis percentage figures are shown.

Table 3: Information regarding village population under selected watersheds

Particulars	Watershed-I (Nawada Dist.)				Watershed-II (Kaimur Dist.)				Watershed-III (Aurangabad Dist.)				Watershed-IV (Rohtas Dist.)				Over all			
	No. of H.H	M	F	Total	No. of H.H	M	F	Total	No. of H.H	M	F	Total	No. of H.H	M	F	Total	No. of H.H	M	F	Total
General	168	590	513	1103	109	371	311	682	135	343	331	674	125	361	326	687	537 (61.37)	1665	1481	3146 (60.42)
SC	32	120	99	219	28	91	96	187	85	217	208	425	46	152	138	290	191 (21.83)	580	541	1121 (21.53)
ST	-	-	-`	-	-	-	-	-	-	-	-	-	05	18	11	29	05 (0.57)	18	11	29 (0.56)
OBC	48	173	140	313	27	99	90	189	15	41	34	75	52	179	155	334	142 (16.33)	492	419	911 (17.49)
All Total	248	883	752	1635	164	561	497	1058	235	601	573	1174	228	710	630	1340	875	2755	2452	5207
%	-	54.0	46.0	100.0	-	53.02	46.97	100.0	-	51.19	48.81	100.0	-	52.58	47.02	100.0	100.0	52.91	47.09	100.00

Figures given in parenthesis are percentage
Source: Field Survey

Table 4: Educational status of the villagers of sample watersheds

Sl. No.	Educational status	1 General			2 Schedule Caste (SC)			3 Schedule Tribe (ST)			4 OBC			5 Total			6 %
		Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	
I – Dist. Nawada																	
1.	P.G.	20	-	20	-	-	-	-	-	-	02	-	02	22	-	22	1.35
2.	U.G.	27	07	34	-	-	-	-	-	-	14	03	17	41	10	51	3.12
3.	H.S.	50	29	79	10	-	10	-	-	-	18	04	22	78	33	111	6.79
4.	M.P.	120	66	186	20	04	24	-	-	-	25	37	62	165	107	272	16.64
5.	VIII Standard	153	183	336	24	11	35	-	-	-	44	43	87	221	237	458	28.01
6.	Literate	170	142	312	20	15	35	-	-	-	62	34	96	252	191	443	27.09
7.	Illiterate	50	86	136	46	69	115	-	-	-	08	19	27	104	174	278	17.00
Total		590	513	1103	120	99	219	-	-	-	173	140	313	883	752	1635	100.00
%		36.08	31.38	67.46	7.34	6.05	13.39	-	-	-	10.58	8.57	19.15	54.00	46.00	100.00	-
II – Dist. Kaimur																	
1.	P.G.	02	-	02	-	-	-	-	-	-	02	01	03	04	01	05	0.47
2.	U.G.	19	05	24	-	-	-	-	-	-	15	02	17	34	07	41	3.88
3.	H.S.	68	29	97	04	-	04	-	-	-	21	08	29	93	37	130	12.29
4.	M.P.	101	77	178	10	05	15	-	-	-	22	18	40	133	100	233	22.02
5.	VIII Standard	75	61	136	13	05	18	-	-	-	18	09	27	106	75	181	17.11
6.	Literate	82	109	191	27	07	34	-	-	-	17	49	66	126	165	291	27.50
7.	Illiterate	24	30	54	37	79	116	-	-	-	04	03	07	65	112	177	16.73
Total		371	311	682	91	96	187	-	-	-	99	90	189	561	497	1058	100.00
%		35.07	29.39	64.46	8.60	9.07	17.67	-	-	-	9.35	8.52	17.87	53.02	46.98	100.00	-
III – Dist. Aurangabad																	
1.	P.G.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2.	U.G.	02	05	07	-	-	-	-	-	-	03	01	04	05	06	11	0.94
3.	H.S.	05	08	13	02	-	02	-	-	-	11	06	17	18	14	32	2.73
4.	M.P.	05	05	10	04	08	12	-	-	-	05	09	14	14	22	36	3.07
5.	VIII Standard	12	08	20	12	12	24	-	-	-	02	06	08	26	26	52	4.43
6.	Literate	125	94	219	80	92	172	-	-	-	14	08	22	219	194	413	35.18
7.	Illiterate	194	211	405	119	96	215	-	-	-	06	04	10	319	311	630	53.65
Total		343	311	674	217	208	425	-	-	-	41	34	75	601	573	1174	100.00
%		29.22	28.19	57.41	18.48	17.72	36.20	-	-	-	3.49	2.90	6.39	51.19	48.81	100.00	-
IV – Dist. Routas																	
1.	P.G.	01	-	01	-	-	-	-	-	-	-	-	-	01	-	01	0.07
2.	U.G.	03	04	07	01	-	01	-	-	-	17	04	21	21	08	29	2.17
3.	H.S.	10	07	17	03	-	03	-	-	-	41	09	50	54	16	70	5.22
4.	M.P.	19	10	29	08	05	13	-	-	-	12	21	33	39	36	75	5.60
5.	VIII Standard	27	21	48	12	05	17	-	-	-	55	27	82	94	53	147	10.97
6.	Literate	143	120	263	30	46	76	05		05	30	69	99	208	284	492	36.72
7.	Illiterate	158	164	322	98	82	180	13	11	24	24	25	49	293	233	526	39.25
Total		361	326	687	152	138	290	18	11	29	179	155	334	710	630	1340	100.00
%		26.94	24.3	51.27	11.34	10.30	21.64	1.34	0.82	2.16	13.36	11.57	24.93	52.98	47.02	100.00	-

Source : Field Survey

Table 5: Description land resources in selected watersheds

(Area in ha)

Sl. No.	Particulars	Nawada (WS-I)	Kaimur (WS-II)	Aurangabad (WS - III)	Rohtas (WS - IV)	Bihar
1.	Total Area	560 (100.00)	521 (100.00)	507 (100.00)	544 (100.00)	533 (100.00)
2.	Forest	100 (17.85)	74 (14.20)	--	26 (4.76)	67 (12.57)
3.	Cultivable Area	417 (74.46)	432 (182.91)	443 (87.38)	494 (90.81)	446 (83.68)
4.	Land Holding Status					
a.	% Marginal Farmers	80.24	64.63	52.34	56.58	63.66
b.	% Small Farmers	10.89	21.34	40.85	26.75	25.03
c.	%Medium Farmers	5.24	7.93	3.83	11.84	7.09
d.	%Big Farmers	3.63	6.10	2.98	4.84	4.22
5.	% Irrigation to Total Area	51.73	50.88	65.09	41.69	57.80

In parenthesis percentage figures are shown.
Source : Field Survey.

Table 8(a): Occupational status of the non-beneficiaries under selected watersheds

Occupations	(WS-I)	(WS-II)	(WS - III)	(WS -IV)
Agriculture	18	21	16	24
Service	2	--	3	--
Agricultural laborers	9	9	6	2
Rural Artisans	2	3	2	2
Business / Trade	8	7	8	9
Others	1	--	5	3
Total	40	40	40	40

Source: Primary Data

Table 6: Information regarding self help groups (SHGs) and user groups (UGs) of the villages under selected watersheds

Sl. No.	Particulars	Watershed-I (Nawada Dist.)		Watershed-II (Kaimur Dist.)		Watershed-III (Aurangabad Dist.)		Watershed-IV (Rohtas Dist.)	
		S.H.G.	U.G.	S.H.G.	U.G.	S.H.G.	U.G.	S.H.G.	U.G.
1.	Total No. of SHGs?/ UGs in the village	06	22	03	27	05	21	04	20
2.	No. of SHGs/UGs are involved in watershed management	06	22	03	27	05	21	04	20
3.	No. of SHGs/UGs farmed by women only	04	-	02	-	03	-	04	-
4.	No. of SHGs/UGs farmed only by women are involved inwatershed management	04	-	02	-	03	-	04	-

Source: Field Survey

Table 7: Information regarding contribution to the fund (in Rs.) by the self help group (SGs) of the villages under selected watersheds

Sl. No.	Particulars	Watershed-I (Nawada Dist.)	Watershed-II (Kaimur Dist.)	Watershed-III (Aurangabad Dist.)	Watershed-IV (Rohtas Dist.)	Overall
1.	Contribution of SGHs framed for the other activities					
	i)Only men	-	-	-	-	-
	ii)Only women	-	-	-	-	-
	iii) Total	-	-	-	-	-
2.	Fund available by sources					
	i)Bank	-	-	-	-	-
	ii)Govt. sector	-	-	-	-	-
	iii)Other	-	-	-	-	-
3.	Contribution of SGHs framed for watershed management only					
	i)Only men	1500.00	1000.00	1000.00	1000.00	1125
	ii)Only women	1000.00	1200.00	1500.00	1200.00	1225
	iii) Total	2500.00	2200.00	2500.00	2200.00	2350
4.	Find available by source					
	i)Bank	-	-	-	-	-
	ii)Govt. sector	1,25,000.00	1,,50,000.00	1,49,684.00	1,67,000.00	1,47,792
	iii)Other	-	-	-	-	-

Source : Field Survey

Table 8: Information regarding occupational status of the SGHs and UG beneficiaries of the villages under selected watersheds

Sl. No.	Occupational Group	Total no of Groups	Total Beneficiaries	SC	ST	General	Minorities	Women
I (Dist. Nawada, No-99)								
1.	Agriculture	21	48	06	-	42	-	04
2.	Poultry	13	13	13	-	-	-	13
3.	Dairy	-	-	-	-	-	-	-
4.	Business	-	-	-	-	-	-	-
5.	Rural Artisan	-	-	-	-	-	-	-
6.	Service	-	-	-	-	-	-	-
7.	Landless labour	04	38	34	-	04	-	12
8.	Others	-	-	-	-	-	-	-
9.	Total	28	99(100.00)	53(53.54)	-	46(46.46)	-	29(29.29)
		II- Dist. Kaimur, No-101						
1.	Agriculture	20	46	04	-	42	-	03
2.	Poultry	02	20	14	-	06	-	04
3.	Dairy	-	-	-	-	-	-	-
4.	Business	-	-	-	-	-	-	-
5.	Rural Artisan	01	08	05	-	03	-	03
6.	Service	-	-	-	-	-	-	-
7.	Landless labour	07	27	05	-	22	-	05
8.	Others	-	-	-	-	-	-	-
Total		30	101(100.00)	28(27.72)	-	73(72.28)	-	15(14.85)
III – Dist. Aurangabad, No-107								
1.	Agriculture	22	70	08	-	62	-	-
2.	Poultry	01	10	10	-	-	-	-
3.	Dairy	-	-	-	-	-	-	-
4.	Business	-	-	-	-	-	-	-
5.	Rural Artisan	01	11	04	-	07	-	-
6.	Service	-	-	-	-	-	-	-
7.	Landless labour	02	16	10	-	06	-	16
8.	Others	-	-	-	-	-	-	-
Total		26	107(100.00)	32(29.91)	-	75(70.09)	-	16(14.95)
IV- Rohtas, No-104								
1.	Agriculture	22	81	10	-	71	05	20
2.	Poultry	01	10	10	-	-	-	10
3.	Dairy	-	-	-	-	-	-	-
4.	Business	-	-	-	-	-	-	-
5.	Rural Artisan	-	-	-	-	-	-	-
6.	Service	-	-	-	-	-	-	-
7.	Landless labour	01	13	05	-	08	-	10
8.	Others	-	-	-	-	-	-	-
Total		24	104(100.00)	25(24.04)	-	79(75.96)	05(4.81)	40(38.46)

Source : Field Survey

Table 9: Information regarding sample households under selected watersheds

Sl. No.	Name of the Commu-nities	Watershed-I (Nawada Dist.)				Watershed-II (Kaimur Dist.)				Watershed-III (Aurangabad Dist.)				Watershed-IV (Rohtas Dist.)				Over all			
		No. of H.H.	Male	Female	Total	No. of H.H.	Male	Female	Total	No. of H.H	Male	Female	Total	No. of H.H	Male	Female	Total	No. of H.H	Male	Female	Total
Beneficiary																					
1.	General	21	79	51	130	17	57	44	101	27	89	73	162	19	63	54	117	84	288	222	510 (49.18)
2.	SC	05	22	19	41	08	24	29	53	06	23	24	47	06	22	21	43	25	91	93	184 (17.74)
3.	ST	-	-	-	-	-	-	-	-	-	-	-	-	02	07	06	13	02	07	06	13 (1.26)
4.	OBC	14	53	41	94	15	51	47	98	07	31	20	51	13	45	42	87	49	180	150	330 (31.82)
All Total		40	154	111	265	40	132	120	252	40	143	117	260	40	137	123	260	160	566	471	1037
In %		25.00	14.85	10.70	25.55	25.00	12.73	11.58	24.31	25.00	13.79	11.28	25.07	25.00	13.21	11.86	25.07	100.0	54.58	45.42	100.00
Non-Beneficiary																					
1.	General	22	77	55	132	17	61	56	117	19	81	48	129	21	67	62	129	79	286	221	507 (46.69)
2.	SC	12	50	46	96	08	33	26	59	16	73	58	131	04	15	12	27	40	171	142	313 (28.82)
3.	ST	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4.	OBC	06	22	20	42	15	49	44	93	05	17	15	32	15	53	46	99	41	141	125	266 (24.49)
All Total		40	149	121	270	40	143	126	269	40	171	121	292	40	135	120	255	160	598	488	1086
In %		25.00	13.72	11.14	24.86	25.00	13.17	11.60	24.77	25.00	15.75	11.14	26.89	25.00	12.43	11.05	23.48	100.0	55.06	44.94	100.00

Source: Field Survey

Table 10: Allocation of funds in different components of the project (2002-07)

Sl. No.	Particulars			Rs. (In Lakh)	% of Exp.
A.	Management Component			246.36	18.38
B.	Development Component				
I.	Natural Resource Management				
	a.		Arable Land		
		i.	Soil and moisture conservation activities	97.472	7.27
		ii.	Contour bunding /field building executed	--	--
		iii.	Agronomic conservation practices	46.272	3.45
		iv.	Others	30.67	2.29
	b.		Non- Arable		
		i.	Run – off management structures/ check dams	40.00	2.98
		ii.	Water harvesting structures/ SDD	87.40	6.53
		iii.	Dry land horticulture	88.528	6.60
		iv.	Conservation and development of biomass	63.885	4.77
		v.	Others	32.212	2.40
	c.		Drainage Lines		
		i.	Upper reaches	49.372	3.68
		ii.	Middle reaches	51.575	3.85
		iii.	Lower reaches	108.722	8.12
			Total	**696.108**	**51.94**
II.	Farm Production System for Land Owing Families				
	a.		Establishment of nurseries and production of seedlings	44.95	3.35
	b.		Testing and demonstration of new technologies/demonstration	90.95	6.78
	c.		Diversification of production system	60.787	4.54
	d.		Adoption of proven technologies (organic farming, use of bio-fertilizers, integrated pest management, on farm management, development of micro irrigation system, etc.)	53.547	4.00
	e.		Livestock management	25.67	1.91
	f.		Others	---	---
			Total	**275.904**	**20.58**
III.	Livelihood Support System for Landless Families				
	a.		Household production system	24.758	1.85
	b.		Bio-mass based rural industry activities	25.083	1.87
	c.		Dairy, Sericulture, Goat breeding, Beekeeping, Mushroom cultivation, Commercial poultry, etc.	27.731	2.07
	d.		Livestock management	23.558	1.76
	e.		Others	20.778	1.55
			Total	**121.908**	**9.10**
			Sub-total – B	**1093.92**	**81.62**
			Grand total (A+B)	**1340.28**	**100.00**

Source: Directorate of Soil Conservation, Bihar, Patna.

Table 11: Information regarding land of the villages under selected watersheds

Sl. No.	Nature of land	Watershed-I (Nawada Dist.)			Watershed-II (Kaimur Dist.)			Watershed-III (Aurangabad Dist.)			Watershed-IV (Rohtas Dist.)		
		Area in ha.		% change in area	Area in ha.		% change in area	Area in ha.		% change in area	Area in ha.		% change in area
		2001-02	2006-07		2001-02	2006-07		2001-02	2006-07		2001-02	2006-07	
1.	Govt. waste land	20	20	0.00	10.00	8.50	-15.00	-	-	-	12.79	10.05	-21.42
2.	Private waste land	06	05	-16.67	2.25	1.75	-22.22	64.04	50.00	21.92	10.21	7.00	-31.44
3.	Common grazing land	-	-	-	-	-	-	-	-	-	-	-	-
4.	Forest land	100	100	00.00	73.10	74.95	2.23	-	-	-	24.50	26.50	8.16
5.	Agricultural land	417	417	00.00	432.50	432.65	0.035	442.96	443.25	0.065	493.00	494.79	0.36
6.	Others if any	17	18	5.00	3.15	3.15	-	-	-	-	03.50	3.50	00.00
Total		560	560	00.00	512.00	521.00	00.00	507.00	493.25	-2.71	544.00	541.84	-0.39

Source : Field Survey

Table 14: Information regarding changes in irrigation of the villages under selected watersheds

Sl. No	Category of Farmers	Watershed-I (Nawada Dist.)				Watershed-II (Kaimur Dist.)				Watershed-III(Aurangabad Dist.)				Watershed-IV (Rohtas Dist.)				Over all			
		No. of H.H.	% of land acquired	% of land irrigated		No. of H.H.	% of land acquired	% of land irrigated		No. of H.H.	% of land acquired	% of land irrigated		No. of H.H.	% of land acquired	% of land irrigated		No. of H.H.	% of land acquired	% of land irrigated	
				2001-02	2006-07			2001-02	2006-07			2001-02	2006-07			2001-02	2006-07			2001-02	2006-07
1.	Big	09	45.54	31.9	32.4	10	56.23	47.67	47.71	07	30.78	25.00	25.90	11	33.91	28.00	29.71	37	41.67	33.00	33.25
2.	Medium	13	9.28	24.0	23.8	13	9.98	26.57	27.10	09	27.10	26.50	27.00	27	15.46	23.00	23.50	62	11.64	25.20	25.29
3.	Small	27	9.64	29.1	29.25	35	13.44	18.04	18.10	96	37.86	19.00	20.20	61	26.88	17.50	18.20	219	20.55	21.00	21.08
4.	Marginal	199	35.53	28.0	28.65	106	20.35	28.65	29.66	123	24.26	20.00	21.50	129	23.75	15.00	15.25	557	26.14	18.00	18.85

Source : Field Survey

Table 12: Irrigation status of agricultural land of the villages under selected watersheds (in ha)

Sl. No	Year	particulars	Watershed-I (Nawada Dist.)		Watershed-II (Kaimur Dist.)		Watershed-III (Aurangabad Dist.)		Watershed-I (Rohtas Dist.)	
			Irri	Un-irri	Irri	Un-irri	Irri	Un-irri	Irri	Un-irri
1.	2001-2002	Kharif	187.65	229.35	199.00	233.50	230.35	212.61	226.78	266.22
		Rabi	100.26	316.74	66.09	366.41	99.67	343.29	120.79	372.21
		Summer	1.80	415.16	-	432.50	-	-	-	493.00
2.	2001-2002	Kharif	187.69	229.31	199.10	233.40	230.41	212.55	227.78	265.22
		Rabi	100.26	316.74	66.20	366.30	99.69	343.27	120.78	372.22
		Summer	1.85	415.15	-	432.50	0.50	442.46	-	493.00
3.	2001-2002	Kharif	188.50	228.50	199.32	233.18	230.90	212.06	228.16	264.84
		Rabi	100.32	316.68	66.20	366.30	99.75	343.21	122.02	370.98
		Summer	1.86	415.14	-	-	0.72	442.24	0.25	492.75
4.	2001-2002	Kharif	189.75	227.25	199.72	232.78	231.00	211.96	229.25	263.75
		Rabi	100.35	316.65	66.50	366.00	99.90	343.06	123.22	369.78
		Summer	1.88	415.12	0.25	432.25	0.75	441.25	0.25	492.75
5.	2001-2002	Kharif	190.77	226.23	200.50	232.00	231.22	211.74	230.00	263.00
		Rabi	100.50	316.50	67.50	365.28	100.00	342.96	123.92	369.08
		Summer	1.90	415.10	0.28	432.22	0.75	442.21	0.34	492.66
6.	2001-2002	Kharif	190.80	226.20	203.90	228.60	231.25	211.71	232.19	260.81
		Rabi	101.00	316.00	67.79	364.71	100.00	342.96	124.20	368.80
		Summer	1.90	415.10	0.30	432.20	0.76	442.20	0.38	492.62

Source: Field Survey

Table 13: Number of water harvesting structures in the villages under selected watersheds

Sl. No.	Type of structure	Watershed-I (Nawada Dist.)			Watershed-II (Kaimur Dist.)			Watershed-III (Aurangabad Dist.)			Watershed-I (Rohtas Dist.)		
		Total number of working		% change	Total number of working		% change	Total number of working		% change	Total number of working		% change
		(a)	(b)		(a)	(b)		(a)	(b)		(a)	(b)	
1.	Tanks	03	05	66.67	03	04	33.33	02	03	50.00	03	04	33.33
2.	Check Dams	-	02	-	-	02	NA	-	03	NA	-	01	NA
3.	Nalla plugs	-	-	-	-	-	-	-	-	-	-	-	-
4.	Weirs	-	-	-	-	-	-	-	-	-	-	-	-
5.	Farm ponds	01	06	500.00	01	07	600.00	01	08	700.00	01	04	400.00
6.	Diversion	01	01	00.00	01	01	00.0	-	-	-	-	-	-
7.	Submersible check Dams	-	-	-	-	-	-	-	-	-	-	-	-
8.	Percolation well	-	-	-	01	02	00.00	-	-	-	01	01	00.00
9.	Any other	01	01	00.00	01	03	200.00	01	01	-	01	01	00.00

Note: (a)=2001-02 and (b)=2006-07
Source: Field Survey

Table 14A : Information regarding gross irrigation area by source of the villages under selected watersheds

Sl.No.	Type of sources	Watershed-I (Nawada Dist.)			Watershed-II (Kaimur Dist.)			Watershed-III (Aurangabad Dist.)			Watershed-I (Rohtas Dist.)		
		Area in ha.		% change in area	Area in ha.		% change in area	Area in ha.		% change in area	Area in ha.		% change in area
		2001-02	2006-07		2001-02	2006-07		2001-02	2006-07		2001-02	2006-07	
A.	Irrigated land (Govt.)												
	Tank	103.20	103.20	00.00	42.50	42.65	00.35	49.60	49.95	00.71	40.10	42.00	4.74
	Tube well	-	-	-	-	-	-	-	-	-	-	-	-
	Well	12.80	13.05	01.95	08.15	09.05	11.04	21.70	23.05	06.22	28.70	30.10	4.88
	Others	74.96	76.15	01.59	26.00	29.22	12.38	67.30	67.35	00.52	45.38	47.60	4.89
	Total	190.96	192.40	00.75	76.65	80.92	05.57	138.60	140.65	1.48	114.18	119.70	04.83
B.	Irrigated land (Pvt.)												
	Tank	30.12	30.40	01.00	67.15	70.50	04.99	72.40	78.40	08.29	88.25	88.47	00.25
	Tube well	28.40	24.70	(-)13.03	-	-	-	-	-	-	-	-	-
	Well	07.15	10.50	46.85	18.20	20.07	10.27	32.15	38.09	18.48	23.70	25.45	01.75
	Others	33.08	35.70	07.92	103.09	100.50	(-)02.51	86.87	74.87	(-)13.81	121.44	123.15	01.41
	Total	98.75	101.30	02.58	188.44	191.07	01.39	191.42	191.36	(-)0.03	233.39	237.07	01.58
Gr. Total (A+B)		289.71	293.70	01.37	265.09	271.99	02.60	330.02	332.01	00.60	347.57	356.77	02.64

Source : Field Survey

Table 15: Information important crop cultivated area (in ha) of the sample farmers under selected watersheds

Sl.No.	Name of the Crop	Watershed-I (Nawada Dist.)			Watershed-II (Kaimur Dist.)			Watershed-III (Aurangabad Dist.)			Watershed-I (Rohtas Dist.)		
		Cultivation Area (in ha)		% change in area	Cultivation Area (in ha)		% change in area	Cultivation Area (in ha)		% change in area	Cultivation Area (in ha)		% change in area
		2001-02	2006-07		2001-02	2006-07		2001-02	2006-07		2001-02	2006-07	
Beneficiary													
1.	Paddy	78.25	78.75	0.64	68.55	71.55	4.37	85.00	86.55	1.82	87.00	89.17	2.49
2.	Wheat	22.00	22.17	0.77	15.10	15.28	1.19	17.00	18.10	6.47	17.40	17.83	2.47
3.	Maize	13.78	13.88	0.72	08.00	08.27	3.37	12.20	12.28	0.65	10.22	10.52	2.93
4.	Pulses	09.12	09.22	1.10	10.05	10.15	0.99	12.00	12.25	2.08	11.25	11.38	1.15
5.	Oilseeds	05.00	05.00	-	06.10	06.10	-	07.00	07.10	1.42	8.10	08.25	1.85
All		128.15	129.02	0.68	107.80	111.35	3.55	133.20	136.28	3.08	133.97	137.15	2.37
Non – Beneficiary													
1.	Paddy	62.78	62.80	0.03	55.25	56.28	1.86	70.82	70.99	0.24	71.82	72.48	0.92
2.	Wheat	11.30	11.30	-	12.00	12.20	1.67	14.00	14.16	1.14	14.64	14.75	0.75
3.	Maize	07.00	07.15	2.14	05.10	05.20	1.96	05.54	05.70	2.89	06.72	06.78	0.89
4.	Pulses	09.25	09.25	-	02.65	02.72	2.64	03.19	03.21	0.62	04.10	04.14	0.98
5.	Oilseeds	01.00	01.00	-	01.75	01.75	-	02.10	02.12	0.95	02.00	02.04	2.00
All		91.33	91.50	0.19	76.75	78.15	1.82	95.65	96.18	0.55	99.28	100.19	0.92

Source : Primary Data

Table 16: Information regarding crop production (in Qty.) of the sample farmers under selected watersheds

Sl.No.	Name of the Crop	Watershed-I (Nawada Dist.)			Watershed-II (Kaimur Dist.)			Watershed-III (Aurangabad Dist.)			Watershed-I (Rohtas Dist.)		
		Production (in qnt.)		% change in Production	Production (in qnt.)		% change in Production	Production (in qnt.)		% change in Production	Production (in qnt.)		% change in Production
		2001-02	2006-07		2001-02	2006-07		2001-02	2006-07		2001-02	2006-07	
Beneficiary													
1.	Paddy	1643.25	1661.63	1.11	1439.55	1509.70	4.87	1827.50	1882.46	3.01	1922.70	1984.03	3.19
2.	Wheat	396.00	410.15	3.57	265.61	268.93	1.25	289.00	309.15	6.97	313.20	324.68	3.73
3.	Maize	179.14	183.22	2.28	104.00	109.25	5.05	164.70	170.57	3.56	143.08	152.54	6.61
4.	Pulses	76.50	78.55	2.69	82.91	83.94	1.24	97.20	101.06	3.97	101.25	104.13	2.84
5.	Oilseeds	25.00	24.00	(-)4.00	30.50	30.80	1.00	34.30	35.35	3.06	41.31	42.24	2.25
All		2319.89	2357.55	1.62	1922.57	2002.62	4.16	2412.70	2498.59	3.56	2521.54	2607.62	3.41
Non – Beneficiary													
1.	Paddy	1318.78	1321.94	0.24	1146.44	1181.88	3.09	1490.76	1497.89	0.48	1544.13	1578.61	2.23
2.	Wheat	179.11	180.80	0.94	204.00	209.23	2.56	239.40	243.27	1.62	266.45	269.19	1.03
3.	Maize	94.50	99.03	4.79	71.91	73.79	2.61	73.41	76.64	3.04	97.57	98.99	1.45
4.	Pulses	74.00	74.19	0.25	20.91	21.76	4.06	25.72	25.97	0.97	32.80	33.95	3.50
5.	Oilseeds	05.00	05.00	-	08.75	08.78	0.40	10.50	10.62	1.14	10.00	10.24	2.41
All		1671.39	1680.96	0.57	1452.01	1495.44	2.99	1839.79	1854.39	0.79	1950.95	1990.98	2.05

Source : Primary Data

Table 17: Information regarding cost of cultivation (in Rs./ha) of the sample farmers under selected watersheds

Sl.No.	Name of the Crop	Watershed-I (Nawada Dist.)			Watershed-II (Kaimur Dist.)			Watershed-III (Aurangabad Dist.)			Watershed-I (Rohtas Dist.)		
		Cost of Cultivation (in Rs.)		% change in cost of cultivation	Cost of Cultivation (in Rs.)		% change in cost of cultivation	Cost of Cultivation (in Rs.)		% change in cost of cultivation	Cost of Cultivation (in Rs.)		% change in cost of cultivation
		2001-02	2006-07		2001-02	2006-07		2001-02	2006-07		2001-02	2006-07	
Beneficiary													
1.	Paddy	5100.00	5361.90	5.14	5255.00	5489.06	4.44	4972.80	5175.00	4.07	4412.75	4818.00	9.18
2.	Wheat	5042.50	5362.74	6.35	4717.15	5011.25	6.23	4221.10	4671.00	10.66	4417.20	4690.10	6.18
3.	Maize	6080.00	6325.00	4.03	5390.50	5915.19	9.73	4912.75	5070.60	3.21	4885.15	5117.19	4.75
4.	Pulses	2187.00	2212.00	1.14	2288.00	2436.00	6.47	2611.10	2942.92	12.71	2913.27	3115.22	6.93
5.	Oilseeds	2538.00	2749.00	8.31	2942.00	3011.50	2.36	2217.18	2419.27	9.11	2692.50	3351.15	24.46
All		4823.30	5217.00	8.16	5392.25	5691.15	5.54	4725.00	4932.17	4.38	5120.70	5790.60	13.08
Non – Beneficiary													
1.	Paddy	5030.12	5568.70	10.71	4639.15	5218.65	12.49	4372.50	4979.00	13.87	4072.00	4491.80	10.31
2.	Wheat	4972.30	5125.90	3.09	4731.85	5029.25	6.29	4215.70	4594.40	8.98	4218.42	4362.00	3.40
3.	Maize	4798.50	4952.17	3.20	3992.10	4101.70	0.03	4213.10	4431.70	5.19	4010.00	4292.00	7.03
4.	Pulses	2412.15	2672.75	10.68	2591.20	2881.00	11.18	2892.81	2911.50	0.65	3217.45	4012.50	24.71
5.	Oilseeds	2319.40	2517.15	8.53	2615.60	2939.00	12.36	3481.00	3912.25	12.39	3790.14	3985.75	5.16
All		4615.00	5420.00	17.44	5020.00	5715.00	13.84	3990.00	4828.00	21.00	4919.00	5420.00	10.18

Source : Primary Data

Table 18: Information regarding disposal of yield (in Qty.) of the sample farmers under selected watersheds

Sl.No.	Name of the Crop	Watershed-I (Nawada Dist.)			Watershed-II (Kaimur Dist.)			Watershed-III (Aurangabad Dist.)			Watershed-I (Rohtas Dist.)		
		Disposal of Yield (in qnt.)		% change in Disposal of Yield	Disposal of Yield (in qnt.)		% change in Disposal of Yield	Disposal of Yield (in qnt.)		% change in Disposal of Yield	Disposal of Yield (in qnt.)		% change in Disposal of Yield
		2001-02	2006-07		2001-02	2006-07		2001-02	2006-07		2001-02	2006-07	
Beneficiary													
1.	Cereals	552.87	465.75	(-)15.61	230.23	321.52	39.65	482.78	582.66	20.68	689.08	833.63	20.97
2.	Pulses	21.00	21.60	2.86	41.46	46.17	11.36	56.38	60.64	7.55	58.73	64.56	9.93
3.	Oilseeds	13.75	08.40	(-)38.91	15.50	18.48	19.23	17.15	17.68	3.09	22.72	25.34	11.53
All		587.62	495.75	(-)15.63	287.19	386.17	34.47	556.31	660.98	18.82	770.53	923.53	19.86
Non – Beneficiary													
1.	Cereals	404.67	397.14	(-)1.86	385.20	410.39	6.54	508.39	598.82	17.79	373.87	460.09	23.06
2.	Pulses	37.00	46.00	24.32	12.54	14.14	12.76	16.46	17.08	3.77	20.61	22.07	7.08
3.	Oilseeds	03.25	03.50	7.69	06.13	05.44	(-)11.26	06.28	06.27	(-)0.16	06.00	06.14	2.33
All		444.92	446.64	0.39	403.87	429.97	6.46	531.13	622.17	17.15	400.48	488.30	21.93

Source : Primary Data

Table 19: Information regarding average annual income (in Rs.) of the sample farmers under selected watersheds

Sl.No.	Name of the Occupation	Watershed-I (Nawada Dist.)			Watershed-II (Kaimur Dist.)			Watershed-III (Aurangabad Dist.)			Watershed-I (Rohtas Dist.)		
		Annual Income (in Rs.)		% change in Annual Income	Annual Income (in Rs.)		% change in Annual Income	Annual Income (in Rs.)		% change in Annual Income	Annual Income (in Rs.)		% change in Annual Income
		2001-02	2006-07		2001-02	2006-07		2001-02	2006-07		2001-02	2006-07	
Beneficiary													
1.	Agriculture	25500	27350	7.25	39000	45500	16.67	24948	32417	29.94	40124	44965	12.07
2.	Service	--	--	--	--	--	--	--	--	--	322	615	91.00
3.	Business	5045	5110	1.29	12800	16254	26.98	1342	1467	9.31	1290	1248	(-)3.26
4.	Others	6000	4200	(-)30.00	--	--	--	4932	5219	5.82	2512	2419	3.70
5.	Total	36545	36660	0.31	51800	61754	19.22	31222	39103	25.24	44248	49247	11.30
Non – Beneficiary													
1.	Agriculture	20185	22765	12.78	28912	32310	11.75	41742	44387	6.34	36671	44931	22.52
2.	Service	317	412	29.97	404	92	(-)77.23	1309	687	(-)17.52	--	--	--
3.	Business	221	303	41.18	1205	985	(-)18.26	442	389	(-)3.68	605	540	10.74
4.	Others	756	942	23.14	540	320	(-)40.74	1217	392	(-)67.79	342	865	+152.92
5.	Total	21288	24422	14.72	32061	33707	5.13	44710	45855	2.56	37618	46336	23.18

Source : Primary Data

Table 20: Information regarding live stock of the villages under selected watersheds

Sl. No.	Type of livestock	Watershed-I (Nawada Dist.)			Watershed-II (Kaimur Dist.)			Watershed-III (Aurangabad Dist.)			Watershed-I (Rohtas Dist.)		
		Number		% change	Number		% change	Number		% change	Number		% change
		(a)	(b)		(a)	(b)		(a)	(b)		(a)	(b)	
1.	Bullocks	01	02	50.00	188	207	10.11	207	228	10.14	90	115	27.78
2.	Cows	180	300	66.67	190	215	13.16	210	235	11.90	165	220	33.33
3.	Cow calf he/she	60	80	33.33	210	290	38.10	285	315	10.53	103	111	7.77
4.	Buffalo	300	500	66.67	40	48	20.00	267	290	8.61	80	103	28.75
5.	Buffalo calf he/she	170	240	41.18	28	41	46.43	272	310	13.97	72	85	19.06
6.	Goat	490	800	63.27	366	442	20.77	817	1012	23.87	414	574	38.65
7.	Sheep	-	-	-	-	-	-	480	675	40.63	-	-	-
8.	Camel	-	-	-	-	-	-	-	-	-	-	-	-
9.	Others	-	-	-	-	-	-	253	275	27.91	-	-	-
Total		1111	1922	73.00	1122	1243	10.78	2753	3340	21.32	924	1208	30.74

Source: Field Survey

Table 21: Direct impact of watershed in changing quality of the sample farmers under selected watersheds

Sl. No.	Particulars	Watershed-I (Nawada Dist.)		Watershed-II (Kaimur Dist.)		Watershed-III (Aurangabad Dist.)		Watershed-IV (Rohtas Dist.)	
		Since Inception to Completion (2001-02 to 2006-07)		Since Inception to Completion (2001-02 to 2006-07)		Since Inception to Completion (2001-02 to 2006-07)		Since Inception to Completion (2001-02 to 2006-07)	
		Changed Positively*	Same	Changed Positively*	Same	Changed Positively*	Same	Changed Positively*	Same
Beneficiary									
1.	Production	10.00	90.00	15.00	85.00	12.50	87.50	10.00	90.00
2.	Cropping intensity	7.50	92.50	7.50	92.50	10.00	90.00	10.00	90.00
3.	Irrigation	12.50	87.50	17.50	82.50	15.00	85.00	12.50	87.50
4.	Quality of land	-	100.00	-	100.00	-	100.00	-	100.00
5.	Recharging of ground water	20.00	80.00	17.50	82.50	20.00	80.00	15.00	85.00
6.	Availability of irrigation	10.00	90.00	12.50	87.50	17.50	82.50	15.00	85.00
7.	Other agro-allied activities	-	100.00	-	100.00	-	100.00	-	100.00
8.	Labour absorbing	10.00	90.00	-	100.00	-	100.00	-	100.00
9.	Out migration	-	100.00	-	100.00	-	100.00	-	100.00
10.	Absorption of women in various activities	7.50	92.50	15.00	85.00	15.00	85.00	10.00	90.00
11.	Enhancement of female labour absorption	-	100.00	-	100.00	-	100.00	-	90.00
12.	Changes in forestry and afforestation	12.50	87.50	17.50	82.50	15.00	85.00	12.50	87.50
13.	Change in livestock	-	100.00	-	100.00	12.50	87.50	5.00	95.00
14.	Increase in CPRS	-	100.00	-	100.00	-	100.00	-	100.00
15.	Change in literacy	-	100.00	-	100.00	-	100.00	-	100.00
16.	Change in qualitative aspects of livelihood	15.00	100.00	20.00	80.00	10.00	90.00	12.50	87.50
Non-Beneficiary									
1.	Production	2.50	97.50	5.00	95.00	5.00	95.00	7.5	92.50
2.	Cropping intensity	-	100.00	-	100.00	-	100.00	-	100.00
3.	Irrigation	-	100.00	5.00	95.00	5.00	95.00	15.00	85.00
4.	Quality of land	-	100.00	-	100.00	17.50	100.00	-	100.00
5.	Recharging of ground water	10.00	90.00	7.50	92.50	5.00	82.50	15.00	85.00
6.	Availability of irrigation	7.50	92.50	2.50	97.50	-	95.00	2.50	97.50
7.	Other agro-allied activities	-	100.00	-	100.00	-	100.00	-	100.00
8.	Labour absorbing	-	100.00	-	100.00	-	100.00	-	100.00
9.	Out migration	-	100.00	-	100.00	-	100.00	-	100.00
10.	Absorption of women in various activities	-	100.00	-	100.00	-	100.00	-	100.00
11.	Enhancement of female labour absorption	-	100.00	-	100.00	-	100.00	-	100.00
12.	Changes in forestry and afforestation	-	100.00	-	100.00	-	100.00	-	100.00
13.	Change in livestock	-	100.00	-	100.00	-	100.00	-	100.00
14.	Increase in CPRS	-	100.00	-	100.00	-	100.00	-	100.00
15.	Change in literacy	-	100.00	-	100.00	-	100.00	-	100.00
16.	Change in qualitative aspects of livelihood	5.00	95.00	7.50	92.50	12.50	87.50	5.00	95.00

Attributes give in percentage responsiveness of the households

Source : Primary Data

Table 22: Year–wise formation of UGs and SHGs of the selected watersheds

Year	I – Nawada																	
	Formation of UG									Formation of SHG								
	No	General		SC		OBC		Total		No	General		SC		OBC		Total	
		Male	Female	Male	Female	Male	Female	Male	Female		Male	Female	Male	Female	Male	Female	Male	Female
2002-03																		
2003-04																		
2004-05	5	4	-	6	-	-	-	10	-	-	-	-	-	-	-	-	-	-
2005-06	8	6	-	13	-	2	-	21	-	4	5	-	-	9	-	2	5	11
2006-07	9	9	2	12	-	7	-	28	2	2	3	-	-	12	3	4	6	16
Total	22	19	2	31	-	9	-	59	2	6	8	-	-	21	3	6	11	27
II – Kaimur																		
2002-03																		
2003-04																		
2004-05	4	9	-	6	-	-	-	10	-	-	-	-	-	-	-	-	-	-
2005-06	11	23	-	13	-	2	-	21	-	1	5	-	-	9	-	2	5	11
2006-07	12	14	-	9	-	7	-	28	2	2	3	-	-	12	3	4	6	16
Total	27	46	-	28	-	9	-	59	2	3	8	-	-	21	3	6	11	27
III – Aurangabad																		
2002-03																		
2003-04																		
2004-05	4	6	-	9	-	2	-	17	-	-	-	-	-	-	-	-	-	-
2005-06	9	18	-	12	-	5	-	35	-	1	-	-	-	3	-	1	-	4
2006-07	8	16	-	11	-	12	-	39	-	4	-	-	-	9	-	3	-	12
Total	21	40	-	32	-	19	-	91	-	5	-	-	-	12	-	4	-	16
IV – Rohtas																		
2002-03																		
2003-04																		
2004-05	7	12	-	-	-	9	-	21	-	-	-	-	-	-	-	-	-	-
2005-06	8	8	-	-	-	19	-	27	-	1	-	-	-	-	-	11	-	11
2006-07	5	8	-	-	-	8	-	16	-	3	-	-	-	25	-	4	-	29
Total	20	28	-	-	-	36	-	64	-	4	-	-	-	25	-	15	-	40

Source : Field Survey

Table 23: Details of physical &financial targets and achievements of the selected watersheds during 2002- 2007

Sl. No.	District	Name of the Selected Watershed	Physical				Financial (In lakh Rs.)	
			Target		Achievement		Target	Achievement (In %)
			No.	Coverage	No. (%)	Coverage (%)		
I	Nawada	Nata Nala M/W-B	182	242	171(93.96)	217(89.67)	18.10	17.840(98.56)
II	Kaimur	Khamkala M/W- K-5	132	253.5	190(143.94)	212.5(83.83)	18.0029	17.837(99.08)
III	Aurangabad	Narkapi Machani M/W-K-8	161	237	159(98.76)	224(94.51)	18.00489	17.84746(99.13)
IV	Rohtas	Jayantipur M/W Sone – 2-1	198	136	192(96.97)	123(90.44)	18.10	17.96980(99.28)

Source : Respective Watershed

Table 24: Performance indicates of the selected watersheds

Sl. No.	Particular	Selected Watershed			
		Watershed – I (Nawada)	Watershed – II (Kaimur)	Watershed – III (Aurangabad)	Watershed – IV (Rohtas)
1.	Project Cost (Rs. In lakh)	17.840	17.837	17.847	17.969
2.	Watershed area taken up for development (in ha.)	560	521	507	544
3.	Area development (in ha.)	208	219	272	253
4.	Per hectare cost (in Rs.)	8213/ha	8144/ha	6561/ha	7102/ha
5.	Internal rate of return (in %)	187	192	189	2.02
6.	Cost benefit ratio	1:1.87	1:1.92	1:1.89	1:2.02
7.	Agro forestry:				
	i)No. of seedling planted	250	325	300	340
	ii)No. of seedling survived	85	95	70	125
	iii)Survival percentage (%)	34.00	29.23	23.33	36.76
	iv)Area covered (in ha.)	4	7	6	5
8.	Horticulture:				
	i)No. of seedling planted	800	750	700	700
	ii)No. of seedling survived	360	300	225	250
	iii)Survival percentage (%)	45.00	40.00	32.14	35.71
	iv)Area covered (in ha.)	18	20	25	22
9.	Employment generated (man days)	7142(12.75/ha)	8500(16.31/ha)	8915(17.58/ha)	8050(14.80/ha)
10.	No. of training conducted	5	4	5	5
11.	No. of persons trained	93	70	65	75
12.	Fund given to per SHG	M=15000, F=36000	M=15000, F=36000	M=15000, F=36000	M=15000, F=36000
13.	Additional area brought under cultivation	2	8	5	6
14.	Additional area brought under Supplemental cultivation	18	14	14	17

Source : Field Survey

Table 25: Pre and post project scenario of the selected watersheds

Sl. No.	Particular	Watershed – I (Nawada)			Watershed – II (Kaimur)			Watershed – III (Aurangabad)			Watershed – IV (Rohtas)		
		Pre	Post	% Change	Pre	Post	% Change	Pre	Post	% Change	Pre	Post	% Change
1.	Productivity of major crops (kg/ha.):												
	a)Cereals	1961	2005	2.24	1593	1600	0.44	2110	2140	1.42	2090	2150	2.87
	b) Pulses	708	789	10.44	685	685	0.00	667	650	(-) 2.55	650	650	0.00
	c) Oilseeds	509	512	0.59	489	502	2.66	590	630	6.78	575	600	4.35
	d) Vegetables & Others	14.65	14.70	0.34	12318	12425	0.87	15550	15580	0.19	12500	12800	2.40
2.	Major cropped area (in ha.)												
	a)Cereals	156	166	6.41	132	135	2.27	217	217	0.00	190	190	0.00
	b) Pulses	35	38	8.57	56	51	(-)8.93	42	42	0.00	27	25	(-) 7.41
	c) Oilseeds	5	5	0.00	8	8	0.00	13	13	0.00	10	10	0.00
	d) Vegetables & Others	28	30	7.14	40	40	0.00	42	48	14.29	30	35	16.67
3.	Cropping Intensity (%)	112	114	2	120.92	124	2.55	143.7	139	(-)4.72	140.5	140	0.00
4.	Farm income per ha. per year (in	16015	18142	13.28	20930	22718	8.54	22150	23970	8.22	24300	26500	9.05
5.	Family income per ha. per year (in	22165	23400	5.57	22917	25320	10.49	27500	29000	5.45	26500	28000	5.66
6.	Migration of rural labour	25	25	0	10	10	0.00	0.00	0.00	0.00	-	-	-
7.	Green cover / bio-mas (%)	5	6	20.00	20	22	10.00	8	10	25.00	5	7	40.00
8.	Ground water level (meters)	20	16	20.00	23	25	8.70	19	18	(-) 5.26	16	15	(-)6.25
9.	Animal breed improvement	No	No	No	No	No	No	No	No	No	No	No	No
10.	Fodder yield (kg/per ha.)	400	400	00.00	375	390	4.00	510	525	2.94	300	300	00.00
11.	Average milk yield (liters per day)	360	425	18.06	615	650	5.69	450	500	11.11	325	300	00.00
12.	Number of farmers adopted stall feeding	No	No	No	No	No	No	No	No	No	No	No	No
13.	Percentage run of from the	-	-	-	-	-	-	-	-	-	-	-	-

Source : Primary Data

Table 26: Basic amenities available to the sample households under selected watersheds

Sl. No.	Particular	Watershed – I (Nawada)		Watershed – II (Kaimur)		Watershed – III (Aurangabad)		Watershed – IV (Rohtas)	
		2001-02	2006-07	2001-02	2006-07	2001-02	2006-07	2001-02	2006-07
1.	School: a) Primary School	01	01	1	1	1	1	1	1
	b) Secondary School	01	01	1	1	1	1	1	1
	c) High School	-	-	-	-	-	-	-	-
2.	No. of Students : a) Boys	375	700	212	262	352	515	42	47
	b) Girls	125	350	148	152	107	200	38	43
3.	Nearest medical services (in kms.) : a) Doctor	01	01	1	1	2	2	2	2
	b) Nurse	01	01	1	1	2	2	2	2
	c) Nearest primary health centre	01	01	1	1	4	4	2	2
4.	Nearest Post Office (in kms.)	01	01	1	1	1	1	2	2
5.	Nearest Police Station (in kms.)	01	01	1	1	4	4	2	2
6.	Nearest Public Distribution System Outlet (Ration Shop) (in kms.)	01	01	1	1	1	1	1	1
7.	Nearest Bank (in kms.)	01	01	1	1	5	5	2	2
8.	Nearest Agriculture Produce Market (in kms.)	15	15	17	17	5	5	4	4
9.	Number of Public Toilets	-	-	-	-	5	7	-	-
10.	Number of Households with Latrine Facilities	32	45	27	41	9	15	11	14

Source : Field Survey

MAHARASHTRA

Table 1: Gadhinglaj Block (Kolhapur District)

Important Feature	Unit	Gadhinglaj
Geographical Position and Area : (Sq.km.)		
North Latitude	Degree	15^0 - 17^0
East longitude	Degree	73^0 - 74^0
Area	000ha	481.2
Climate (2001):		
Minimum temperature	Degree Celsius	14^0 c - 16^0c
Maximum temperature	Degree Celsius	39^0 c - 41^0c
Normal Rainfall	MM	946.2
Number of rainy days	Number	74
Demographic Features :		
Population (2001-02)	Number	216257
Density of population	Per sq.km.	449
Population Growth Rate (2001-02)	%	13.27
Sex ratio (Female per 1000 males)	Number	1016
Literacy Rate	%	71.81
Agriculture (2003)		
Percentage of forest area to geographical area	%	3.77
Percentage of cultivable land to geographical area	%	91.13
Percentage of net area shown more than once to net	%	12.16
Sown area	%	42336
Cropping intensity	%	96.54
Percentage of net area irrigated to area shown	%	17.13
Percentage of gross irrigated area to gross cropped area	%	16.71
Livestock and Tractors (2003):		
Number of tractors per 10000 hectares of net area sown	Number	91
Number of working cattle, buffalos 1000 hectares of net area sown area	Number	460

Source: Socio-Economic Abstract Kolhapur District, Maharashtra State 2006-07

Table 2: Kuhi Block (Nagpur District)

Important Feature	Unit	Kuhi
Geographical Position and Area : (Sq.km.)		
North Latitude	Degree	20^0 - 35^0
East longitude	Degree	78.15^0 - 79.40^0
Area	000ha	819.71
Climate (2001):		
Minimum temperature	Degree Celsius	10^0 c - 11^0c
Maximum temperature	Degree Celsius	42^0 c - 44^0c
Normal Rainfall	MM	1157
Number of rainy days	Number	114
Demographic Features :		
Population (2001-02)	Number	126316
Density of population	Per sq.km.	154
Population Growth Rate (2001-02)	%	35.13
Sex ratio (Female per 1000 males)	Number	972
Literacy Rate	%	71.94
Agriculture (2003)		
Percentage of forest area to geographical area	%	1.91
Percentage of cultivable land to geographical area	%	69.33
Percentage of net area shown more than once to net	%	9.94
Sown area	%	50941
Cropping intensity	%	88.57
Percentage of net area irrigated to area shown	%	19.55
Percentage of gross irrigated area to gross cropped area	%	21.85
Livestock and Tractors (2003):		
Number of tractors per 10000 hectares of net area sown	Number	19
Number of working cattle, buffalos 1000 hectares of net area sown area	Number	895

Source: Socio-Economic Abstract Nagpur District, Maharashtra State 2006-07

Table 3: Himayatnagar Block (Nanded District)

Important Feature	Unit	Himayatnagar
Geographical Position and Area : (Sq.km.)		
North Latitude	Degree	18.15^0 - 19.55^0
East longitude	Degree	77.7^0 - 78.15^0
Area	000ha	N.A.
Climate (2001):		
Minimum temperature	Degree Celsius	13.9^0 c
Maximum temperature	Degree Celsius	41.6^0 c
Normal Rainfall	MM	953.8
Number of rainy days	Number	43
Demographic Features :		
Population (2001-02)	Number	88924
Density of population	Per sq.km.	203
Population Growth Rate (2001-02)	%	4.22
Sex ratio (Female per 1000 males)	Number	949
Literacy Rate	%	61.86
Agriculture (2003)		
Percentage of forest area to geographical area	%	N.A.
Percentage of cultivable land to geographical area	%	N.A.
Percentage of net area shown more than once to net	%	N.A.
Sown area	%	N.A.
Cropping intensity	%	N.A.
Percentage of net area irrigated to area shown	%	N.A.
Percentage of gross irrigated area to gross cropped area	%	N.A.
Livestock and Tractors (2003):		
Number of tractors per 10000 hectares of net area sown	Number	2
Number of working cattle, buffalos 1000 hectares of net area sown area	Number	834

Source : Socio-Economic Abstract Nanded District, Maharashtra State 2006-07

Table 4: Murud Block (Raigarh District)

Important Feature	Unit	Murud
Geographical Position and Area : (Sq.km.)		
North Latitude	Degree	17.51^0 - 19.80^0
East longitude	Degree	72.51^0 - 73.40^0
Area	000ha	234.51
Climate (2001):		
Minimum temperature	Degree Celsius	10^0 c - 11^0c
Maximum temperature	Degree Celsius	34^0 c - 35^0c
Normal Rainfall	MM	3998
Number of rainy days	Number	102
Demographic Features :		
Population (2001-02)	Number	72046
Density of population	Per sq.km.	307
Population Growth Rate (2001-02)	%	3.64
Sex ratio (Female per 1000 males)	Number	1061
Literacy Rate	%	78.36
Agriculture (2003)		
Percentage of forest area to geographical area	%	23.47
Percentage of cultivable land to geographical area	%	45.80
Percentage of net area shown more than once to net	%	18.62
Sown area	%	10148
Cropping intensity	%	83.51
Percentage of net area irrigated to area shown	%	13.58
Percentage of gross irrigated area to gross cropped area	%	11.15
Livestock and Tractors (2003):		
Number of tractors per 10000 hectares of net area sown	Number	4
Number of working cattle, buffalos 1000 hectares of net area sown area	Number	937

Source: Socio-Economic Abstract Raigarh District, Maharashtra State 2006-07

Table 5: Information regarding village population under selected watersheds

Name of the Communities	Watershed-I (Kolhpur Dist.)				Watershed-II (Nagpur Dist.)				Watershed-III (Raigarh Dist.)				Watershed-IV (Nanded Dist.)				Over all			
	No. of H.H	M	F	Total	No. of H.H	M	Fe	Total	No. of H.H	M	F	Total	No. of H.H	Male	F	Total	No. of H.H	M	F	Total
General	667 (62.92)	1909 (49.16)	1974 (50.83)	3883 (76.28)	13.54 (64.75)	3317 (50.00)	3316 (49.99)	6633 (67.30)	663 (69.56)	1790 (48.30)	1916 (51.70)	3706 (78.88)	245 (68.05)	654 (51.13)	625 (48.86)	1279 (68.87)	2929 (65.61)	7670 (49.48)	7831 (50.51)	15501 (72.09)
SC	111 (10.47)	163 (48.94)	170 (51.05)	333 (6.54)	375 (17.93)	919 (51.39)	869 (48.60)	1788 (18.14)	95 (9.96)	173 (51.48)	163 (48.52)	336 (7.15)	63 (17.50)	171 (5343)	149 (46.56)	320 (17.23)	644 (14.42)	1426 (51.35)	1351 (48.64)	2777 (12.91)
ST	91 (8.58)	143 (47.19)	160 (52.80)	303 (5.95)	148 (7.07)	410 (50.67)	399 (49.32)	809 (8.20)	88 (9.23)	172 (52.59)	155 (47.39)	327 (6.96)	29 (8.05)	85 (55.55)	68 (44.44)	153 (8.23)	356 (7.97)	810 (50.87)	782 (49.12)	1592 (7.40)
OBC	191 (18.01)	280 (49.03)	291 (50.96)	571 (11.23)	214 (10.23)	328 (52.48)	297 (47.42)	625 (6.34)	107 (11.22)	168 (51.06)	161 (48.94)	329 (7.00)	23 (6.38)	56 (53.33)	49 (46.66)	105 (5.56)	535 (11.98)	832 (51.04)	798 (48.95)	1630 (7.58)
All Total	1060 (100)	2495 (49.01)	2595 (50.99)	5090 (100)	2091 (100)	4974 (50.47)	4881 (49.53)	9855 (100)	953 (100)	2303 (49.03)	2395 (50.97)	4698 (100)	360 (100)	99 (52.02)	891 (47.98)	1857 (100)	4464 (100)	10738 (49.94)	107621 (50.05)	21500 (100)

`Source : Census of India, 2001

*M= Male, *F= Female, *H.H. = House Holds, * Bracket value indicating the %

Table 6: Information regarding self help groups (SHGs) and user groups (UGs) of the villages under selected watersheds

Sl. No.	Particulars	Watershed-I (Kolhpur Dist.) Basarge Village		Watershed-II (Nagpur Dist.) Mandhal Village		Watershed-III (Raigarh Dist.) Walke- shirgoan Village		Watershed-IV (Nanded Dist.) Takarala Village	
		S.H.G.	U.G.	S.H.G.	U.G.	S.H.G.	U.G.	S.H.G.	U.G.
1.	Total No. of SHGs?/ UGs in the village	7	9	15	16	17	5	9	10
2.	No. of SHGs/UGs are involved in watershed management	4	9	4	5	4	2	2	4
3.	No. of SHGs/UGs farmed by women only	5	0	14	0	5	0	1	0
4.	No. of SHGs/UGs farmed only by women are involved inwatershed management	0	0	4	0	0	0	2	0

Source : Interview schedules, field survey, village panchayat office record of the various watersheds, 2002 - 03 to 2006 - 07

Table 7: Information regarding contribution to the fund (in Rs.) by the self help group (SGs) of the villages under selected watersheds

Sl. No.	Particulars	Watershed-I (Kolhpur Dist.)	Watershed-II (Nagpur Dist.)	Watershed-III (Raigarh Dist.)	Watershed-IV (Nanded Dist.)	Overall
1.	Contribution of SGHs framed for the other activities					
	i)Only men	0	1	0	2	3
	ii)Only women	4	14	10	13	41
	iii) Total	4	15	10	15	44
2.	Fund available by sources (other activities)					
	i)Bank	10,000	15,000	10,000	10,000	45,000
	ii)Govt. sector	0	0		0	0
	iii)Other	0	0		1	1
3.	Contribution of SGHs framed for watershed management only					
	i)Only men	0	0	0	0	0
	ii)Only women	5	2	6	2	15
	iii) Total	5	2	6	2	15
4.	Find available by source (in Rs.)					
	i)Bank	1,00,000	1,00,000	1,50,000	1,00,000	4,50,000
	ii)Govt. sector	0	0	0	0	0
	iii)Other	0	0	0	0	0

Source : Field Survey, village panchayat office record of the various watersheds, 2002 - 03 to 2006 – 07

Table 8: Information regarding changes in irrigation of the villages under selected watersheds

Sl.No	Category of Farmers	Watershed-I (Kolhpur Dist.) Basarge village				Watershed-II (Nagpur Dist.) Mandhal village				Watershed-III (Raigarh Dist.) Walke-Shirgoan village				Watershed-IV (Nanded Dist.) Takarala village			
		No. of H.H.	% of land acquired	% of land irrigated		No. of H.H.	% of land acquired	% of land irrigated		No. of H.H.	% of land acquired	% of land irrigated		No. of H.H.	% of land acquired	% of land irrigated	
				2001-02	2006-07			2001-02	2006-07			2001-02	2006-07			2001-02	2006-07
1.	Big	10	11	21	34	90	12	26	62	15	5	26	34	6	5	10	15
2.	Medium	281	21	29	48	134	18	27	48	31	10	31	42	46	20	8	14
3.	Small	254	33	26	54	229	24	34	52	147	15	27	39	184	45	9	12
4.	Marginal	635	35	34	77	311	46	31	74	442	70	22	38	156	30	6	10

Source : Field Survey, village panchayat office record of the various watersheds, 2002 - 03 to 2006 – 07

Table 9: Information regarding land of the villages under selected watersheds

Sl. No.	Nature of land	Watershed-I (Kolhpur Dist.) Basarge village			Watershed-II (Nagpur Dist.) Mandhal village			Watershed-III (Raigarh Dist.) Walke-Shirgoan village			Watershed-IV (Nanded Dist.) Takarala village		
		Area in ha.		% change in area	Area in ha.		% change in area	Area in ha.		% change in area	Area in ha.		% change in area
		2001-02	2006-07		2001-02	2006-07		2001-02	2006-056.007		2001-02	2006-07	
1.	Govt. waste land	45.87	45.87	0.00	120.42	120.42	0.00	113.00	113.00	0.00	2.15	2.15	0.00
2.	Private waste land	42.37	0.00	-100.00	229.00	32.54	-85.79	286.11	56.00	-80.42	30.13	17.69	-410.28
3.	Common grazing land	10.23	10.23	0.00	5.73	8.19	42.93	20.85	20.85	0.00	170.10	170.10	0.00
4.	Forest land	0.00	0.00	0.00	0.00	0.00	0.00	111.63	111.63	0.00	12.30	12.30	0.00
5.	Agricultural land	623.06	665.43	6.80	987.00	1181.00	19.65	206.89	493.00	138.29	490.00	502.40	2.53
6.	Others if any	27.76	27.76	0.00	0.00	0.00	0.00	197.60	141.60	-28.34	9.40	9.40	0.00
Total		749.29	749.29	0.00	1342.15	1342.15	0.00	963.08	936.08	0.00	714.10	714.10	0.00

Source : Field Survey, village panchayat office record of the various watersheds, 2002 - 03 to 2006 – 07

Table 10: Irrigation status of agricultural land of the villages under selected watersheds (in ha)

Sl.No	Year	particulars	Watershed-I (Kolhpur Dist.) Basarge village		Watershed-II (Nagpur Dist.) Mandhal village		Watershed-III (Raigarh Dist.) Walke-Shirgoan village		Watershed-IV (Nanded Dist.) Takarala village	
			Irrigated	Un-irrigated	Irrigated	Un-irrigated	Irrigated	Un-irrigated	Irrigated	Un-irrigated
1.	2001	Kharif	101.56	521.50	201.88	785.12	108.11	98.78	115.16	374.84
		Rabi	64.31	558.75	89.35	897.65	79.09	127.80	110.03	379.97
		Summer	63.27	559.79	66.27	920.73	41.04	165.85	67.46	422.54
2.	2002	Kharif	107.12	520.76	229.34	757.66	119.05	94.84	127.64	362.41
		Rabi	69.37	558.51	92.27	898.73	74.14	139.75	113.97	376.08
		Summer	64.56	563.32	79.54	911.46	46.51	167.38	89.44	400.61
3.	2003	Kharif	105.16	528.00	233.21	680.36	132.07	128.64	129.49	360.56
		Rabi	73.25	559.91	98.10	815.47	91.90	168.81	112.31	377.74
		Summer	71.33	561.83	74.11	839.46	88.27	172.44	92.02	398.03
4.	2004	Kharif	119.35	514.91	256.89	664.11	153.51	158.67	126.60	365.55
		Rabi	79.21	555.05	129.65	791.35	89.67	222.51	115.09	377.06
		Summer	77.87	556.39	87.63	833.37	91.04	221.14	96.89	395.26
5.	2005	Kharif	147.96	501.19	288.71	660.29	202.31	124.80	131.61	360.54
		Rabi	87.33	561.82	114.45	834.55	143.97	183.14	117.19	374.96
		Summer	94.28	554.87	97.22	851.78	128.64	198.47	86.29	405.86
6.	2006	Kharif	188.98	476.45	351.45	661.55	389.88	103.18	169.54	322.61
		Rabi	112.32	553.11	181.33	831.67	381.45	11.61	129.10	363.05
		Summer	96.74	568.69	104.11	908.89	339.64	153.39	97.36	394.79
7.	2007	Kharif	191.13	474.30	429.57	751.43	419.10	73.90	192.96	309.48
		Rabi	129.37	536.06	287.11	893.89	411.44	81.56	156.71	345.73
		Summer	113.56	551.87	269.05	911.95	443.47	49.53	109.96	392.48

Source : Field Survey, village panchayat office record of the various watersheds, 2002 - 03 to 2269.05006 – 07

Table 11: Information regarding irrigation source of the villages under selected watersheds

Sl. No.	Type of sources	Watershed-I (Kolhpur Dist.) Basarge village				Watershed-II (Nagpur Dist.) Mandhal village				Watershed-III (Raigarh Dist.) Walke-Shirgoan village				Watershed-IV (Nanded Dist.) Takarala village			
		No. Capa. length	Area in ha.		% change in area	No. Capa. length	Area in ha.		% change in area	No. Capa. length	Area in ha.		% change in area	No. Capa. length	Area in ha.		% change in area
			2001-02	2006-07			2001-02	2006-07			2001-02	2006-07			2001-02	2006-07	
1.	Irrigated land (Govt.)ha	0	0	0	0	0			0	0	0	0	0	0	0	0	0
2.	Irrigated land (Pvt.)ha	120	78	102	30.76	435.82	234.67	262.45	11.83	376.68	127	324	155.12	271	110	125	13.63
3.	Tanks (Govt.)	1	1	2.2	120	2	3.21	5.27	64.17	1	1.75	4	128.57	0	0	0	0
4.	Tanks (Pvt.)	5	2.3	9.2	300	3	4	6	50	4	2	5	150	0	0	0	0
5.	Well (Govt.)	2	11	17	54.54	4	19	26	36.84	5	11	23	109.09	1	2	3	50
6.	Well (Pvt.)	9	23	65	182.61	21	101	131.06	29.76	64	111.12	137.48	23.72	7	15	20	33.33
7.	Sallow tube-well	2	4	10	150	9	16.11	23.95	48.66	15	17	29	70.58	11	25	45	80
8.	Deep tube well	2	1	5	400	0	0	0	0	14	9	11	22.22	5	7	10	42.85
9.	Others	5	13	22	69.23	0	0	0	0	54	49	72	46.93	0	0	0	0

Source : Field Survey, village panchayat office record of the various watersheds, 2002 - 03 to 2006 – 07

Table 12: Information regarding water harvesting structure of the villages under selected watersheds

Sl. No.	Type of sources	Watershed-I (Kolhpur Dist.) Basarge village			Watershed-II (Nagpur Dist.) Mandhal village			Watershed-III (Raigarh Dist.) Walke-Shirgoan village			Watershed-IV (Nanded Dist.) Takarala village		
		Total no. working			Total no. working			Total no. working			Total no. working		
		2001-02	2006-07	% change of working	2001-02	2006-07	% change of working	2001-02	2006-07	% change of working	2001-02	2006-07	% change of working
1.	Tanks	1	4	300	3	3	0	3	3	0	0	0	0
2.	Check Dams	0	0	0	6	6	0	0	0	0	0	0	0
3.	Nala Plughs	2	6	200	3	3	0	0	0	0	0	0	0
4.	Weirs	0	0	0	0	0	0	0	0	0	0	0	0
5.	Farm ponds	1	4	300	0	6	100	2	25	1150	0	0	0
6.	Diversion	0	0	0	0	0	0	0	3	0	4	4	0
7.	Submersible Check Dams	0	2	0	0	0	0	0	0	0	25	45	80
8.	Percolation Well	4	10	150	0	0	0	0	0	0	15	20	33.33
9.	Any other (boar wells)	0	0	0	0	0	0	0	0	0	0	0	0

Source : Field Survey, village panchayat office record of the various watersheds, 2002 - 03 to 2006 – 0700

Table 13: Information regarding sources of drinking water of villages under selected watersheds

Sl. No.	Type of sources	Watershed-I (Kolhpur Dist.) Basarge village		Watershed-II (Nagpur Dist.) Mandhal village		Watershed-III (Raigarh Dist.) Walke-Shirgoan village		Watershed-IV (Nanded Dist.) Takarala village	
		Functioning	Not Functioning	Functioning	Not Functioning	Functioning	Not Functioning	Functioning	Not Functioning
1.	Hand Pump	6	0	31	0	0	0	5	0
2.	Wells	5	0	19	0	16	0	7	0
3.	Ponds	4	0	6	0	0	0	0	0
4.	Stand Posts	0	0	3	0	15	0	0	0
5.	Household taps	26	0	153	0	425	0	0	0
6.	Springs	0	0	0	0	1	0	0	0
7.	Others (boar well)	0	0	0	0	0	0	25	15

Source : Field Survey, village panchayat office record of the various watersheds, 2002 - 03 to 2006 – 07

Table 14: Information regarding occupational status of the SHG/beneficiaries of the villages under selected watershed–I (Kolhapur) Basarge village

Sl. No.	Occupational Group	Total no of Group	Total no of Beneficiaries	SC (%)	ST (%)	General other than Minorities (%)	Minorities (%)	Woman (%)	Total (%)
1.	Agriculture	5	60	2 (3.33)	1 (1.66)	16 (26.66)	0	41 (68.33)	60 (66.66)
2.	Poultry	0	0	0	0	0	0	0	0
3.	Dairy	2	30	4 (13.33)	1 (3.33)	9 (30.00)	2 (6.66)	14 (46.66)	30 (33.34)
4.	Business	0	0	0	0	0	0	0	0
5.	Rural Artisan	0	0	0	0	0	0	0	0
6.	Service	0	0	0	0	0	0	0	0
7.	Landless Labour	0	0	0	0	0	0	0	0
8.	Others	0	0	0	0	0	0	0	0
9.	Total	7	90	6 (16.66)	2 (4.99)	25 (56.66)	2 (6.66)	55 (114.99)	90 (100.00)

Source : Taluka Agriculture office, Gadhinglaj, Dist. Kolhapur, Village panchayat office record, 2002-03 to 2006-07.

Table 14 A: Information regarding occupational status of the SHG/beneficiaries of the villages under selected watershed–II (Nagpur) Mandhal village

Sl. No.	Occupational Group	Total no of Group	Total no of Beneficiaries	SC (%)	ST (%)	General other than Minorities (%)	Minorities (%)	Woman (%)	Total (%)
1.	Agriculture	4	80	9 (11.25)	6 (7.50)	0	11 (13.75)	54 (67.50)	80 (26.66)
2.	Poultry	1	20	1 (5.00)	0	4 (20.00)	6 (30.00)	9 (45.00)	20 (6.66)
3.	Dairy	0	0	0	0	0	0	0	0
4.	Business	2	40	6 (15.00)	8 (20.00)	4 (10.00)	4 (10.00)	18 (45.00)	40 (13.33)
5.	Rural Artisan	6	120	2 (1.67)	0	24 (20.00)	0	94 (78.34)	120 (40.00)
6.	Service	0	0	0	0	0	0	0	0
7.	Landless Labour	2	40	6 (15.00)	4 (10.00)	16 (40.00)	6 (15.00)	8 (20.00)	40 (13.33)
8.	Others	0	0	0	0	0	0	0	0
9.	Total	15	300	24 (47.92)	18(37.50)	48 (90.00)	27 (68.75)	18 (255.84)	300(100.00)

Source : Project report on N.W.D.P.R.A. 10th five year plan, Kuhi, Nagpur, Department of Agriculture Government of Maharashtra, 2002-03 to 2006-07.

Table 14 B: Information regarding occupational status of the SHG/beneficiaries of the villages under selected watershed–III (Raigarh) Walke-Shirgoan village

Sl. No.	Occupational Group	Total no of Group	Total no of Beneficiaries	SC (%)	ST (%)	General other than Minorities (%)	Minorities (%)	Woman (%)	Total (%)
1.	Agriculture	7	89	14 (15.73)	11 (12.35)	23 (25.84)	9 (10.11)	32 (35.96)	89 (41.59)
2.	Poultry	2	24	3 (12.50)	2 (8.33)	4 (16.67)	6 (25.00)	9 (37.50)	24 (11.21)
3.	Dairy	2	23	5 (21.73)	4 (17.39)	3 (13.04)	6 (26.08)	5 (21.73)	23 (10.74)
4.	Business	5	64	9 (14.06)	5 (7.81)	18 (28.12)	8 (12.50)	24 (37.50)	64 (29.92)
5.	Rural Artisan	0	0	0	0	0	0	0	0
6.	Service	0	0	0	0	0	0	0	0
7.	Landless Labour	1	14	2 (14.28)	1 (7.14)	2 (14.28)	1 (7.14)	8 (57.14)	14 (6.54)
8.	Others	0	0	0	0	0	0	0	0
9.	Total	17	214	33 (15.42)	23 (10.75)	50 (23.36)	30 (14.01)	78 (36.44)	214 (100.00)

Source : Interview schedules, field survey,Village panchayat office record, 2002-03 to 2006-07.

Table 14 C: Information regarding occupational status of the SHG/beneficiaries of the villages under selected watershed–IV (Nanded) Takarala village

Sl. No.	Occupational Group	Total no of Group	Total no of Beneficiaries	SC (%)	ST (%)	General other than Minorities (%)	Minorities (%)	Woman (%)	Total (%)
1.	Agriculture	3	41	8 (19.51)	5 (12.19)	11 (26.82)	7 (17.07)	10 (24.39)	41 (33.06)
2.	Poultry	1	14	2 (14.28)	0	7 (50.00)	1 (7.14)	4 (28.57)	14 (11.29)
3.	Dairy	2	25	5 (20.00)	2 (8.00)	9 (36.00)	2 (8.00)	7 (28.00)	25 (20.16)
4.	Business	1	16	2 (12.50)	1 (6.25)	2 (12.50)	2 (12.50)	9 (56.25)	16 (12.90)
5.	Rural Artisan	0	0	0	0	0	0	0	0
6.	Service	0	0	0	0	0	0	0	0
7.	Landless Labour	2	28	4 (14.28)	1 (3.57)	2 (7.14)	6 (21.43)	15 (53.57)	28 (22.58)
8.	Others	0	0	0	0	0	0	0	0
9.	Total	9	124	21 (16.93)	9 (7.25)	31 (25.00)	18 (14.51)	45 (36.29)	124 (100.00)

Source : Interview schedules, field survey,Village panchayat office record, 2002-03 to 2006-07.

Table 15: Information regarding livestock of the villages under selected watersheds

Sl. No.	Type of Live Stock	Watershed-I (Kolhpur Dist.) Basarge village			Watershed-II (Nagpur Dist.) Mandhal village			Watershed-III (Raigarh Dist.) Walke-Shirgoan village			Watershed-IV (Nanded Dist.) Takarala village		
		Number		% change	Number		% change	Number		% change	Number		% change
		2001-02	2006-07		2001-02	2006-07		2001-02	2006-07		2001-02	2006-07	
1.	Bullock	271	349	28.78	1900	1950	2.63	265	295	11.32	80	100	25
2.	Cows	283	317	12.01	1025	1050	2.43	55	70	27.27	150	200	33.33
3.	Cows calf he/she	97	189	94.84	247	325	31.57	15	30	100	80	100	25
4.	Buffalo	176	307	74.43	95	100	5.26	40	58	45	45	50	11.11
5.	Buffalo calf (he/she)	84	131	55.95	32	69	115.62	20	30	50	32	38	18.75
6.	Goat	173	297	71.67	136	324	138.23	120	145	20.83	250	230	-8
7.	Sheep	96	164	70.83	2325	2450	5.37	0	0	0	0	0	0
8.	Camel	0	0	0	0	0	0	0	0	0	0	0	0
9.	Others	1977	2722	37.68	0	0	0	550	690	25.45	100	70	-30

Source : Field Survey, village panchayat office record of the various watersheds, 2002 - 03 to 2006 – 07

Table 16: Educational status of villagers/category of farmers of watershed–I (Kolhapur) Basarge village

Sl. No.	Educational Status	General			Schedule Caste (SC)			Schedule Tribe (ST)			Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
1.	P.G.	37 (56.06)	29(43.93)	66(81.48)	7(63.63)	4(36.36)	11(15.58)	3(75.00)	1(25.00)	4(4.94)	47(58.02)	34(41.97)	81(2.25)
2.	U.G.	53 (53.00)	47(47.00)	100(69.44)	15(46.87)	17(53.12)	32(22.23)	5(41.67)	7(58.34)	12(8.34)	73(50.69)	71(49.30)	144(3.99)
3.	H.S.	127(52.91)	113(47.08)	240(78.43)	18(58.06)	13(41.93)	31(10.13)	16(45.71)	19(54.28)	35(11.43)	161(52.61)	145(47.38)	306(8.49)
4.	M.P.	109(55.32)	88(44.67)	197(75.77)	9(37.50)	15(62.50)	24(9.23)	18(46.15)	21(53.84)	39(15.00	136(52.30)	124(47.69)	260(7.22)
5.	VIII Standard	131(50.97)	126(49.06)	257(83.44)	13(40.62)	19(59.37)	32(10.38)	13(68.42)	6(31.57)	19(6.16)	157(50.97)	151(49.02)	308(8.55)
6.	Literate	492(49.44)	503(50.55)	995(89.88)	31(51.67)	29(59.34)	60(5.42)	29(55.76)	23(44.23)	52(4.69)	552(49.86)	555(50.13)	1107(30.74)
7.	Illiterate	581(46.33)	673(53.66)	1254(89.90)	36(51.42)	34(48.34)	70(5.01)	27(38.02)	44(61.97)	71(5.08)	644(46.16)	751(53.83)	1395(38.73)
8.	Total	1530(49.21)	1579(50.78)	3109(86.340	129(49.61)	131(50.38)	260(7.22)	111(47.84)	121(52.15)	232(6.44)	1770(49.15)	1831(50.85)	3601(100.00)

Source : Records of the village literacy census 2001-02, field survey village panchayat.

Table 16A: Educational status of villagers/category of farmers of watershed–II (Nagpur) Mandhal village

Sl. No.	Educational Status	General			Schedule Caste (SC)			Schedule Tribe (ST)			Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
1.	P.G.	227(52.47)	202(47.08)	429(81.72)	33(55.93)	26(44.06)	59(11.23)	21(56.75)	16(43.24)	37(7.04)	281(53.52)	244(46.47)	525(6.14)
2.	U.G.	253(83.83)	217(46.17)	470(80.20)	44(51.76)	41(48.23)	85(14.50)	18(58.06)	13(41.93)	31(5.29)	315(53.75)	271(46.24)	586(6.85)
3.	H.S.	283(51.74)	264(48.26)	547(78.93)	36(55.38)	29(44.61)	65(9.37)	44(54.32)	37(45.67)	81(11.68)	363(52.38)	330(47.61)	693(8.11)
4.	M.P.	241(47.53)	266(52.46)	507(61.38)	112(56.00)	88(44.00)	200(24.21)	64(53.78)	55(46.21)	119(14.40)	417(50.48)	409(49.51)	826(9.67)
5.	VIII Standard	195(47.56)	215(52.44)	410(45.96)	181(50.41)	178(49.58)	359(40.24)	59(47.96)	64(52.03)	123(13.78)	435(48.76)	457(51.23)	892(10.44)
6.	Literate	734(57.66)	539(42.34)	1273(67.78)	202(47.98)	219(52.01)	421(22.41)	83(45.10)	10154.89)	184(9.79)	1019(54.25)	859(45.74)	1878(21.98)
7.	Illiterate	1124(45.10)	1368(54.89)	2492(79.26)	216(50.94)	208(49.05)	424(13.48)	117(51.31)	111(48.68)	228(7.25)	1457(46.34)	1687(53.65)	3144(36.79)
8.	Total	3057(49.88)	3071(50.11)	6128(71.72)	824(51.08)	789(48.91)	1613(18.87)	406(50.56)	397(49.43)	803(9.39)	4287(50.17)	4257(49.82)	8544(100.00)

Source : Records of the village literacy census 2001-02, field survey village panchayat.

Table 16B: Educational status of villagers/category of farmers of watershed–III (Raigarh) Walke-Shirgoan village

Sl. No.	Educational Status	General			Schedule Caste (SC)			Schedule Tribe (ST)			Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
1.	P.G.	23(57.56)	17(42.50)	40(68.96)	4(66.67)	2(33.34)	6(10.34)	7(58.34)	5(41.67)	12(20.69)	34(58.62)	24(41.37)	58(2.14)
2.	U.G.	29(58.00)	21(42.00)	50(59.52)	9(64.28)	5(35.71)	14(16.67)	11(55.00)	9(45.00)	20(23.81)	49(58.34)	35(41.67)	84(3.10)
3.	H.S.	87(58.00)	63(42.00)	150(71.42)	21(61.76)	13(38.23)	34(16.19)	14(53.85)	12(46.15)	26(12.38)	122(58.09)	88(41.90)	210(7.76)
4.	M.P.	176(57.32)	131(42.67)	307(84.10)	14(46.67)	16(53.34)	30(8.21)	17(60.71)	11(39.28)	28(7.67)	207(56.71)	158(43.28)	364(13.49)
5.	VIII Standard	173(55.62)	138(44.37)	311(81.63)	19(45.00)	23(54.76)	42(11.02)	15(53.57)	13(46.42)	28(7.34)	207(54.34)	174(45.67)	381(4.09)
6.	Literate	389(47.09)	437(52.90)	826(89.78)	29(55.76)	23(44.23)	52(5.65)	19(45.23)	23(54.76)	42(4.56)	437(47.5)	483(52.5)	920(34.02)
7.	Illiterate	248(42.83)	331(57.16)	579(84.40)	21(39.62)	32(60.37)	53(7.72)	26(48.15)	28(51.85)	54(7.87)	295(43.00)	391(57.00)	686(25.36)
8.	Total	1125(49.71)	1138(50.28)	2263(83.69)	117(50.64)	114(49.35)	231(8.54)	109(51.90)	101(48.09)	210(7.76)	1351(49.96)	1353(50.04)	2704(100.00)

Source : Records of the village literacy census 2001-02, field survey village panchayat.

Table 16C: Educational status of villagers/category of farmers of watershed–IV (Nanded) Takarala village

Sl. No.	Educational Status	General			Schedule Caste (SC)			Schedule Tribe (ST)			Total		
		Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
1.	P.G.	2(66.67)	1(33.34)	3(18.75)	5(62.50)	3(37.50)	8(50.00)	3(60.00)	2(40.00)	5(31.25)	10(62.50)	6(37.50)	16(5.48)
2.	U.G.	1(25.00)	3(75.00)	4(18.18)	9(64.28)	5(35.71)	14(63.64)	2(50.00)	2(50.00)	4(18.19)	12(54.55)	10(45.45)	22(7.53)
3.	H.S.	17(58.62)	12(41.37)	29(43.94)	14(56.00)	11(44.00)	25(37.88)	7(58.34)	5(41.67)	12(18.19)	38(57.58)	28(42.42)	66(22.60)
4.	M.P.	11(55.00)	9(45.00)	20(30.31)	19(52.78)	17(47.23)	36(54.55)	6(60.00)	4(40.00)	10(15.16)	36(54.55)	30(45.45)	66(22.60)
5.	VIII Standard	18(54.55)	15(45.46)	33(33.67)	23(44.23)	29(55.77)	52(53.06)	8(61.54)	5(38.47)	13(13.26)	49(50.00)	49(50.00)	98(33.56)
6.	Literate	56(54.39)	47(45.63)	103(57.86)	33(58.93)	23(41.07)	56(31.46)	11(57.89)	8(42.10)	19(13.01)	49(33.56)	97(66.43)	146(50.00)
7.	Illiterate	3(6.25)	45(93.75)	48(32.87)	37(46.83)	42(53.16)	79(54.10)	9(47.37)	10(52.63)	19(13.01)	49(33.56)	97(66.43)	146(50.00)
8.	Total	140(51.47)	132(48.53)	272(93.15)	140(51.85)	130(48.14)	270(92.46)	46(56.09)	36(43.90)	82(28.08)	294(49.66)	298(50.33)	292(100.00)

Source : Records of the village literacy census 2001-02, field survey village panchayat.

Table 17: Information regarding basic amenities of the villages under selected watersheds

Sl. No.	Particulars	Watershed-I (Kolhpur Dist.) Basarge Village		Watershed-II (Nagpur Dist.) Mandhal Village		Watershed-III (Raigarh Dist.) Walke- shirgoan Village		Watershed-IV (Nanded Dist.) Takarala Village	
		2001-02	2006-07	2001-02	2006-07	2001-02	2006-07	2001-02	2006-07
1.	School : a) Primary School	1	1	2	2	1	1	1	1
	b) Secondary School	0	0	1	1	1	1	0	0
	c) High School	0	0	5	5	1	1	0	0
2.	No. of Student : a) Boys	190	230 (21.05)	980	1887(192.55)	350	408(16.57)	30	50(66.67)
	b) Girls	70	101(44.28)	870	1527(175.510	250	333(33.2)	50	70(40.00)
3.	Nearest Medical Services : a) Doctor	1	2	4	6	1	1	1	1
	b) Nurse	2	5	2	8	1	1	1	1
	c) Nearest Primary Health Care Centre	2km	2 km	0	1km	Walke	Walke	15 km	15 km
4.	Nearest Post Office	Basarge	Basarge	In village	In village	Walke	Walke	Kandi	Kandi
5.	Nearest Police Station	Nalkarni	Nalkarni	9 km	9 km	Ravadanda	Ravadanda	Tamsa	Tamsa
6.	Nearest Public Distribution System Outlet (Ration shop)	In village	In village	In village	In village	Shirgoan	Shirgoan	Local	Local
7.	Nearest Bank	Nalkarni	Nalkarni	Bankof Maharashtra	Bankof Maharashtra	State Bank (Salav)	State Bank (Salav)	S.B.I. (Savsam)	S.B.I. (Savsam)
8.	Nearest Agriculture Production Market	Nalkarni	Nalkarni	A.P.M.C. 1km	A.P.M.C. 1km	APML Murud 35km	APML Murud 35km	Bhokar 15 km	Bhokar 15 km
9.	Number of Public Toilets	4	4	2	2	0	75	No.	No.
10.	Number of Households to Latrines	All	All	3	3	0	3	4	5

Source : Records of the village panchayat , field survey of the various watersheds, 2002 - 03 to 2006 - 07

Table 18: Information regarding beneficiary households under selected watersheds

Sl. No.	Name of the Communities	Watershed-I (Kolhpur Dist.) Basarge village				Watershed-II (Nagpur Dist.) Mandhal village				Watershed-III (Raigarh Dist.) Walke-Shirgoan village				Watershed-IV (Nanded Dist.) Takarala village			
		No. of H.H.	Male	Female	Total	No. of H.H.	Male	Female	Total	No. of H.H.	Male	Female	Total	No. of H.H.	Male	Female	Total
1.	General	504	1530 (49.21)	1579 (50.78)	3109	1231	3057 (49.88)	3071 (50.11)	6128	434	1125 (49.71)	1138 (50.28)	2263	61	140 (51.47)	132 (48.52)	272
2.	SC	92	129 (49.61)	131 (50.38)	260	340	824 (51.08)	789 (48.91)	1613	77	117 (50.65)	114 (49.35)	231	36	92 (51.68)	86 (48.31)	178
3.	ST	77	111 (47.84)	121 (52.15)	232	147	406 (50.56)	397 (49.44)	803	64	109 (51.90)	101 (48.09)	210	15	46 (56.09)	36 (43.90)	82
4.	Minorities & Others	155	221 (49.22)	228 (50.78)	449	214	328 (52.48)	297 (47.52)	625	71	89 (50.28)	88 (49.71)	177	23	56 (53.34)	49 (46.67)	105

Source : Census of India, 2001

Table 18(a): Information regarding non-beneficiary households under selected watersheds

Sl. No.	Name of the Communities	Watershed-I (Kolhpur Dist.) Basarge village				Watershed-II (Nagpur Dist.) Mandhal village				Watershed-III (Raigarh Dist.) Walke-Shirgoan village				Watershed-IV (Nanded Dist.) Takarala village			
		No. of H.H.	Male	Female	Total	No. of H.H.	Male	Female	Total	No. of H.H.	Male	Female	Total	No. of H.H.	Male	Female	Total
1.	General	163	379 (48.95)	395 (51.03)	774	123	260 (51.48)	245 (48.51)	505	229	665 (46.08)	778 (53.91)	1443	184	514 (51.04)	493 (48.95)	1007
2.	SC	19	34 (46.96)	39 (53.42)	73	35	95 (54.28)	80 (45.71)	175	18	56 (53.34)	49 (46.67)	105	27	79 (55.63)	63 (44.36)	142
3.	ST	14	32 (45.07)	39 (54.92)	71	1	4 (66.67)	2 (33.34)	6	24	63 (53.85)	54 (46.15)	117	14	39 (54.92)	32 (45.07)	71
4.	Minorities & Others	36	59 (48.36)	63 (51.63)	122	-	-	-	-	36	79 (51.97)	73 (48.02)	152	-	-	-	-

Source : Census of India, 2001

Table 19: Information regarding crop cultivated area of the beneficiary farmers (big) under selected watersheds

(area in ha)

Sl.No.	Type of Crop	Watershed-I (Kolhpur Dist.) Basarge village			Watershed-II (Nagpur Dist.) Mandhal village			Watershed-III (Raigarh Dist.) Walke-Shirgoan village			Watershed-IV (Nanded Dist.) Takarala village		
		Cultivated Area (in ha)			Cultivated Area (in ha)			Cultivated Area (in ha)			Cultivated Area (in ha)		
		2001-02	2006-07	% change Cultivated Area	2001-02	2006-07	% change Cultivated Area	2001-02	2006-07	% change Cultivated Area	2001-02	2006-07	% change Cultivated Area
1.	Kharif	15.2	28	84.21	18.2	30.8	69.23	12.6	29.8	136.51	26.6	29.8	12.03
2.	Rabi	6.8	15.6	129.41	11.2	23.8	112.5	3.7	4.2	13.51	3	4.4	46.66
3.	Summer	5.6	10	78.51	1.2	2.8	133.33	3.6	3.6	0	0.4	2.4	500

Source : Interview schedules, village panchayat office record of the various watersheds, 2002 - 03 to 2006 – 07

Table 19(A): Information regarding crop cultivated area of the non-beneficiary farmers (big) under selected watersheds

(area in ha)

Sl.No.	Type of Crop	Watershed-I (Kolhpur Dist.) Basarge village			Watershed-II (Nagpur Dist.) Mandhal village			Watershed-III (Raigarh Dist.) Walke-Shirgoan village			Watershed-IV (Nanded Dist.) Takarala village		
		Cultivated Area (in ha)			Cultivated Area (in ha)			Cultivated Area (in ha)			Cultivated Area (in ha)		
		2001-02	2006-07	% change Cultivated Area	2001-02	2006-07	% change Cultivated Area	2001-02	2006-07	% change Cultivated Area	2001-02	2006-07	% change Cultivated Area
1.	Kharif	6.85	8.4	22.62	46	49.8	8.26	17.8	17.7	-0.56	38	38.1	0.26
2.	Rabi	1.1	2.6	136.36	23.2	24.0	3.44	0.35	0.45	28.57	4.6	6.4	39.13
3.	Summer	1.0	1.2	20.0	3.4	4.8	41.17	11.2	11.2	0	0.8	2	100

Source : Field survey, village panchayat office record of the various watersheds, 2002 - 03 to 2006 – 07

Table 20: Information regarding crop production of the beneficiary farmers (big) under selected watersheds

(prodn. In quintal)

Sl.No.	Type of Crop	Watershed-I (Kolhpur Dist.) Basarge village			Watershed-II (Nagpur Dist.) Mandhal village			Watershed-III (Raigarh Dist.) Walke-Shirgoan village			Watershed-IV (Nanded Dist.) Takarala village		
		Production (in Quintal)			Production (in Quintal)			Production (in Quintal)			Production (in Quintal)		
		2001-02	2006-07	% change of Production	2001-02	2006-07	% change of Production	2001-02	2006-07	% change of Production	2001-02	2006-07	% change of Production
1.	Kharif	629	1824	189.98	335	1376	310.74	519	1008	94.21	389.75	402.75	3.33
2.	Rabi	161	360	123.60	157	1520	868.15	11	23.2	110.90	45.5	87	91.20
3.	Summer	5230	13100	150.47	87	376	332.18	101.4	119.7	18.4	605	1858	207.10

Source : Field survey, village panchayat office record of the various watersheds, 2002 - 03 to 2006 – 07

Table 20(A): Information regarding crop production of the non-beneficiary farmers (big) under selected watersheds

(prodn. In quintal)

Sl.No.	Type of Crop	Watershed-I (Kolhpur Dist.) Basarge village			Watershed-II (Nagpur Dist.) Mandhal village			Watershed-III (Raigarh Dist.) Walke-Shirgoan village			Watershed-IV (Nanded Dist.) Takarala village		
		Production (in Quintal)			Production (in Quintal)			Production (in Quintal)			Production (in Quintal)		
		2001-02	2006-07	% change of Production	2001-02	2006-07	% change of Production	2001-02	2006-07	% change of Production	2001-02	2006-07	% change of Production
1.	Kharif	101	259.5	156.93	409	489	18.55	614	720	17.26	416.5	535.5	28.57
2.	Rabi	9	53	488.88	81	66	-18.51	1.5	2.33	55.33	54.5	88.5	62.38
3.	Summer	4	7	75	9	14	55.55	477	347.94	-27.05	507	610	20.31

Source : Field survey, village panchayat office record of the various watersheds, 2002 - 03 to 2006 – 0754.5

Table 21: Information regarding cost of cultivation (in Rs.) of the beneficiary farmers (big) under selected watersheds

(cost in (Rs/ha)

Sl.No.	Type of Crop	Watershed-I (Kolhpur Dist.) Basarge village			Watershed-II (Nagpur Dist.) Mandhal village			Watershed-III (Raigarh Dist.) Walke-Shirgoan village			Watershed-IV (Nanded Dist.) Takarala village		
		Cost of Cultivation (in Rs.)			Cost of Cultivation (in Rs.)			Cost of Cultivation (in Rs.)			Cost of Cultivation (in Rs.)		
		2001-02	2006-07	% change Cost of Cultivation	2001-02	2006-07	% change Cost of Cultivation	2001-02	2006-07	% change Cost of Cultivation	2001-02	2006-07	% change Cost of Cultivation
1.	Kharif	45045	66800	48.30	133100	187000	40.50	187000	270000	44.39	224400	244000	8.73
2.	Rabi	19100	28100	47.12	63200	132400	109.49	9950	13450	35.18	19000	26500	39.47
3.	Summer	86000	117000	36.05	7800	15500	98.72	30000	31565	5.22	42000	62000	47.62

Source : Field survey, village panchayat office record of the various watersheds, 2002 - 03 to 2006 – 07

Table 21(A): Information regarding average cost of cultivation of the beneficiary farmers (big) under selected watersheds

(cost in (Rs/ha)

Sl.No.	Type of Crop	Watershed-I (Kolhpur Dist.) Basarge village			Watershed-II (Nagpur Dist.) Mandhal village			Watershed-III (Raigarh Dist.) Walke-Shirgoan village			Watershed-IV (Nanded Dist.) Takarala village		
		Cost of Cultivation (in Rs.)			Cost of Cultivation (in Rs.)			Cost of Cultivation (in Rs.)			Cost of Cultivation (in Rs.)		
		2001-02	2006-07	% change Cost of Cultivation	2001-02	2006-07	% change Cost of Cultivation	2001-02	2006-07	% change Cost of Cultivation	2001-02	2006-07	% change Cost of Cultivation
1.	Kharif	2963.49	2385.71	-19.50	7313.19	6071.43	-16.98	14841.27	9060.40	-38.95	8436.09	8187.92	-2.94
2.	Rabi	2808.82	1801.28	-35.87	5642.86	5563.03	-1.41	2689.19	3202.38	19.08	6333.33	6022.73	-4.90
3.	Summer	15357.14	11700.00	-23.81	6500.00	5535.71	-14.84	8333.33	8768.06	5.22	105000	25833.33	-75.40

Source : Field survey, village panchayat office record of the various watersheds, 2002 - 03 to 2006 – 07

Table 21(B): Information regarding average cost of production of the beneficiary farmers (big) under selected watersheds

(cost in (Rs/qt)

Sl.No.	Type of Crop	Watershed-I (Kolhpur Dist.) Basarge village			Watershed-II (Nagpur Dist.) Mandhal village			Watershed-III (Raigarh Dist.) Walke-Shirgoan village			Watershed-IV (Nanded Dist.) Takarala village		
		Cost of Cultivation (in Rs.)			Cost of Cultivation (in Rs.)			Cost of Cultivation (in Rs.)			Cost of Cultivation (in Rs.)		
		2001-02	2006-07	% change Cost of Cultivation	2001-02	2006-07	% change Cost of Cultivation	2001-02	2006-07	% change Cost of Cultivation	2001-02	2006-07	% change Cost of Cultivation
1.	Kharif	71.61	36.62	-48.86	397.31	135.90	-65.79	360.31	267.86	-25.66	575.75	605.83	5.22
2.	Rabi	118.63	78.06	-34.20	402.55	87.11	-78.36	904.55	579.74	-35.91	417.58	304.60	-27.06
3.	Summer	16.44	8.93	-45.69	89.66	41.22	-54.02	295.86	263.70	-10.87	69.42	33.37	-51.93

Source : Field survey, village panchayat office record of the various watersheds, 2002 - 03 to 2006 – 07

Table 22: Information regarding cost of cultivation of the non-beneficiary farmers (big) under selected watersheds

(cost in Rs/ha)

Sl.No.	Type of Crop	Watershed-I (Kolhpur Dist.) Basarge village			Watershed-II (Nagpur Dist.) Mandhal village			Watershed-III (Raigarh Dist.) Walke-Shirgoan village			Watershed-IV (Nanded Dist.) Takarala village		
		Cost of Cultivation (in Rs.)			Cost of Cultivation (in Rs.)			Cost of Cultivation (in Rs.)			Cost of Cultivation (in Rs.)		
		2001-02	2006-07	% change Cost of Cultivation	2001-02	2006-07	% change Cost of Cultivation	2001-02	2006-07	% change Cost of Cultivation	2001-02	2006-07	% change Cost of Cultivation
1.	Kharif	19500	56300	188.72	155500	185900	19.55	157500	275000	74.60	217600	313500	44.07
2.	Rabi	2300	14500	530.43	40500	49700	22.71	1900	3100	63.15	10700	23400	118.69
3.	Summer	2800	6000	114.28	7000	15000	144.00	104000	166000	59.61	24000	32000	33.33

Source : Field survey, village panchayat office record of the various watersheds, 2002 - 03 to 2006 – 07

Table 22(A): Information regarding cost of cultivation of the non-beneficiary farmers (big) under selected watersheds

(cost in (Rs/ha)

Sl.No.	Type of Crop	Watershed-I (Kolhpur Dist.) Basarge village			Watershed-II (Nagpur Dist.) Mandhal village			Watershed-III (Raigarh Dist.) Walke-Shirgoan village			Watershed-IV (Nanded Dist.) Takarala village		
		Cost of Cultivation (in Rs.)			Cost of Cultivation (in Rs.)			Cost of Cultivation (in Rs.)			Cost of Cultivation (in Rs.)		
		2001-02	2006-07	% change Cost of Cultivation	2001-02	2006-07	% change Cost of Cultivation	2001-02	2006-07	% change Cost of Cultivation	2001-02	2006-07	% change Cost of Cultivation
1.	Kharif	2846.71	6702.38	135.44	3380.43	3732.93	10.42	8848.31	15536.72	75.58	5726.31	8228.346	43.69
2.	Rabi	2090.90	5576.92	166.72	1745.69	2070.83	18.62	5428.57	6888.88	26.90	2326.08	3656.25	57.18
3.	Summer	2800	5000	78.57	2058.82	3125	51.78	9285.71	14821.43	59.61	30000	40000	33.33

Source : Field survey, village panchayat office record of the various watersheds, 2002 - 03 to 2006 – 07

Table 22(B): Information regarding cost of production of the non-beneficiary farmers (big) under selected watersheds

(cost in (Rs/qt)

Sl.No.	Type of Crop	Watershed-I (Kolhpur Dist.) Basarge village			Watershed-II (Nagpur Dist.) Mandhal village			Watershed-III (Raigarh Dist.) Walke-Shirgoan village			Watershed-IV (Nanded Dist.) Takarala village		
		Cost of Cultivation (in Rs.)			Cost of Cultivation (in Rs.)			Cost of Cultivation (in Rs.)			Cost of Cultivation (in Rs.)		
		2001-02	2006-07	% change Cost of Cultivation	2001-02	2006-07	% change Cost of Cultivation	2001-02	2006-07	% change Cost of Cultivation	2001-02	2006-07	% change Cost of Cultivation
1.	Kharif	193.06	216.96	12.37	380.19	380.94	0.20	256.51	381.94	48.89	522.44	585.43	12.05
2.	Rabi	255.55	273.58	7.05	500	753.03	50.60	1266.66	133047	5.04	196.33	264.40	34.67
3.	Summer	700	857	22.45	777.77	1071.42	37.75	218.02	477.09	118.82	47.33	52.45	10.81

Source : Field survey, village panchayat office record of the various watersheds, 2002 - 03 to 2006 – 07

Table 23: Information regarding disposal of yield of the beneficiary farmers (small) under selected watersheds

(yield in qt)

Sl.No.	Type of Crop	Watershed-I (Kolhpur Dist.) Basarge village			Watershed-II (Nagpur Dist.) Mandhal village			Watershed-III (Raigarh Dist.) Walke-Shirgoan village			Watershed-IV (Nanded Dist.) Takarala village		
		Disposal of Yield (in Qnt.)			Disposal of Yield (in Qnt.)			Disposal of Yield (in Qnt.)			Disposal of Yield (in Qnt.)		
		2001-02	2006-07	% change in Disposal of Yield (in Qnt.)	2001-02	2006-07	% change in Disposal of Yield (in Qnt.)	2001-02	2006-07	% change in Disposal of Yield (in Qnt.)	2001-02	2006-07	% change in Disposal of Yield (in Qnt.)
1.	Cereals	0	17	100	36	137.5	281.94	258	329.5	27.71	62	111	79.03
2.	Pulses	0	0	0	0	14	100	0	5.5	100	42	59	100
3.	Oilseeds	0	0	0	5	33	560	0	0	0	0	45	0
4.	Vegetables & Others	0	0	0	34	378	1011.8	1044	1569	50.28	80	86	7.5
5.	Sugarcane	2039.5	7087.3	247.5	0	0	0	0	0	0	0	0	0

Source : Field survey, village panchayat office record of the various watersheds, 2002 - 03 to 2006 – 07

Table 23(A): Information regarding disposal of yield of the non-beneficiary farmers (small) under selected watersheds

(yield in qt)

Sl.No.	Type of Crop	Watershed-I (Kolhpur Dist.) Basarge village			Watershed-II (Nagpur Dist.) Mandhal village			Watershed-III (Raigarh Dist.) Walke-Shirgoan village			Watershed-IV (Nanded Dist.) Takarala village		
		Disposal of Yield (in Qnt.)			Disposal of Yield (in Qnt.)			Disposal of Yield (in Qnt.)			Disposal of Yield (in Qnt.)		
		2001-02	2006-07	% change in Disposal of Yield (in Qnt.)	2001-02	2006-07	% change in Disposal of Yield (in Qnt.)	2001-02	2006-07	% change in Disposal of Yield (in Qnt.)	2001-02	2006-07	% change in Disposal of Yield (in Qnt.)
1.	Cereals	0	0	0	0	16	100	187	224	19.78	30	40	33.33
2.	Pulses	0	0	0	0	0	0	0	0	0	27	35	29.62
3.	Oilseeds	0	0	0	54	31	-42.59	0	0	0	14	25	78.57
4.	Vegetables & Others	0	0	0	0	14	100	25.59	31.86	24.50	61	76	24.59
5.	Sugarcane	0	0	0	0	0	0	0	0	0	10	0	-100

Source : Field survey, village panchayat office record of the various watersheds, 2002 - 03 to 2006 – 07

Table 24: Information regarding disposal of yield of the beneficiary farmers (marginal) under selected watersheds

(yield in qt)

Sl.No.	Type of Crop	Watershed-I (Kolhpur Dist.) Basarge village			Watershed-II (Nagpur Dist.) Mandhal village			Watershed-III (Raigarh Dist.) Walke-Shirgoan village			Watershed-IV (Nanded Dist.) Takarala village		
		Disposal of Yield (in Qnt.)			Disposal of Yield (in Qnt.)			Disposal of Yield (in Qnt.)			Disposal of Yield (in Qnt.)		
		2001-02	2006-07	% change in Disposal of Yield (in Qnt.)	2001-02	2006-07	% change in Disposal of Yield (in Qnt.)	2001-02	2006-07	% change in Disposal of Yield (in Qnt.)	2001-02	2006-07	% change in Disposal of Yield (in Qnt.)
1.	Cereals	11	12	9.09	7	71	914.29	204	267	30.88	95.5	118	23.56
2.	Pulses	0	0	0	0	0	0	4.5	7	55.55	20.25	29.5	45.67
3.	Oilseeds	0	0	0	15	48	220	0	0	0	5	15	200
4.	Vegetables & Others	0	0	0	0	81	100	21	28	33.33	60.5	80	32.23
5.	Sugarcane	76	212	178.95	0	0	0	0	0	0	0	0	0

Source : Field survey, village panchayat office record of the various watersheds, 2002 - 03 to 2006 – 07

Table 24(A): Information regarding disposal of yield of the non-beneficiary farmers (marginal) under selected watersheds

(yield in qt)

Sl.No.	Type of Crop	Watershed-I (Kolhpur Dist.) Basarge village			Watershed-II (Nagpur Dist.) Mandhal village			Watershed-III (Raigarh Dist.) Walke-Shirgoan village			Watershed-IV (Nanded Dist.) Takarala village		
		Disposal of Yield (in Qnt.)			Disposal of Yield (in Qnt.)			Disposal of Yield (in Qnt.)			Disposal of Yield (in Qnt.)		
		2001-02	2006-07	% change in Disposal of Yield (in Qnt.)	2001-02	2006-07	% change in Disposal of Yield (in Qnt.)	2001-02	2006-07	% change in Disposal of Yield (in Qnt.)	2001-02	2006-07	% change in Disposal of Yield (in Qnt.)
1.	Cereals	0	0	0	10	17	70	189	220	16.40	61	65	6.55
2.	Pulses	0	0	0	0	0	0	0	0	0	21	30	42.85
3.	Oilseeds	0	0	0	43	29	-32.56	0	0	0	6	0	-100
4.	Vegetables & Others	0	0	0	15	20	33.33	3	5	66.66	41	53	29.26
5.	Sugarcane	65	163	150.77	0	0	0	0	0	0	0	0	0

Source : Field survey, village panchayat office record of the various watersheds, 2002 - 03 to 2006 – 07

Table 25: Information regarding annual income of the beneficiary farmers (big) under selected watersheds

(in Rs.)

Sl.No.	Type of Crop	Watershed-I (Kolhpur Dist.) Basarge village			Watershed-II (Nagpur Dist.) Mandhal village			Watershed-III (Raigarh Dist.) Walke-Shirgoan village			Watershed-IV (Nanded Dist.) Takarala village		
		Annual Income (in Rs.)			Annual Income (in Rs.)			Annual Income (in Rs.)			Annual Income (in Rs.)		
		2001-02	2006-07	% change in Annual Income (in Rs.)	2001-02	2006-07	% change in Annual Income (in Rs.)	2001-02	2006-07	% change in Annual Income (in Rs.)	2001-02	2006-07	% change in Annual Income (in Rs.)
1.	Agriculture	1060000	2062000	94.52	936000	2241500	139.48	453900	888600	95.77	541850	1337950	146.92
2.	Service	32500	57200	76	114800	192000	67.24	126000	368000	192.06	69600	104400	50
3.	Business	253500	527740	108.18	190000	402500	111.84	0	6000	100	0	0	0
4.	Others	0	0	0	0	0	0	13500	21600	60	0	0	0
5.	Total	1346000	2646940	96.65	1240800	2836000	128.56	593400	1284200	116.41	611450	1442350	135.89

Source : Field survey, village panchayat office record of the various watersheds, 2002 - 03 to 2006 – 07

Table 25(A): Information regarding annual income of the non-beneficiary farmers (big) under selected watersheds

(in Rs.)

Sl.No.	Type of Crop	Watershed-I (Kolhpur Dist.) Basarge village			Watershed-II (Nagpur Dist.) Mandhal village			Watershed-III (Raigarh Dist.) Walke-Shirgoan village			Watershed-IV (Nanded Dist.) Takarala village		
		Annual Income (in Rs.)			Annual Income (in Rs.)			Annual Income (in Rs.)			Annual Income (in Rs.)		
		2001-02	2006-07	% change in Annual Income (in Rs.)	2001-02	2006-07	% change in Annual Income (in Rs.)	2001-02	2006-07	% change in Annual Income (in Rs.)	2001-02	2006-07	% change in Annual Income (in Rs.)
1.	Agriculture	146500	234000	59.72	617700	727100	17.71	886250	1359850	53.43	518150	882325	70.28
2.	Service	95000	144000	51.57	0	0	0	241000	429200	78.09	11200	15200	35.71
3.	Business	88500	135195	52.76	14000	15000	7.14	200000	270000	35	7750	14500	87.09
4.	Others	0	0	0	0	0	0	0	0	0	8000	0	-100
5.	Total	330000	513195	55.51	631700	742100	17.47	1327250	2059050	55.13	545100	912025	67.31

Source : Field survey, village panchayat office record of the various watersheds, 2002 - 03 to 2006 – 07

Table 26: District impact of watershed in changing the quality of the beneficiary farmers (big) under selected watersheds

Sl.No.	Particulars	Watershed-I (Kolhpur Dist.) Basarge village		Watershed-II (Nagpur Dist.) Mandhal village		Watershed-III (Raigarh Dist.) Walke-Shirgoan village		Watershed-IV (Nanded Dist.) Takarala village	
		Since Inception to Completion (2001-02 to 2006-07)		Since Inception to Completion (2001-02 to 2006-07)		Since Inception to Completion (2001-02 to 2006-07)		Since Inception to Completion (2001-02 to 2006-07)	
		Changed Positively	Same	Changed Positively	Same	Changed Positively	Same	Changed Positively	Same
1.	Production	Y	-	Y	-	Y	-	Y	-
2.	Cropping intensity	Y	-	Y	-	Y	-	Y	-
3.	Irrigation	Y	-	Y	-	N	-	Y	-
4.	Quality of land	Y	-	Y	-	Y	-	-	Same
5.	Recharging of water	Y	-	N	Same	Y	-	Y	-
6.	Availability of irrigation	Y	-	Y	-	-	Same	-	Same
7.	Other agro-allied activities	Y	-	N	Same	N	-	Y	-
8.	Labour absorbing	Y	-	Y	-	Y	-	Y	-
9.	Out migration	Y	-	Y	-	Y	-	Y	-
10.	Absorption of women in various activities	Y	-	N	-	Y	-	Y	-
11.	Enhancement of female labour absorption	Y	-	N	-	Y	-	-	Same
12.	Changes in forestry and Afforestation	Y	-	N	-	N	-	N	-
13.	Change in livestock	Y	-	N	-	Y	-	Y	-
14.	Increase in CPRS	Y	Same	N	-	-	Same	N	-
15.	Change in literacy	Y	-	Y	-	Y	-	Y	-
16.	Change in Qualitative aspects of livelihood	Y	-	Y	-	Y	-	Y	-

Table 26(A): District impact of watershed in changing the quality of the non-beneficiary farmers (big) under selected watersheds

Sl. No.	Particulars	Watershed-I (Kolhpur Dist.) Basarge village		Watershed-II (Nagpur Dist.) Mandhal village		Watershed-III (Raigarh Dist.) Walke-Shirgoan village		Watershed-IV (Nanded Dist.) Takarala village	
		Since Inception to Completion (2001-02 to 2006-07)		Since Inception to Completion (2001-02 to 2006-07)		Since Inception to Completion (2001-02 to 2006-07)		Since Inception to Completion (2001-02 to 2006-07)	
		Changed Positively	Same	Changed Positively	Same	Changed Positively	Same	Changed Positively	Same
1.	Production	N	Same	N	Same	N	Same	N	Same
2.	Cropping intensity	N	Same	N	Same	N	Same	N	Same
3.	Irrigation	N	Same	N	Same	N	Same	N	Same
4.	Quality of land	N	Same	N	Same	N	Same	N	Same
5.	Recharging of water	N	Same	N	Same	N	Same	N	Same
6.	Availability of irrigation	N	Same	N	Same	N	Same	N	Same
7.	Other agro-allied activities	N	Same	N	Same	N	Same	N	Same
8.	Labour absorbing	N	Same	N	Same	N	Same	N	Same
9.	Out migration	Y	Same	Y	Same	Y	Same	Y	Same
10.	Absorption of women in various activities	N	Same	N	Same	N	Same	N	Same
11.	Enhancement of female labour absorption	N	Same	N	Same	N	Same	N	Same
12.	Changes in forestry and Afforestation	N	Same	N	Same	N	Same	N	Same
13.	Change in livestock	N	Same	N	Same	N	Same	N	Same
14.	Increase in CPRS	N	Same	N	Same	N	Same	N	Same
15.	Change in literacy	N	Same	N	Same	N	Same	N	Same
16.	Change in Qualitative aspects of livelihood	N	Same	N	Same	N	Same	N	Same

Table 27: Year wise formation of UGs and SHGs of the selected watershed–I (Kolhapur) Basarge village

Year	Formation of Users group (UG)									Formation of self help group (SHG)								
	No	General		SC		ST		Total		No	General		SC		ST		Total	
		Female	Male	Female	Male	Female	Male	Female	Male		Female	Male	Female	Male	Female	Male	Female	Male
2002 – 03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003 – 04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004 – 05	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
2005 – 06	1	0	1	0	0	0	0	1	1	1	1	0	0	0	0	0	1	0
2006 – 07	3	1	2	0	0	0	0	1	2	2	1	1	0	0	0	0	1	1
2007 – 08	4	2	2	0	0	0	0	2	2	4	2	2	0	0	0	0	2	2

Source : Filed Survey, Record of Taluka Agriculture officer, 2002-03 to 2006-07, Gadhinglaj, District Kolhapur

Table 28: Year wise formation of UGs and SHGs of the selected watershed–II (Nagpur) Mandhal village

Year	Formation of Users group (UG)									Formation of self help group (SHG)								
	No	General		SC		ST		Total		No	General		SC		ST		Total	
		Female	Male	Female	Male	Female	Male	Female	Male		Female	Male	Female	Male	Female	Male	Female	Male
2002 – 03	0	0	0	0	0	0	0	0	0	2	1	1	0	0	0	0	1	1
2003 – 04	2	1	1	0	0	0	0	1	1	2	1	1	0	0	0	0	1	1
2004 – 05	2	1	1	0	0	0	0	1	1	2	1	1	0	0	0	0	1	1
2005 – 06	2	1	1	0	0	0	0	1	1	4	2	1	1	0	0	0	2	2
2006 – 07	2	1	1	0	0	0	0	1	1	2	1	1	0	0	0	0	1	1
2007 – 08	8	2	2	1	1	2	0	4	4	11	6	2	2	0	1	0	6	5

Source : Filed Survey, Record of Taluka Agriculture officer, 2002-03 to 2006-07, Kuhi, District Nagpur

Table 29: Year wise formation of UGs and SHGs of the selected watershed–III (Raigarh) Walke-Shirgaon village

Year	Formation of Users group (UG)									Formation of self help group (SHG)								
	No	General		SC		ST		Total		No	General		SC		ST		Total	
		Female	Male	Female	Male	Female	Male	Female	Male		Female	Male	Female	Male	Female	Male	Female	Male
2002 – 03	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0	0	2	0
2003 – 04	1	1	0	0	0	0	0	1	0	2	1	0	1	0	0	0	2	0
2004 – 05	2	1	1	0	0	0	0	1	1	3	2	1	0	0	0	0	2	1
2005 – 06	1	0	0	1	0	0	0	1	0	5	2	1	1	0	1	0	4	1
2006 – 07	1	1	0	0	0	0	0	1	0	1	1	0	0	0	0	0	1	0
2007 – 08	0	0	0	0	0	0	0	0	0	3	3	0	0	0	0	0	3	0

Source : Filed Survey, Record of Taluka Agriculture officer, 2002-03 to 2006-07, Murud, District Raigarh

Table 30: Year wise formation of UGs and SHGs of the selected watershed–IV (Nanded) Takarala village

Year	Formation of Users group (UG)									Formation of self help group (SHG)								
	No	General		SC		ST		Total		No	General		SC		ST		Total	
		Female	Male	Female	Male	Female	Male	Female	Male		Female	Male	Female	Male	Female	Male	Female	Male
2002 – 03	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2003 – 04	10	0	5	0	2	0	3	0	10	5	0	2	0	2	0	1	0	5
2004 – 05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005 – 06	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2006 – 07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2007 – 08	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Source : Filed Survey, Record of Taluka Agriculture officer, 2002-03 to 2006-07, Himayatnagar District Nanded

Table 31: Year wise activities target and achievement of the selected watershed–I (Kolhapur) Basarge village

Year	Farm Production System (FPS)					Natural Resource Management (NRM)					Livelihood Support System (LSS)				
	No	Physical (Units)		Financial (Rs. In Lakh)		No	Physical (Units)		Financial (Rs. In Lakh)		No	Physical (Units)		Financial (Rs. In Lakh)	
		Target	Achieve.	Target	Achieve.		Target	Achieve.	Target	Achieve.		Target	Achieve.	Target	Achieve.
2002 – 03	0	0	0	0	0	0	0	0	0	0	10	10	0	0.10	0
2003 – 04	10	10	0	43	0	1	1	0	2.6	0	10	10	0	0.75	0
2004 – 05	13	13	4	0.79	0.73	2	2	3	3.95	6.73	20	10	1	0.25	0.07
2005 – 06	18	18	10	1.09	0.60	1	1	2	2.55	6.09	24	24	0	0.24	0
2006 – 07	14	14	12	0.79	0.69	1	1	1	3	2.9	30	30	30	0.62	0.62
2007 – 08	55	55	50	3.97	3.80	5	5	6	12.14	15.75	0	0	0	1.36	0.69

Source : Record of Taluka Agriculture officer, 2002-03 to 2006-07, Gadhinglaj, District Kolhapur

Table 32: Year wise activities target and achievement of the selected watershed–II (Nagpur) Mandhal village

Year	Farm Production System (FPS)					Natural Resource Management (NRM)					Livelihood Support System (LSS)				
	No	Physical (Units)		Financial (Rs. In Lakh)		No	Physical (Units)		Financial (Rs. In Lakh)		No	Physical (Units)		Financial (Rs. In Lakh)	
		Target	Achieve.	Target	Achieve.		Target	Achieve.	Target	Achieve.		Target	Achieve.	Target	Achieve.
2002 – 03	1	1	1	0	0.22	1	1	1	0.47	0.64	8	8	8	0.08	0.08
2003 – 04	2	2	1	0.46	0.28	4	4	1	1.55	0.36	8	8	24	0.08	0.54
2004 – 05	3	3	1	0.93	0.28	2	2	1	2.32	1.89	16	16	0	0.31	0
2005 – 06	3	3	0	0.93	0	6	6	1	1.55	0.24	20	20	20	0.31	0.44
2006 – 07	2	2	2	0.78	0.78	2	2	1	1.86	1.02	10	10	0	0.38	0
2007 – 08	2	2	1	3.1	1.56	4	4	3	7.75	4.15	38	38	32	1.16	1.06

Source : Project report on N.W.D.P.R.A. 10th five year olan, Kuhi, Nagpur, Department of Agriculture Government of Maharashtra, 2002-03 to 2006-07

Table 33: Year wise activities target and achievement of the selected watershed–III (Raigarh) Walka-Shirgoan village

Year	Farm Production System (FPS)					Natural Resource Management (NRM)					Livelihood Support System (LSS)				
	No	Physical (Units)		Financial (Rs. In Lakh)		No	Physical (Units)		Financial (Rs. In Lakh)		No	Physical (Units)		Financial (Rs. In Lakh)	
		Target	Achieve.	Target	Achieve.		Target	Achieve.	Target	Achieve.		Target	Achieve.	Target	Achieve.
2002 – 03	0	0	0	0	0	5	5	2	0.77	0.77	4	4	4	0.12	0.12
2003 – 04	2	2	1	0.77	0.24	6	6	4	2.40	2.40	3	5	3	0.14	0.11
2004 – 05	5	5	3	1.54	1.07	6	6	2	3.91	3.91	5	5	2	0.51	0.25
2005 – 06	7	7	9	1.54	2.70	9	9	0	2.58	0	5	5	4	0.51	0.43
2006 – 07	6	6	9	1.29	3.70	4	4	5	3.09	2.3	11	11	11	0.64	0.64
2007 – 08	11	11	6	5.16	2.50	0	0	9	12.9	4.80	18	18	16	1.93	1.50

Source : Record of Taluka Agriculture officer, 2002-03 to 2006-07, 2.50M0urud District Raigarh

Table 34: Year wise activities target and achievement of the selected watershed–IV (Nanded) Takarala village

Year	Farm Production System (FPS)					Natural Resource Management (NRM)					Livelihood Support System (LSS)				
	No	Physical (Units)		Financial (Rs. In Lakh)		No	Physical (Units)		Financial (Rs. In Lakh)		No	Physical (Units)		Financial (Rs. In Lakh)	
		Target	Achieve.	Target	Achieve.		Target	Achieve.	Target	Achieve.		Target	Achieve.	Target	Achieve.
2002 – 03	83	83	0	5.98	0	45	45	0	14.97	0	93	93	0	2.24	0
2003 – 04	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2004 – 05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2005 – 06	0	0	0	0	0	0	0	10	0	2		0	0	0	0
2006 – 07	0	0	65	0	4.57	0	0	10	0	4.50	0	0	89	0	2.04
2007 – 08	0	0	0	0	0	0	0	25	0	8.57	0	0	0	0	0

Source : Record of Taluka Agriculture officer, 2002-03 to 2006-07, Himayatnagr, District Nanded

Table 35: Physical and financial assessment of management component for watershed–I (Kolhapur) Basarge village

Sl. No.	Activity	Physical (Unit)			Financial (Rupees in Lakh)		
		Target	Achievement	Percentage	Allotted	Actual Expenditure	Percentage
1.	Administrative Cost	0	0	0	298000	40000	13.42
2.	Community Organization :	0	0	0	0	0	0
	i)Entry point activity	1	1	100	89000	89000	100
	ii) Corpus for WDF	1	0	0	30000	30000	0
	iii) Honorarium to village community organizer	0	0	0	30000	12000	40
	iv) Expenses at district Head Quarter (HQ.)	0	0	0	74000	16000	21.62
3.	Training Programme	10	4	40	54000	20000	37.03

Source : Implementation completion Report, 2002-03 to 2006-07, Village – Baserge, Block- Gadhinglaj, Kolhapur

Table 35A: Physical and financial assessment of management component for watershed–II (Nagpur) Mandhal village

Sl. No.	Activity	Physical (Unit)			Financial (Rupees in Lakh)		
		Target	Achievement	Percentage	Allotted	Actual Expenditure	Percentage
1.	Administrative Cost	0	0	0	155000	124000	80
2.	Community Organization :						
	i)Entry point activity	1	0	0	46000	46000	100
	ii) Corpus for WDF	0	0	0	31000	31000	100
	iii) Honorarium to village community organizer	0	0	0	0	0	0
	iv) Expenses at district Head Quarter (HQ.)	0	0	0	39000	39000	100
3.	Training Programme	14	14	100	78000	78000	100

Source : Project report on N.W.D.P.R.A. 10th five year olan, Kuhi, Nagpur, Department of Agriculture Government of Maharashtra, 2002-03 to 2006-07

Table 35B: Physical and financial assessment of management component for watershed–III (Raigarh)Walke-shirgaon village

Sl. No.	Activity	Physical (Unit)			Financial (Rupees in Lakh)		
		Target	Achievement	Percentage	Allotted	Actual Expenditure	Percentage
1.	Administrative Cost	0	0	0	133000	35000	26.31
2.	Community Organization :						
	i)Entry point activity	1	1	0	70000	70000	100.00
	ii) Corpus for WDF	0	0	0	27000	20000	74.07
	iii) Honorarium to village community organizer	0	0	0	53000	80000	150.94
	iv) Expenses at district Head Quarter (HQ.)	0	0	0	27000	3000	11.11
3.	Training Programme	11	4	0	53000	12000	22.64

Source : Implementation completion Report, 2002-03 to 2006-07, Village – Walke-shirgaon Block- Murud, Raigarh

Table 35C: Physical and financial assessment of management component for watershed–IV (Nanded) Takarala village

Sl. No.	Activity	Physical (Unit)			Financial (Rupees in Lakh)		
		Target	Achievement	Percentage	Allotted	Actual Expenditure	Percentage
1.	Administrative Cost	0	0	0	299000	32000	10.70
2.	Community Organization :						
	i)Entry point activity	1	1	100	100000	100000	100
	ii) Corpus for WDF	0	0	0	14000	14000	100
	iii) Honorarium to village community organizer	0	0	0	50000	0	0
	iv) Expenses at district Head Quarter (HQ.)	0	0	0	60000	6000	10
3.	Training Programme	16	2	12.50	150000	7000	4.66

Source : Implementation completion Report, 2002-03 to 2006-07, Village – Takarala Block- Himayatnagar, Nanded

Table 36: Physical and financial assessment of management component for watershed–I (Kolhapur) Basarge village

Sl. No.	Activity	Physical (Unit)			Financial (Rupees in Lakh)		
		Target	Achievement	Percentage	Allotted	Actual Expenditure	Percentage
1.	Arable land :						
	i)Soil & moisture structure	250	0	0	188000	0	0
	ii) Agronomic practices	0	0	0	0	0	0
	iii) Others	0	0	0	0	0	0
2.	Non- Arable land						
	i)Runoff management structure	0	0	0	0	0	0
	ii) Water harvesting structure	0	0	0	0	0	0
	iii) Dry horticulture	0	0	0	0	0	0
	iv) Conservation & development of bio-mass	20	0	0	10000	0	0
	v) Others	3	0	0	82000	0	0
3.	Drainage Line Treatment :						
	i)Upper Reaches	0	0	0	0	0	0
	ii) Middle Reaches	0	0	0	0	0	0
	iii) Lower Reaches	6	6	100	1219000	1573000	129.04
	iv) Farm Pond	0	0	0	0	0	0

Source : Implementation completion Report, 2002-03 to 2006-07, Village – Baserge, Block- Gadhinglaj, Kolhapur

Table 36A: Physical and financial assessment of management component for watershed–II (Nagpur) Mandhal village

Sl. No.	Activity	Physical (Unit)			Financial (Rupees in Lakh)		
		Target	Achievement	Percentage	Allotted	Actual Expenditure	Percentage
1.	Arable land :						
	i)Soil & moisture structure Conservation						
	ii) Repair of exiting indigenous conservation measures	70	70	100	21000	21000	100
	iii) Contour cultivation paddy bonding	26.1	26.1	100	622000	622000	100
	iv) Any other measures special problem-Farm ponds	4	4	100	132000	132000	100
2.	Non- Arable land						
	i)Conservation measures	0	0	0	0	0	0
	ii) Production system	0	0	0	0	0	0
3.	Drainage Line Treatment :						
	i)Upper Reaches	0	0	0	0	0	0
	ii) Middle Reaches	0	0	0	0	0	0
	iii) Lower Reaches	0	0	0	0	0	0
	iv) Water harvesting structure	0	0	0	0	0	0

Source : Implementation completion Report, 2002-03 to 2006-07, Village – Mandhal, Block- Kuhi, Nagpur

Table 36B: Physical & financial assessment of management component for watershed–III (Raigarh) Walke-shirgaon village

Sl. No.	Activity	Physical (Unit)			Financial (Rupees in Lakh)		
		Target	Achievement	Percentage	Allotted	Actual Expenditure	Percentage
1.	Arable land :						
	i)Soil & moisture structure Conservation	0	0	0	0	0	0
	ii) Agronomic conservation practices	0	0	0	0	0	0
	iii) Others	39	39	100	1037000	1037000	100
2.	Non- Arable land						
	i)Runoff management structure	0	0	0	0	0	0
	ii) Water harvesting structure	0	0	0	0	0	0
	iii) Dry horticulture	0	0	0	0	0	0
	iv) Conservation & development of bio-mass	0	0	0	0	0	0
	v) Others	0	0	0	0	0	0
3.	Drainage Line Treatment :						
	i)Upper Reaches	0	0	0	70000	70000	100
	ii) Middle Reaches	2	2	100	202000	202000	100
	iii) Lower Reaches	0	0	0	0	0	0
	iv) Farm Pond	0	0	0	0	0	0
	v) Water harvesting structure	0	0	0	0	0	0

Source : Implementation completion Report, 2002-03 to 2006-07, Village – Walke-shirgaon Block- Murud, Raigarh

Table 36C: Physical and financial assessment of management component for watershed–IV(Nanded) Takarala village

Sl. No.	Activity	Physical (Unit)			Financial (Rupees in Lakh)		
		Target	Achievement	Percentage	Allotted	Actual Expenditure	Percentage
1.	Arable land :						
	i)Soil & moisture structure Conservation activities	250	250	100	550000	550000	100
	ii) Counter Bunding /field bounding executed (Cumulative in RMT)	0	0	0	0	0	0
	iii) Agronomic conservation practice (Contour Cultivation)	0	0	0	0	0	0
	iv) Others	0	0	0	0	0	0
2.	Non- Arable land						
	i)Runoff management structure	0	0	0	0	0	0
	ii) Water harvesting structure (Cumulative)	4	4	100	600000	600000	100
	iii) Dry land horticulture	0	0	0	0	0	0
	iv) Conservation & development of bio-mass	0	0	0	0	0	0
3.	Drainage Line Treatment :	0	0	0	0	0	0
	i)Upper Reaches	100	100	100	75000	75000	100
	ii) Middle Reaches	100	100	100	272000	272000	100
	iii) Lower Reaches	0	0	0	0	0	0
	iv) Farm Pond	0	0	0	0	0	0
	v) Water harvesting structure	0	0	0	0	0	0

Source : Implementation completion Report, 2002-03 to 2006-07, Village – Takarala Block- Himayatnagar, Nanded

Table 37: Assessment of FPS for land owing families & LSS for landless families under selected watershed

No.	Farm Production System (FPS) For Land Owing Families			Livelihood Support System (LSS) for Landless Families		
	Number of families benefited	Amount spent (Rs.)	Average of Amount spent for per family	Number of families benefited	Amount spent (Rs.)	Average of Amount spent for per family
Watershed – I (Kolhapur) Basarage village	375	395000	1053.34	29	69000	2379.31
Watershed – II (Nagpur) Mandhal village	154	156000	1012.98	116	106000	913.79
Watershed – III (Raigarh) Walke-shirgaon village	781	516000	660.69	167	150000	898.20
Watershed – IV (Nanded) Takarala village	683	457000	669.10	189	204000	1079.36

Note: FPS=Farm Production System, LSS= Livelihood Support System
Source : Record of Taluka Agriculture Office, Kolhapur, Nagpur, Raigarh, Nanded, 2002-03 to 2006-07

Table 38: Performance indicators of the selected watershed

Sl. No.	Particular	Watershed-I (Kolhpur Dist.) Basarge village	Watershed-II (Nagpur Dist.) Mandhal village	Watershed-III (Raigarh Dist.) Walke-Shirgoan village	Watershed-IV (Nanded Dist.) Takarala village
1.	Project Cost (Rs.)	2977740.00	1550000.00	2652000.00	2992000.00
2.	Project Expenditure (Rs.)	1695196.00	794000.00	2034000.00	2317000.00
3.	Watershed area taken up for Development (in ha)	749.29	378.4	727	665
4.	Area developed (in ha.)	496.29	344.4	442	515
5.	Internal Rate of Return (IRR) (%)	4.15	7.58	2.41	1.64
6.	Backward class Ratio	1:0.3	1:0.49	1:0.27	1:1.34
7.	Net Project Value (NPV) in Watershed (Rs. In)	29.77	15.5	26.52	29.92
8.	Agro Forestry :				
	i)No. of seedling planted	0	0	0	0
	ii) No. of seedling survived	0	0	0	0
	iii) Survival percentage (%)	0	0	0	0
	iv) Area covered (in ha.)	0	0	0	0
9.	Horticulture :				
	i)No. of seedling planted	900.00	0	1000	0
	ii) No. of seedling survived	738.00	0	800	0
	iii) Survival percentage (%)	82	0	80	0
	iv) Area covered (in ha.)	8ha.	0	14 ha.	0
10.	Employment generated (man days)	46765	11746	15590	36907
11.	No. of training conducted	7	3	12	5
12.	No. of persons trained	460	150	331	125
13.	Total fund given to:	0	0	0	0
	i)Self Help Groups (SHG)	43650.00	106000.00	145000.00	316000.00
	ii) User Groups (UG)	68650.00	156000.00	96600.00	516000.00
	iii) MKM etc.	0	0	375000.00	0
14.	Additional area brought under cultivation (in ha)	20.70	26.10	49	65
15.	Additional area brought under supplemental	142.50	10.00	64	34

Source : project record of various districts on N.W. D. P. R. A. 10^{th} five year plan, Department of Agriculture Government of Maharashtra 2001-02 to 2006-07.

Table 39: Pre (2001-02) and post (2006-07) project scenario of the selected watershed

Sl. No.	Particulars	Watershed-I (Kolhpur Dist.) Basarge village			Watershed-II (Nagpur Dist.) Mandhal village			Watershed-III (Raigarh Dist.) Walke-Shirgoan village			Watershed-IV (Nanded Dist.) Takarala village		
1.	Productivity of major crops (in Qnt.)	Pre	Post	%	Pre	Post	%	Pre	Post	%	Pre	Post	%
	a)Cereals	479.5	1047	118.35	296	1147.5	287.66	1402.5	2077.95	48.16	350	391	11.71
	b) Pulses	77.5	134	72.90	26	202	676.92	4.250	7.2	69.41	134.2	211	57.22
	c) Oilseeds	321.5	705.5	119.44	157	724	361.14	0	0	0	72	106	47.22
	d) Vegetable & Others	6.75	12.35	82.96	405	2436	501.48	1149.6	1728.35	50.35	365.5	468	28.04
	e) Sugarcane	7810	8395	7.49	0	800	100	0	0	0	600	1850	208.33
2.	Major cropped area (in ha)												
	a)Cereals	23.3	34.66	48.75	20.9	31.05	48.56	39.37	6.02	42.29	19.2	21	9.37
	b) Pulses	3.05	7.7	152.45	6.5	17.6	170.76	0.9	1.6	77.77	14.45	19.25	33.21
	c) Oilseeds	20.96	34.75	65.79	18.25	29.9	63.83	0	0	0	4.6	3.3	-28.26
	d) Vegetable & Others	0.2	0.49	145	7	23	228.57	9.32	11.17	19.84	30.3	34.8	14.85
	e) Sugarcane	9.2	25	171.73	0	0.8	100	0	0	0	0.8	2	150
3.	Cropping intensity (%)	43.75	66.30	51.52	30.18	48.91	62.05	65.30	2.41	41.52	95.24	101.58	6.66
4.	Farm income per ha. per year (in Rs.)	35038.03	42579.86	21.52	31095.92	41587.69	33.74	18563.72	26477.32	42.62	16712.04	29583.39	77.01
5.	Family income per ha. per year (in Rs.)	2232185	2774582	24.29	16603.99	18584.37	11.92	13307.12	22648.64	70.19	5617.88	8495.33	51.21
6.	Migration of rural labour	235	0	-100	102	25	-75.49	44	10	-77.27	289	0	-100
7.	Green cover/bio-mass (%)	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
8.	Ground Water level (meters)	8	13	62.5	7	10	42.85	6	11	83.33	0	0	0
9.	Animal breed improvement	1414	1596	12.87	0	3	100	1	4	300	105	200	90.47
10.	Fodder yield (Kg/per ha.)	375	550	46.66	100	225	125	89	244	174.15	0	0	0
11.	Average milk yield (litters per day)	2	5	150	2	3.5	75	2	4	100	2.5	3.75	50
12.	Number of farmers adopted stall feeding	0	14	100	0	0	0	0	0	0	0	0	0
13.	Percentage run of from the watershed	8.82	18.27	107.14	30	65	116.66	24	79	229.16	34	64	88.23

Source : Filed survey, project record of various districts on N.W.D.P.R.A. 10^{th} five year plan, Department of Agriculture Government of Maharashtra 2001-02 to 2006-07 *N.A.= Not available.