



**Nile Basin Initiative**  
**Eastern Nile Subsidiary Action Program (ENSAP)**  
**Eastern Nile Technical Regional Office (ENTRO)**

**Watershed Management Project**

**Field Report**

**International study tour on watershed management to India**

**March 8 - 7, 2010**



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## ACKNOWLEDGEMENT

The Regional capacity building component of the Eastern Nile Watershed Project is financed by GEF/World Bank and is implemented by the Eastern Nile Technical Regional Office (ENTRO). It has the objective of strengthen the knowledge base and human resource capacity of participating institutions for effective trans-boundary watershed management in the Eastern Nile Basin through organizing training and experience exchange visits. The specific objectives of organizing experience exchange visits include: i) on the spot and first hand knowledge and experience learning of watershed management planning, implementation and monitoring; ii) document experiences of participatory watershed management in the country to be visited and draw lessons which will be useful and applicable to the development of integrated watershed management interventions in the Eastern Nile context. Such experience exchange visits will also provide a forum to discuss on project implementation modalities and contribute multi disciplinary perspective on integrated watershed management approaches and thereby ensure performance of project implementation and sustainability of outputs as well as serve as a forum for capacity and confidence building by enabling interaction among professionals of the basin.

The study tour to India has indeed achieved the intended objectives. Participants of the study tour are very grateful for ENTRO (represented by the Regional Project Coordinator of the Watershed Project and its management( for organizing this extremely useful International tour. Our thanks also go to the World Bank for financing the study tour.

We would also like to extend our appreciation to Pragmatix Research & Advisory Services Pvt. Ltd. for the excellent facilitation. Our special thanks go to Dr. J.J.James and Dr. Dushyant Badal for their exceptional effort and contribution to make the visit a success.

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## 1 BACKGROUND

The EN countries, comprising of Egypt, Ethiopia, & Sudan are pursuing cooperative development at the sub-basin level through the investment oriented Eastern Nile Subsidiary Action Program (ENSAP). Towards this end, the EN countries have identified their first joint project, the Integrated Development of the Eastern Nile (IDEN), which consists of a series of sub-projects addressing issues related to flood preparedness and early warning, power development and interconnection, irrigation and drainage, watershed management, multi-purpose water resources development, and modelling in the Eastern Nile. The Eastern Nile Technical Regional Office (ENTRO) is an institution established by the three EN countries to advance the implementation of ENSAP projects.

**The Eastern Nile Watershed Project** is one of the seven areas of cooperation agreed by the Eastern Nile countries. Its immediate objective is to establish a sustainable framework for the management of selected watersheds in the sub-basin in order to improve the living conditions of the people, enhance agricultural productivity, protect the environment, and reduce sediment transport and siltation.

Towards meeting its objective, the Watershed project undertook two sets of activities in parallel between 2004 -2008: preparation of investment ready projects for national implementation (fast track projects) and a Regional Cooperative Assessment (CRA) study. Both sets of activities were successfully completed. Currently implementation of eight pilot projects is initiated at national level.

The need for capacity building across a wide range of disciplines and subjects at all levels has been identified in the trans-boundary analysis of the CRA as a key pre-requisite for effective trans-boundary watershed management data collection, multi-disciplinary watershed management research and monitoring and evaluation of watershed management activities. To address this gap, a regional capacity building component is formulated with the objective to strengthen the knowledge base and human resource capacity for cooperative action on watershed management in the Eastern Nile Basin. Organization of training and experience exchange visits is a key activity of the regional capacity building component.

## 2 Experience exchange visit to India

From the outset, ENTRO and member countries have recognized the importance of organizing study tours both within & outside the region in order to learn from experiences of other countries and adapt and incorporate good land management practices into the regional watershed program. In September 2004, ENTRO organized a knowledge exchange tour to the China Loess Plateau with the objective of learning from the experience and drawing lessons in the planning and implementation of watershed management interventions in the loess plateau project. The knowledge exchange tour was very useful in terms of enhancing project preparation exercise for the fast track projects for watershed. It also helped to build capacity, trust and confidence among stakeholders.

Building on the experience, it was decided during the formulation of the Eastern Nile Watershed Project that this regional process of learning experience (through well organized study tours) is maintained and enhanced in the current project. Among other things such experience exchange visit will enable: i) on the spot and first hand knowledge and experience learning of watershed management planning, implementation and monitoring; ii) to document experiences of participatory watershed management in the country to be visited and draw lessons which will be useful and applicable to the development of integrated watershed management interventions in the Eastern Nile context. The experience exchange tour will provide a forum to discuss on project implementation modalities and contribute multi disciplinary perspective on integrated watershed management approaches and thereby ensure performance of project implementation and sustainability of outputs. Such exchange of knowledge will also serve as a forum for capacity and confidence building by enabling interaction among professionals of the basin.

A number of countries and regions were considered as candidates for the experience exchange tour. At the end India was picked as a preferred destination for the following reasons:

- India has a long history of participatory watershed program and government of India has committed huge amount of money every year for the watershed program.
- India has a long history of NGO-implemented and donor funded watershed programs. In addition to supporting government effort in tackling watershed degradation, these programs were instrumental in experimenting and recommending innovative technical, institutional, and socio-economic approaches to watershed development. These experiences were incorporated with the intention of reforming watershed development programs run by the government.
- India is a large country with diverse ecosystems. This enables to identify landscapes that are similar to those found in the Eastern Nile region.

### 2.1 Objectives

The overall goal of the current Eastern Nile Watershed Management Project is to “assist Egypt, Ethiopia, and Sudan to develop and implement coordinated approaches and

planning frameworks for integrated land and water management to improve environmental management and the living standards of local communities in the Eastern Nile Basin.”

In line with the overall goal and cognizant of the critical gap in capacity, the International Study Tour to India intends to enhance the technical capacity of institutions involved in watershed management to undertake effective planning, monitoring & evaluation of watershed management interventions and thereby strengthen the role and capacity of national institutions in the delivery of pro-poor investments and services to promote productive and environmentally sound livelihoods with local community participation. The specific objectives include:

- improve skills in participatory watershed management
- improve capacity in the development of strategies to achieve sustainable land management practices
- up-grade know-how to make effective use of locally available knowledge and resources
- create a forum for sharing experiences on good land management practices

## ***2.2 Expected Outcomes***

The expected outcomes of the study tour: (i) increased technical capacity of the institutions involved in watershed management in the Eastern Nile Basin; and (ii) information products are developed to increase sharing of information on watershed management, including on regional environmental trends, best management practices, and to support decision making in the riparian countries on proactive balancing of competing resource uses.

The study tour focus on the following:

- Review of watershed degradation issues, status, immediate and underlying causes and impacts
- Planning process and procedures including participatory tools
- Interventions/Technologies for sustainable watershed management
- Participatory monitoring & evaluation
- Framework conditions for IWSM (policies and strategies, legal aspects, institutions, etc.)

## ***2.3 Participants***

A total of 17 professionals from the Eastern Nile countries and ENTRO (5 each from Egypt, Ethiopia, and Sudan and two from ENTRO) participated in the study tour (See Annexure 2 for details). The country team members are drawn from the Ministries of Water Resources, Agriculture and Rural Development. ENTRO was represented by the Senior Regional Project Coordinator and the Regional Coordinator for watershed.



## 2.4 Organization of the Visit

The study tour was organized by ENTRO with a support from PRAGMATIX, a consulting firm. The consulting firm headed by Dr. James played a key role in identifying sites for visits (in consultation with ENTRO), establishing contacts with concerned authorities, drafting program (in consultation with ENTRO) and arranging logistics (rooms, transport, resource persons, etc.).

The sites visited were carefully selected to make the learning relevant to the Eastern Nile conditions in terms of landscape setting, and challenges faced in the Eastern Nile watershed development effort. Accordingly the study tour visited two states of India, Maharashtra and Rajasthan, which have landscapes most similar to those found in Sudan and Egypt in the Eastern Nile Basin. While the district of Bikaner in the state of Rajasthan in western India (southwest of Delhi) has an arid desert ecosystem, the lower reaches of the district of Aurangabad in the state of Maharashtra has heavy black cotton soils with erosion problems. However, the general principles of watershed management applied in these project sites are applicable to the entire Eastern Nile Basin.

The study tour was organized such that team members could acquire focused experience and knowledge from the best practices of the host country. Specific methods were the following:

- **Documents:** This included a brief note on the Government Structures in India, and information on specific watershed development projects by different NGOs, hard copies of relevant documents and various reports, research articles, and policy documents on a CD.
- **Presentations and discussions:** These were done regularly during the study tour, with various resource persons on watershed development in India, the focus being not only on providing information but more on addressing specific queries raised by the participants. A conscious effort was made to present information in small chunks throughout the study tour and based on queries from the groups, not only so that information could be digested more easily but also so that information was provided in a demand-based manner. A half-day panel discussion was organized on the last day at the Institute of Development Studies (IDS) Jaipur in Rajasthan.
- **Site visits:** The majority of the study tour was spent on field visits. Participants were taken on field trips to three watersheds in Aurangabad, Maharashtra to see the work done by three NGOs, the Water Organizations Trust (WOTR), Grassroots Action for Social Participation (GRASP) and Marathwada Sheti Sahayya Mandal (MSSM), and also to the project areas of the URMUL Trust in Bikaner, Rajasthan.
- **Expectations and Evaluation:** At the start of the study tour, participants were asked to list down their expectations, and at the end of the study tour, participants were asked to rank the extent to which each expectation had been fulfilled. In addition, a special format designed for the evaluation was used to capture participant perceptions on a range of issues, including the quality of food and accommodation, logistical arrangements, relevance, usefulness and accessibility of the material and facilitation. This is discussed in greater detail below.



The main issues covered in the site visits and institutional visits are briefly described below, while the findings from the expectations and evaluations are detailed subsequently.

### 3 Overview of watershed development in India

#### 3.1 Overview of India<sup>1</sup>

The Republic of India, located on the subcontinent of India, is the world's seventh largest country in area, occupying more than 3 million sq km (1 million sq mi). India consists geographically of the entire Indian Peninsula and portions of the Asian mainland, encompassing a varied landscape rich in natural resources. Its topography varies from the barren dunes of the Thar Desert to the dense tropical forests of rain-drenched Assam state. Much of India, however, consists of fertile river plains and high plateaus. Several major rivers, including the Ganges, Brahmaputra, and Indus, flow through India. Arising in the northern mountains and carrying rich alluvial soil to the plains below, these mighty rivers have supported agriculture-based civilizations for thousands of years.



With more than 1 billion inhabitants, India ranks second only to China among the world's most populous countries. Out of this 28 % lives in urban areas and the remaining 72 % is rural. Its people are culturally diverse, and religion plays an important role in the life of the country. About 81 percent of the people practice Hinduism, 13 percent are Muslims, and the remaining comprises of Christians, Sikhs, Buddhists, and Jains. Eighteen major languages and more than 1,000 minor languages and dialects are spoken in India.

The Indian economy has also evolved since independence. Once heavily dependent on agriculture, it has expanded in recent years into the realms of industry and services.

India can be divided into three main regions: the Himalayas, the Gangetic Plain, and peninsular India.

The Himalayan mountain system is 160 to 320 km wide and extends 2,400 km along the northern and eastern borders of India. It includes the mountains surrounding the Vale of Kashmir in the Karakoram Range, and the central and eastern Himalayas. The Himalayan

<sup>1</sup> Extracted from Microsoft ® Encarta ® 2006

Range is the highest mountain system in the world. The Himalayas region, including the foothills, is sparsely settled. Agriculture and animal herding are the main economic activities.

South and parallel to the Himalayas lies the Gangetic Plain, a belt of flat, alluvial lowlands 280 to 400 km wide. This area includes some of the most agriculturally productive land in India. The Indian portion of the broad Gangetic Plain encompasses several river systems, and stretches from Punjab state in the west, through the Gangetic Plain, to the Assam Valley in the east. The Thar Desert, a huge, dry, sandy region extending into Pakistan, lies at the southwestern end of the Gangetic Plain.

South of the plains region lies peninsular India. The northern peninsula features a series of mountain ranges and plateaus. In the southern part of peninsular India lies the vast Deccan Plateau, a tableland lying within a triangle formed by the Sātpura Range, the steep mountain slopes of the Western Ghats, and the gentler slopes of the Eastern Ghats. Elevations in the plateau region average 600 m, although outcroppings as high as 1,200 m occur. The plateau itself, even rockier than the northern extension of peninsular India, supports a sparse agricultural population and is also home to industrial enterprises.

The rivers of India can be divided into three groups: the great Himalayan rivers of the north, the westward-flowing rivers of central India, and the eastward-flowing rivers of the Deccan Plateau and the rest of peninsular India. Only small portions of India's rivers are navigable because of silting and the wide seasonal variation in water flow (due to the monsoon climate). Water transport is thus of little importance in India. Barrages, structures that redirect water flow, have been erected on many of the rivers for irrigation, diverting water into some of the oldest and most extensive canal systems in the world. There are only a few natural lakes in India of any size.

India is home to abundant plant and animal life and has a wide range of climates that accommodate a diversity of species throughout the country. India has an estimated 45,000 species of plants, 33 percent of which are native. India is inhabited by a wide variety of animal life, including almost 5,000 species of larger animals.



*India: Physical Features*

India's most important natural resources are land and water. About 54 percent of the land area is arable, and groundwater resources are considerable. The Gangetic Plain is one of India's most fertile regions. The soils of this region were formed by the alluvial deposits of the Ganges and its tributaries. In this area, as well as in the peninsular deltas, groundwater is plentiful and close to the surface, making year-round irrigation possible. These regions may produce two or three harvests a year. Most of India's wheat and rice are grown here.

The black and red soils of the Deccan Plateau, although not as thick as the Gangetic Plain alluvium, are also fertile. The groundwater resources of the Deccan are significant but more difficult to reach, so most farmers rely on the monsoons for water. Farmers typically grow a single crop, including coarse grains such as sorghum, maize (corn), millet, and cotton.

Forests constitute another natural resource for India, with woodlands covering 22 percent of its land area. India's highly varied climate and land produce diverse forests. The majority are deciduous forests, which are either tropical-dry, experiencing a significant dry season, or tropical-moist, receiving relatively uniform rainfall year-round. The remainder of forests range in type from tropical evergreen to Himalayan temperate and alpine. Major commercial tree species include teak, rosewood, and sal. Bamboo is a widely used construction material.

India's shape, unusual topography, and geographical position give it a diverse climate. Most of India has a tropical or subtropical climate, with little variation in temperature between seasons.

India's main environmental concern is its growing population, which is expected to increase to 1.6 billion by the year 2050. In order to feed so large a population, more groundwater will be needed to irrigate crops, increasing the risk of poor soil quality due to salinization (increased salt levels). More artificial fertilizer will likely be applied to crop fields, posing threats to drinking water. The demand for meat has increased with greater levels of prosperity, resulting in overgrazing and increasing wasteland. The demand for fuel wood has grown with rural populations, leading to the loss of trees and forests. To decrease reliance on fuel wood, the government has promoted the use of *biogas* (a mixture of methane and carbon dioxide produced by decomposing organic matter) for cooking fuel.

Expanding agrarian population has also affected wildlife. Farmers and herders have encroached on national park and other wildlife sanctuary land, and the spread of cultivation has limited the range of animals such as tigers and elephants outside of parks as well.

Agriculture employs (with forestry and fishing) about two-third of India's workforce. Most land is farmed in small holdings, averaging about 1.5 hectares. Most small holder farmers cultivate their land by hand or by using oxen. India's most important crops include sugarcane, rice, wheat, tea, cotton, and jute. Other important cash crops include

cashews, coffee, oilseeds, and spices. Another central feature of India's agricultural economy is the raising of livestock, particularly horned cattle, buffalo, and goats. The cattle are used mainly as draft animals and for leather. Milk production and distribution increased dramatically in the 1990s because of a nationwide, government-supported cooperative dairy program. Sheep are raised for wool, and goats are the main meat animal.

Agricultural production faces occasional declines as a result of irregular monsoon seasons, resulting in widespread flooding or drought. Food imports help offset yearly fluctuations in output. India faces many future challenges in producing enough food to feed its growing population. Production of food grain has barely kept pace with the rate of population increase. The government-implemented Green Revolution, which took hold in the 1970s, encouraged the use of high-yielding crop varieties, fertilizers, and carefully managed irrigation. It resulted in a steady growth in production of food grain, allowing India to achieve self-sufficiency by 1984. However, success has been limited to areas of assured irrigation, such as northwestern India and the deltaic regions. Output has not significantly improved in dry and semiarid areas, where poverty and malnourishment remain prevalent.

### **3.2 Watershed development program in India<sup>2</sup>**

Despite the impressive macro-economic rate of growth which made the country one of the most exciting economies in the world, the benefit of economic development has not been evenly distributed. Significant portion of India's population still suffer from prevalence of acute poverty and increasing unemployment. The poor performance of agriculture which employs nearly two-third of the population plays an important factor. Rate of growth in agriculture has been increasing at a slower rate than population growth. The rain fed agriculture is the weakest, while they contain the greatest unutilized potential and need to be developed if food security demands are to be meet by the country. Intensive and improved watershed development program holds the key in this regard.

The pressure on the land is often beyond its carrying capacity. The productive lands, especially the farmlands, are in the constant process of various degrees of degradation and are fast turning into wastelands. At present, approximately 68.35 million hectare area of the land is lying as wastelands. Out of these lands, approximately 50% lands are such non-forest lands, which can be made fertile again if treated properly. The unprotected non-forestlands suffered the maximum degradation mainly due to the tremendous biotic pressure on it. In the last 50 years India's lush green village forests and woodlots have been deforested to the maximum.

Estimate by the Ministry of agriculture puts the area affected by soil erosion due to surface runoff around 100mha. Annual soil erosion by water is estimated at 16.35 tonnes per year per hectares. Around 10% of soil eroded is deposited in large dam reservoirs

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<sup>2</sup> Mainly extracted from a report by the Technical Committee on watershed program in India and published by the Department of Land Resources, Ministry of Rural Development of the Government of India, January 2006.

representing a loss of 1-2% of storage capacity per year. A study made on ongoing schemes has revealed that large reservoirs in India have lost about one-third of their storage capacity due to siltation, which resulted in area of irrigated land and lower generation of electricity.

Soil and water conservation work started in the 1960s by Ministry of Agriculture, primarily to stabilize the catchments of reservoirs and to control siltation (Soil Conservation Work in the Catchments of River Valleys Projects). To that effect a scheme “Soil Conservation in the Catchments of River Valley projects” was launched in 1962-63. Another major scheme on “Integrated Watershed Management in the Catchments of Flood Prone areas was launched in 1980-81 exhibiting a number of successful experiences of fully treated watersheds. The Ministry of Agriculture also launched a scheme for propagation of water harvesting/conservation technologies in rainfed areas in 1982-83 which was adapted in the following year by many other locations in the rainfed areas. It was these experiences that led to the institutionalization of the concept of watershed development and in the launch of the National Watershed Development Program of Rainfed Areas (NWDPA) in 1990 covering 99 districts in 16 states.

On a different track, conservation activities were on going in the Drought Prone Areas Program (DPAP) launched in 1972-73 by the Ministry of Rural Development (MoRD) with the objective of tackling the special problems of areas constantly affected by severe drought conditions. Later on the MoRD started a special program called Desert Development Program (DDP) for the desert areas such as Rajasthan.

A review of the above programs led to the development of a new strategy to adapt a watershed based planning and introducing participatory mode of implementation through the involvement of beneficiaries of the program and Non-Government Organizations (NGOs). The review recommended that the management of watershed development should be entrusted to voluntary organizations if they are forthcoming with ultimate aim of handing over one-fourth of the total number of watersheds for development. It also recommended suitable institutional mechanism for bringing about coordination between the various departments at the central and state level with a view of ensuring uniformity of approaches in implementing similar programs for the conservation of land water resources. This recommendation resulted in the development of common guidelines bringing the different programs under the MoRD. The common guideline was followed up from 1994 - 2001 before it is revised for NWDPA to make them more participatory and equitable. The guideline was since revised several times and the watershed program became the centerpiece of rural development in India. In addition to the MoRD, other agencies such as the Ministry of Environment and Forestry as well as bilateral agencies are now involved in implementation of watershed projects in India. Currently ongoing watershed programs by different ministries are listed below:

Ministry of Agriculture (Department of Agriculture and Cooperation)

- NWDPA (Launched in 1990)
- Soil Conservation in the Catchment of River Valley Projects (Launched in 1962 – 63)

- Integrated Watershed Management in Catchments of Flood Prone Areas (Launched in 1981-82)
- Watershed Development Project for Shifting Cultivation Areas (WDPSCA)- (started as pilot and was re-launched in 1994-95)
- Reclamation of Alkali Soils (Launched in 1974-75)
- Watershed Development Fund (established in 1990-2000 at the National Bank of Agriculture and Rural Development with the objective of integrated watershed development in 100 priority districts through participatory approach)
- External Aided Projects on Watershed and Land Reclamation and Development

#### Ministry of Rural Development

- Drought Prone Areas Program (Launched in 1972-73)
- Desert Development Program (Launched ..)
- Integrated Watershed Development Program (started in 1988-89)
- Externally Assisted Project (assisted by donor agencies)
- Technology Development, Extension and Training (launched 1993-94 with a view to promoting and developing suitable technologies for the reclamation of waste lands)
- Investment Promotion Scheme (Launched in 1994-95 to promote participation of the corporate sector and financial institutions to enhance flow of fund for the development of non-forest wastelands)
- Support to NGOs

#### Ministry of Environment

- Integrated Afforestation and Eco-development Project Scheme (Launched 1989-90) to promote afforestation and development of degraded forests by adapting Integrated watershed approach to develop land and other related natural resources through micro-planning process.



## 4 Description and highlight of the visit

### 4.1 Description of the states visited

#### Rajasthan State

Rajasthan State is situated in North West India and lies between 23°3' and 30°12'. The state shares a 1070km long international boarder with Pakistan as well as boarders with Punjab, Haryana, Uttar Pradesh, Madhya Pradesh, and Gujraat from North to South. It is the second largest state with an area of 342,239 km<sup>2</sup> and accounts to 10% of the total land surface of the country and more than 5% of the population.

More than 50% of the area is arid and semi arid and form part of the Great Indian Thar. Annual rainfall is low ranging from 100 -400mm and very erratic. Temperature ranges from 48 - 50°C during summer and go below freezing during winter.

Both human and animal population is relatively high and over the last 50 years, it has increased significantly. This high growth rate poses additional threat to the fragile ecosystem of the desert. That is already constrained by lack of arable land and paucity of surface and ground water, meager forest, low vegetation cover, and diminishing grassland.

The rural economy is largely pastoral. The majority practice some form of semi-nomadic animal husbandry with subsistence cultivation of cereals and millet. Major part of household earning comes from sale of milk, wool, and mutton.

The land privatization that was instituted by the government over the last few decades has led to the dismantling of common property resources which in turn deprived poor and marginal household earning which worth close to 20% of their income. The process of agricultural intensification has led to the widespread destruction of agricultural soils leading to decline in soil fertility and increasing aridity. The scope of non-farm income is limited due to poor infrastructure and facilities. Livelihood opportunities of low cast group depended on traditional skills such as weaving. These have been increasingly being pushed out by industrial commodities which have penetrated the small towns and villages which in turn reduced the demand for these products.

Key development challenges of the arid districts of Rajasthan state include:

- High climate and fragile ecology
- Sharpening inequity and discrimination
- Acute water scarcity
- Inadequate communication and infrastructure facilities
- Scattered and mobile population
- Backward and poor status of women
- Prevalence of endemic diseases and epidemics
- Ecological imbalance created by Indira Gandhi Canal
- Lack of access to information
- Unstable political climate and effective civil society

### **Mararashtra State**

Located in the north centre of Peninsular India, with a command of the Arabian Sea through its port of Mumbai, Maharashtra has a remarkable physical homogeneity. The State of Maharashtra presents a monotonously uniform, flat-topped skyline. This topography of the state is the outcome of its geological structure. The dominant physical trait of the state is its plateau character. The Maharashtra Desh is a plateau of plateaux, its western upturned rims rising to form the Sahyadri Range and its slopes gently descending towards the east and southeast. The major rivers and their master tributaries have carved the plateaux into alternating broad-river valleys and intervening higher lever interfluves, such as the Ahmednagar, Buldana, and Yavatmal plateaux.

The Sahyadri Range is the physical backbone of Maharashtra. Raising on an average to an elevation of 1000 m. it falls in steep cliffs, to the Konkan on the west. Eastwards, the hill country falls in steps through a transitional area known as Mawal to the plateau level. The series of crowning plateaux on the crest forms a distinctive feature of the Sahyadri Range.

The Konkan, lying between the Arabian Sea and the Sahyadri Range is narrow coastal lowland, barely 50 km. wide. Though mostly below 200 m., it is far from being a plain country. Highly dissected and broken, the Konkan alternates between narrow, steep-sided valleys and low laterite plateaux.

The Satpudas, hills along the northern border, and the Bhamragad-Chiroli-Gaikhuri Ranges on the eastern border form physical barriers preventing easy movement, but also serve as natural limits to the state.

The state enjoys a tropical monsoon climate; the hot scorching summer from March onwards yields to the rainy monsoon in early June. The rich green cover of the monsoon season persists during the mild winter that follows through an unpleasant October transition, but turns into a dusty, barren brown as the summer sets in again. The highly pulsatory character of the monsoon, with its short spells of rainy weather and long dry breaks; floods as well as droughts add much to the discomfort of the rural economy. Most of the rainfall occurs in the monsoon season from June to September. Rainfall varies from 9.0 to 693 mm/month. Average annual rainfall is 725 mm. Annual temperatures in Aurangabad district range from 9 to 40°C.

Forests comprising only 17% of the land area of the state covering the eastern region and the Sahyadri Range, while open scrub jungle dots the plateaux.

The soils of Maharashtra are residual, derived from the underlying basalts. In the semi-dry plateau, the regur (black-cotton soil) is clayey, rich in iron, but poor in nitrogen and organic matter; it is moisture-retentive. Where redeposited along the river valleys, those kali soils are deeper and heavier, better suited for rabi crops. Farther away, with a better mixture of lime, the morand soils form the ideal Kharif zone. The higher plateau areas have pather soils, which contain more gravel. In the rainy Konkan, and the Sahyadri Range, the same basalts give rise to the brick-red laterites productive under a forest-

cover, but readily stripped into a sterile varkas when the vegetation is removed. By and large, soils of Maharashtra are shallow and somewhat poor.

Water is the most precious natural resource of the state, greatly in the demand, and most unevenly distributed. A large number of villages lack drinking water, especially during the summer months. Barely 11% of the net sown area is irrigated. Perched water tables in the basalt aquifers have contributed to increased well irrigation, which accounts for approximately 55% of the irrigable water. The granitic-gneissic terrain in the eastern hilly area of Vidarbha accounts for all tank irrigation. Tube-wells in the Tapi-Purna alluvium and shallow wells in the coastal sands are the other main sources of water.

## **4.2 Highlight of the Visit**

### **4.2.1 Mumbai**

Participants arrived in Mumbai early morning of Monday March 8, 2010. On arrival, participants were met by facilitators from Pragmatix Research and were provided with background material on the 1<sup>st</sup> three watersheds that were visited in Aurangabad. After some rest, participants were taken for some sightseeing and shopping in Mumbai before boarding the train for overnight journey to Aurangabad.<sup>3</sup>

### **4.2.2 Aurangabad, Maharashtra**

#### **INTRODUCTORY MEETING**

An introductory meeting was held in the morning of March 9, 2010 at the Conference Room of the Hotel Windsor Castle in Aurangabad. The meeting was facilitated by Dr. A.J James of Pragmatix. After self-introductions and listing down of the team expectations from the study tour, an informal overview of India (Box 1) including the physical features and location of states on maps (Figures 1 and 2) as well as watershed development in the country. The basic points mentioned with regard to watershed development were the following:<sup>4</sup>

1. Watershed development began in the 1950s in India with locality-specific natural resource conservation and only since 1995 was it made a national-level integrated and participatory watershed programme with funds and specific guidelines for implementation. There have been as much as 9 Guidelines for such Watershed Programmes from 1994 to 2008, with the last few being Common Guidelines agreed between the Ministries of Rural Development and Agriculture.<sup>5</sup>
2. Three central government Ministries channel around Rs. 2,000 crores (roughly USD 400 million) every year into watershed development programmes (Box 2)

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<sup>3</sup> See Box 2 for a outline description of Aurangabad district and Annexure 6 for a brief history of the district.

<sup>4</sup> A more detailed account of watershed development in India with and references to more material can be found in Annexure 3 of this Report, which was an Annexure sent with the Concept Note to ENTRO.

<sup>5</sup> The soft copy of the latest version of the Common Guidelines (in 2008) was circulated to the participants on a CD.

3. Apart from government watershed development programmes in India, however, India also has a history of NGO-implemented and donor-funded watershed projects. Unlike the large government programme, however, these smaller programmes have been able to experiment with different technical, institutional and socio-economic approaches to watershed development.
4. Several lessons learnt from these smaller projects have been used to reform the larger government watershed development programmes. Some of the donor-driven NGO-implemented programmes are of excellent quality, with results that have sustained over time, but all donor funds count for less than 10% of the total government budget for watershed development in the country.
5. A key feature of both government and donor-driven watershed development programmes is the combination of natural resource management and poverty alleviation through livelihood promotion.

A brief note on Government structures in India, from national to state to district and village levels was also circulated (see Annexure 5).

Following discussions and clarifications, presentations were made by representatives from two NGOs, Sandeep Jadhav from Water Organizations Trust (WOTR) and Yugandhar Mandavkar of Grassroots Action for Social Participation (GRASP), about their work in the watersheds to be visited in Aurangabad (see Box 2).<sup>6</sup> Both presentations highlighted the principles behind participatory watershed management, with the basic approach being on socio-technical interventions in watersheds – as opposed to mere technical interventions. The aim was to involve the entire community in the activity, so that they developed a sense of ownership and responsibility towards the assets (structures) created for soil and water conservation.

#### **Box 1: India: An Informal Overview**

- Old civilization: one of the richest & most developed countries in the world before the Mughals and the British
- LARGE: We are the land mass of Europe
- Big population: but not standing shoulder-to-shoulder – large empty spaces
- Geo-hydrologically varied: coasts, mountains, plains, plateaus, deserts
- World's largest democracy
- Culturally diverse and yet united, 'geographical term'
- Vibrant economy: small enterprise, large enterprise, black economy!
- Many Indias!: urban, rural, Bollywood, mass poverty, IT capital of the world, vibrant scientific community, ...
- Common themes uniting us: politics, films, cricket!

#### **Five Strengths**

<sup>6</sup> The WOTR PowerPoint presentation is in the CD given to participants. Also, a brief note on Aurangabad district is in Annexure 6, while Annexure 7 and 8 have brief profiles of these two NGOs.

- Tradition of community self-governance, the Panchayats of the 'Village Republic'
- Democratic decision-making from grass-root level upwards
- Strong, widespread and growing civil society, inspired by Gandhian ideals
- Committed and qualified bureaucracy, which draws the cream of the Indian youth every year
- Comprehensive set of policies and laws, providing the fabric for economic growth and social development

#### **Five Weaknesses**

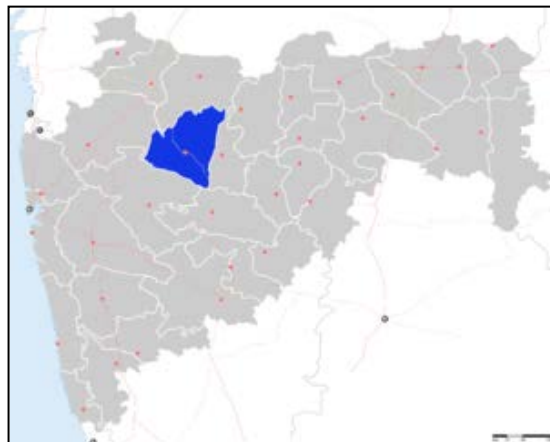
- Urban slums, due to migration from rural areas with relatively less livelihood opportunities
- Politicization of society from grass-root levels, including caste politics
- Corruption, bringing economic gains without social tempering
- Infamous NGO, created and used to make money
- Unimaginative and outdated policies and laws, more of a hindrance than aid for development

#### **Box 2: Indian Government Watershed Development Programmes**

- The Ministry of Rural Development (MORD) implements three programmes: (1) the Drought Prone Areas Programme (DPAP), (2) the Desert Development Program (DDP) and (3) the Integrated Wastelands Development Programme (IWDP).
- The Ministry of Agriculture (MOA) implements the National Watershed Development Programme in Rainfed Areas (NWDPA), focusing on rainfed areas (also known as dry lands since they lack irrigation)
- The Ministry of Environment and Forests (MOEF) implements a watershed development programme for degraded forest lands, through the National Afforestation and Eco-restoration Board (NAEB).

#### **Box 3: About Aurangabad**

**General:** Aurangabad is a district in the centre-west of Maharashtra state in western India. Aurangabad means "Built by the Throne" and is named after the Mughal Emperor Aurangzeb, who founded the city. The city is a tourist hub, surrounded with many historical monuments, including the Ajanta Caves and Ellora Caves, which are UNESCO World Heritage Sites. Aurangabad city is said to be a 'City of Gates' and is the administrative headquarters of the Aurangabad Division of Marathwada region and one of the fastest growing cities in the world.



**Area:** The total area is 10,100 square kilometers of which 141.1 square kilometers is urban area and the remaining 99,587 square kilometers are classified as rural.

**Population:** 2,897,013 in 2001

**Location:** The district is from 19 to 20 degrees north *longitude* and 74 to 76 degrees east *latitude*. It has an average elevation of around 500 metres

**Topography:** The district is located mainly in Godavari Basin and its some part towards North West of Tapi River Basin. This District general slopes down towards the south east while the North West part falls in the Purna –Godavari river basin.

**Geology:** Aurangabad District is covered by Deccan Trap basaltic flows of Upper Cretaceous to Lower Eocene age. In general, depth of weathering of these flows varies from 3 to 9 m. The vesicular-zeolitic basalt, jointed-fractured basalt and the weathered basalt act as an aquifer. In the Northern parts of the district shallow murmic soil is observed while deep fertile black cotton soil is observed near the higher order drainage

**Climate:** The rainy season is from June to September, with winter being from October to February and summer from March to May. The average rainfall is 734 mm and the minimum and maximum temperatures are 5.6 and 45.9 degrees centigrade, respectively.

**Irrigation and agriculture:** The Ganga Canal completed in 1928 and the [[Indira Gandhi Canal - One of The largest canal Project of the world]] completed in 1987 have allowed the farming of crops such as mustard, cotton, Groundnut, wheat and vegetables

**Industries:** Other industries include wool production and the mining of Gypsum, plaster of Paris and bentonite

## KACHNER WATERSHED VISIT

In the afternoon of March 9, 2010, the team visited the watershed activities in Kachner village in Aurangabad district. The watershed development work in Kachner, which is roughly 500 hectares in size, had been initiated by WOTR in October 2008.<sup>7</sup> The team visited farmers' fields with freshly-dug physical structures for water harvesting, including continuous contour trenching (CCTs), Water Absorption Trenches (WATs) and farm bunds. The development project was carried out using government funds from the national watershed development programmes (Box 3) and WOTR was designated as the Project Implementing Agency (PIA) for the watershed project.

The group interacted with villagers and staff of WOTR in the field on a number of issues: technical, planning and monitoring mechanisms, community involvement at all levels of project initiation, planning, monitoring and implementation, linkage with line offices in the government structure.

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<sup>7</sup> See Annexure 9 for a brief description of the Kachner watershed development project.



**Box 4: Key features of the watershed development programmes of MORD & MOA**

- *Time*: 4 - 7 years
- *Approach*: Integrated, participatory NRM + Livelihood promotion (see Common National Guidelines for Watershed Management)
- *Watershed selection*: by State Governments (earlier state government applications approved by GOI, who released funds in tranches, based on documents)
- *PIA*: Project Implementing Agency (Government Department or NGO), responsible for (1) planning, (2) Implementation, (3) Monitoring and (4) Financial management
- *Funding*: From Rs. 9,000 – 12,000 (USD 200 - 250) per hectare, depending on terrain. Money flows from government directly to village Watershed Development Committee (WDC) bank account
- *Synergies*: with other government programmes such as the National Rural Employment Guarantee Act (NREGA) and the Backwards Regions Grant Facility (BRGF)

Key points from the field visit are the following:

1. Forest Department land: The hillsides (elevated ridge portions of the watersheds) were owned by the Forest Department that did not permit watershed development activity to be carried out during the years of the watershed development project. This, participants were informed, is because of a strict interpretation of the Forest Conservation Act of 1990 that prevented 'non-forest activities' on forest land. However a new Common Guidelines was issued by the MORD. Under the new common guidelines, such Forest Land falling within the watershed will have to be treated by the Forest Department, in conjunction with the PIA.
2. Using NREGA labour for plot-level interventions: The villagers and NGO staff also explained the system of work allocation under the NREGA, which pays the labour charges for a lot of the watershed interventions.<sup>8</sup> The NGO staff explained the plot-level planning that takes place on each farmer's field, based on a basic assessment of land characteristics (e.g., slope, texture, contours) but without scientific testing, with the farmer. Plot-



<sup>8</sup> Basically the district government decides the type of work that can be taken up under NREGA, a national programme that guarantees 100 days of labour at the minimum wage (around Rs. 100 per day on average) to any one who demands work. The only stipulation is that 60% of the work must be to create natural resource assets. Villages and NGOs can make representations to the district government to have a certain type of activity in their area. Once the work is decided a 'mate' (labour supervisor) is assigned the task of overseeing the work, measuring the work done by each person, making payments and keeping records. The NGOs role in this activity is two-fold: to suggest the type of work to be taken up and to mobilize villagers to come do the work allotted.



level information is entered in a form, and the farmer and a representative of the Village Development Committee sign an agreement for the work to begin. In some cases, the farmer may not wish to carry out certain suggested treatments (e.g., planting trees on his land or bunds), in which case the NGO staff respect their wishes. Only agreed work is carried out.

3. Increase in water levels in wells: The villagers informed the team that water levels in certain designated indicator wells had already begun rising after the last rains. Trenches dug along the edges of the field help trap rainwater and increase infiltration to groundwater aquifers which, in turn, replenish shallow dug wells that tap these aquifers. Increases in residual moisture also help crop growth, despite the fact that there is barely 6 inches of top soil above the rocky layer of this basaltic plateau. Farmers expect to take a second crop in addition to the normal rain-fed crop cultivated during the period June – October. The team also saw onions grown for seed, and other vegetables grown on the lower part of the fields, where moisture has gathered due to the field bunds that had been constructed. An agricultural well nearby was being used by a village woman to collect drinking water.



The team then had a brief meeting with the village community. The team was welcomed by a traditional tribal song, and young leaders of the watershed development committee and women's self help groups described their efforts and expectations from the programme. In particular, they mentioned that a major gain they felt from the community mobilization done by the project was that it had brought the community together to plan their activities and increased social interaction within their village.



## BOLTEK WATERSHED VISIT

On March 10, 2010, the team visited Boltek watershed. Unlike the previous watershed, the Boltek watershed development project was implemented from 1997 to 2001<sup>9</sup> by GRASP, an NGO. This enabled the team to assess the impact of the interventions beyond the obvious benefits in soil and water conservation. Impact of the project on social and institutional development was also visible (see short notes on all three watersheds in Annexure 9).



The first stop of the visit was to the village where the team was first shown a wall painting of the watershed area and its features, which were explained by one of the villagers. The team then had a meeting with farmers and community leaders, including women, who described the situation prior to the watershed development project, the problems they faced initially in mobilizing the community and the support they received from the GRASP (in terms of capacity building, awareness generation and general hand-holding), and their subsequent realization of economic gains from soil and water conservation activities. They also spoke of how the community mobilization (a major social gain, in their eyes), agricultural prosperity and women's empowerment helped lay a solid foundation for subsequent socio-economic development in the villages. The villagers interacted with the team. During the interaction, they mentioned that some more watershed development interventions are yet to be done, largely



because farmers were initially reluctant to carry out the work on their field and by the time they saw the impacts on the other farmers' fields there was no money left for further interventions. They also mentioned that the building where the meeting was being held had been constructed by people's contribution (*shramdaan*) and that they had lobbied the local administration for repairs and improvement to their school building. Basically, thus, the agricultural prosperity made possible by the soil and water conservation measures and the community mobilization by GRASP staff, led to them using part of the gains for community development.

After the village meeting, the team visited a masonry check dam built on a natural drainage line using project funds, which was recharging several nearby wells, from where

<sup>9</sup> See the Annexure 9 for a brief write up on the Boltek watershed development project

farmers were pumping water out for irrigation. Most were now growing a second crop and inter-crops as well, while some had planted orchards of horticultural species such as *sapota* and *guava*.



*The masonry check dam, Boltek watershed*



*Irrigated sapota plantation, Boltek watershed*

The team left Boltek watershed to a nearby UNESCO heritage site of Ellora caves, visited the main Kailash cave briefly and returned to the hotel around 5 p.m.



## **KADAVANCHI VILLAGE VISIT**

On the 11<sup>th</sup> of March 2010 the team visited Kadavanchi watershed, which was a 2 hour drive from Aurangabad city (see the short notes on this watershed in Annexure 9). This was also a completed watershed project (implemented from 1996 to 2000). Again soil and water conservation benefits were apparent as were social and institutional development. The team visited the various interventions in the field and met farmers and community leaders in the field to discussed about the situation prior to the watershed development project and their impression 10 years after the completion of the project. Four key points that came out of the field visits and discussions from Kadavanchi were the following:

1. Reserved area for grazing: Villagers in Kadavanchi watershed had reserved around 10 hectares of land out of a total of around 90 hectares of common land for open grazing by the goats and sheep of poorer households. The remaining common land (belonging to the Gram Panchayat of the village) was protected by Cattle Proof Trenches (CPTs)



to protect the grass plantations, and villagers were only allowed to cut and carry grass from these lands.

2. Convergence with other government programmes: A large tank measuring 50 metres by 30 metres, with a depth of around 7 metres, has been constructed and lined with thick plastic sheets (to prevent infiltration into the ground) using funds from the National Horticulture Mission, long after the watershed development programme had ended.



3. Impacts of grape cultivation: A couple of grape farmers recounted how the village was not known for grape cultivation before watershed development project, but once water was available, some enterprising farmers started to cultivate grapes on their own initiative. Today the village is famous for its grape cultivation. As a result, land prices have increased around 100 times (from around Rs. 5,000 per acre to Rs. 500,000 per acre). Also, now four banks operate in the village to provide credit to its farmers. Private doctors visit houses looking for clients, and farmers in this village are being called on by other villagers to be 'consultants' for their vineyards. Also, migration has not only stopped, but labourers from other areas are now coming to Kadavanchi to work on the farms here.



After returning from Kadavanchi the team returned to the hotel to reflect on the observations from the three watersheds visited. A brief presentation was also given by on the work done by WOTR in Somaliland to introduce participatory watershed development practices among the nomadic sheep and goat rearers there.

The key observation made by the group was that the principle of infusing capital into a watershed can yield economic, social and institutional gains, which can sustain far

beyond the lifetime of the watershed development project, provided it is based on community participation, involvement and ownership. To this end, the field staff members of all the NGOs working in the area have played a great role in building the trust and capacity of the local community which, coupled with the emergence of strong local leaders (or ‘champions’) led to sustainable economic and social gains.

**Box 5: The changing role of NGOs working on Watershed development in India**

Main role till the 1990s

- To experiment with different technical and social approaches
- To create awareness about potential approaches among government officials
- To push for supportive policies

Main role since 2000

- To critically examine government policies
- To contribute to policy dialogue
- To create cadres of trained village-level workers in their operational areas
- To document and disseminate
- To create networks of NGOs and resource persons
- To design and carry out training programmes for government functionaries
- To standardize procedures for village-level work
- To promote livelihood opportunities (e.g., Non-banking finance companies, micro-credit and micro-enterprise)

The team then took the night train to Mumbai and flew to Jaipur, the capital of the state of Rajasthan on the morning of March 12, 2010. There the team checked into a hotel, ate lunch, After some rest, the team continued its travel by the night train to the district of Bikaner, on the western edge of Rajasthan along the border with Pakistan.



*On the overnight train from Aurangabad to Mumbai*

### 4.2.3 Bikaner, Rajasthan

The team arrived in the early morning of March 13, 2010 at Bikaner and after some rest left for Lunkaransar, around 40 kilometres from Bikaner, to meet the staff of the NGO called Urmul Trust (see Annexure 10 for a brief history of Bikaner and Box 5 for an outline description of Bikaner district).

#### Box 6: ABOUT BIKANER

**General:** Bikaner is a District in the northwest of the state of Rajasthan in northern India. The city is the administrative headquarters of Bikaner District and Bikaner division. It was formerly the capital of the princely state of Bikaner. The city was founded by Rao Bika in 1486 and from its small origins it has developed into the fourth largest city in Rajasthan. Just like Jaipur, Bikaner is called the Camel City/Land of Camels.

**Area:** The total area is 27,284 (000' square kilometer)

**Population:** According to the 2001 India census, Bikaner had a population of 1,674,271.

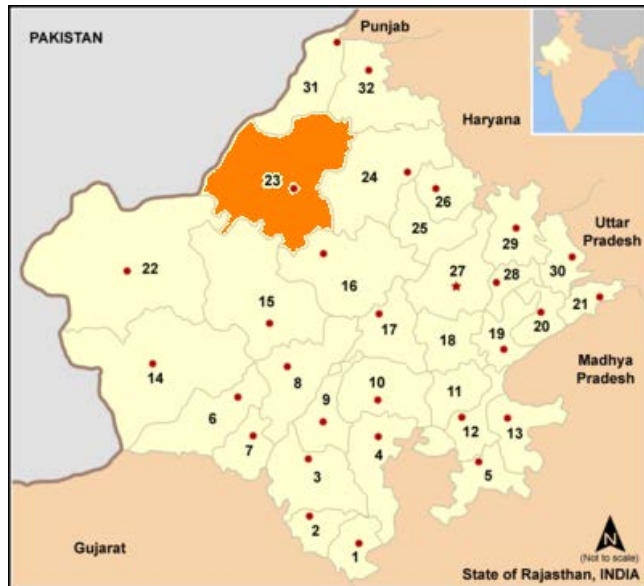
**Location:** Bikaner is located at 28°01'N 73°11'E to 28.01°N 73.19°E.

**Topography & Climate:** Bikaner is situated in the middle of the Thar desert with very little rainfall and extreme temperatures. In summer, temperatures exceed 50 °C and during the winter it dips to freezing point. It has an average elevation of 243 metres (797 feet).

**Rainfall:** Annual Rainfall is in the range of 203–210 millimetres.

**Irrigation and agriculture:** The Ganga Canal completed in 1928 and the [[Indira Gandhi Canal - One of The largest canal Project of the world]] completed in 1987 have allowed the farming of crops such as mustard, cotton, Groundnut, wheat and vegetables.

**Industries:** Other industries include wool production and the mining of Gypsum, plaster of Paris and bentonite.







### **MEETING AT THE URMUL TRUST OFFICE, LUNKARANSAR**

The team visited the office of the URMUL Trust in Lunkaransar and held discussion with the staff of the organization.

#### **Formation and orientation of the Trust**

The staff members of the Trust and Mr. Aravind Ojha, Secretary to the Board of Trustees of the Urmul Trust, described the origins of the Trust formed by the late Sanjay Ghosh. Ghosh had been engaged by the Uttari Rajasthan Milk Union Private Limited (URMUL) in 1984, while still fresh from out of the prestigious Institute of Rural Management, Anand (in Gujarat state) or IRMA, to suggest means to improve the health of the local communities,. Although he studied the problem and gave his suggestions, upon his return from studies abroad in 1986, he discovered that nothing had been done for want of funds. Ghosh then started a novel scheme of getting villagers to agree to put 3 paise for every litre of milk sold into a Trust. With this seed money, Ghosh started the URMUL Trust and began a mobile clinic to cater to the health needs of the nomadic cattle-rearing communities in the arid desert villages of Bikaner. The severe drought of 1987, however, saw the URMUL Trust deeply involved in drought relief work with the government. Using the government funds they earned through their drought relief work, the Trust constructed the campus at Lunkaransar and also realized that for sustainable human development in their drought-prone area, they would have to look beyond health to issues of water and general socio-economic development. They also made a conscious decision to work with the low-caste, poor and women.



### Key intervention areas

**Water:** The arid desert districts of western Rajasthan had a range of traditional water harvesting structures designed to capture the scarce rain water. The hard gypsum layer below the topsoil helps store rain water in shallow aquifers, from where it is tapped through open dug wells. The water harvesting structures range from *baodis* (wells), *khadins* (shallow barriers built to stop running water in fields and common areas), *tankhas* and *khunds* (lime-plastered cisterns into which water is directed by a saucer-shaped apron all around).



*Traditional step well*



*The impact of irrigated agriculture in desert regions, Bikaner*

While the government introduced the 650-kilometre long Indira Gandhi canal network that brings water from the Pong Dam in the northern state of Himachal Pradesh and give a big boost to irrigated agriculture in the barren desert districts of western Rajasthan (including Bikaner), there have been accompanying problems of salinity, waterlogging and land submergence.

However, the coming of piped water into villages has also led to rural communities abandoning traditional means of water harvesting. But with the poor rains and recurrent droughts, especially in recent times, the availability of water from taps can no longer be taken for granted and poor water quality adds to the problems of drinking water in these arid villages. Urmul Trust has thus been working with rural communities to revive traditional water harvesting structures at least for drinking water needs of humans and livestock in the region. Further, since women are traditionally given the responsibility of fetching drinking water, often walking long distances to obtain drinking water, improved local availability of potable water from traditional structures reduces their daily drudgery considerably. This is the main aim of their water-focused interventions in the desert watersheds.

**Women's empowerment:** Urmul Trust consciously seeks to empower rural women through three well-designed interventions. First, the formation of Self-Help Groups for savings and credit increases the economic independence of women, who have a secondary status in this traditionally male-dominated rural society. Second, the Trust runs a Bridge School programme to provide out-of-school girl children with the opportunity



*Colourful women's SHG Federations meeting, Urmul Trust*

to re-join school by preparing them, through six-month residential training courses, to write the Class 5 examination directly and thus enter the mainstream schooling system from Class 6 onwards. Third, the Trust also provides a range of training for village women in livelihood activities, skill development and basic health care and also provides training programmes for women elected representatives (who have 50% of seats in local government positions).

Low castes and poor: Apart from ensuring that low castes and poor are included in all village development activities, Urmul Trust began to support weavers who are traditionally considered low-castes. With extensive support through capacity building, design support, the weavers now run their own organization, and quite successfully.

### **Organizational structure**

The Urmul Trust is registered Trust under Indian laws, and has a Board of Trustees and an Executive Committee and Secretary to manage day-to-day operations. The activities of the URMUL Trust grew quickly from its inception in 1987 to an organization of around 200 employees when the Trustees decided to break up the organization into smaller theme-based NGOs located in different parts of their operational area. This was a revolutionary move given that most organizations prefer to grow in size and influence, but a move based on the principle that ownership and control should be decentralized and given to local bodies. The only stipulation was that the organizations (each of which was registered separately as a Society under the Indian Societies Act) must adhere to the basic principles and values of the Urmul Trust. While 12 organizations were created, only 10 remain today, two having left over differences over core principles and values.

### **VISIT TO THE INDIRA GANDHI CANAL**

In the afternoon of March 13, 2010, the team drove around 40 km to see the Indira Gandhi canal works (see Annexure 11 for a brief write-up). The accompanying staff member from the Urmul Trust explained that this was a branch canal from the main canal that runs from north to south largely by gravity. To take water to villages to the east of the canal, the water is lifted around 50 feet using pumping stations. The team visited one of these pumping stations where water was lifted 25 feet. The staff member also explained that drifting sand dunes were a concern, as also animals that fell into and died in these canals.

### **TRADITIONAL WATER HARVESTING STRUCTURES**

On return from the canal, the team visited a nearby village to see traditional *tankhas*, which are basically large stone cisterns (measuring 50 metres by 30 metres by 10 metres depth) constructed around 100 years ago by wealthy citizens to provide drinking water for the entire village. Earlier there was an apron around the



*A 100-year old community structure to harvest and store rainwater*

*tankha*, which used to direct rain water flowing along the streets into the *tankha*, after first flowing through a silt trap. The roof is sealed to prevent evaporative losses with only two small openings 1 metre-square openings, through which villagers accessed water using buckets and ropes.

### VISIT TO WEAVERS SOCIETY

On the 14<sup>th</sup> of March, 2010, the team travelled to Phalodi, south of Bikaner and en route to the next district town of Jodhpur, to meet representatives of the weaver's cooperative society promoted by the Urmul Trust.



*Owner drawing water for his livestock from a traditional well*

En route, the team stopped to look at traditional wells dug by local farmers – which were narrow mouthed but dug out inside like a pitcher, i.e., with a wide base underground. The covering was closed with a lid of woven thorns, to prevent animals from falling in. The local farmer who had come to water his cattle from the wells explained that the well would be desilted every three years, but also showed a silt trap to reduce the amount of sand that fell into the well.

He also asked team members to taste the water, which did not have any adverse

taste or odour, and said that he and his family preferred drinking the water from these wells – which he had dug with own funds and labour resources.

The team was also taken to see water harvesting trenches dug with NREGA labour, and a nearby *khadin* (a low wall created to impede water flow during the rains), both of which serve to hold back water a bit longer so that it infiltrates into the groundwater and recharges the nearby dug wells.



*Field trenches and bunds to harvest rainwater*

### The Weavers Society

The team visited the Weaver's Society in Phalodi, where the office-bearers and Mr. Arvind Ojha of Urmul Trust, explained the origins and development of the Society. On the issue of water, the weavers recollected days of extreme water scarcity, which had been considerably lessened both by the arrival of piped water from the Indira Gandhi Canal, but also – and more recently – because of the revival of traditional water harvesting structures. Dr. James then explained four stages of development in the region: (1) traditional, low-equilibrium economy and ecology – with traditional water harvesting structures ensuring adequate water for humans, livestock and agriculture; (2) increasing scarcity with the population growth starting from the early 20<sup>th</sup> century; (3) large-scale government interventions such as the canal and piped water supply systems, which improved the situation considerably, but also brought in their wake problems of reliable supply, water quality and sustainability; and (4) a revival of traditional water harvesting structures to provide clean drinking water.



*Meeting Weaver's Cooperative Members, Phalodi*

### Village Visit

In the afternoon of March 14, 2010 the team left for a nearby village to visit water harvesting structures and horticultural plantations using a new water harvesting structure.

**Water harvesting structure:** The Urmul Staff member explained that a total of 8 water harvesting ponds had been deepened in the village, increasing the collection and storage of monsoon-period rain water from 4 to 12 months in a year. The team saw channels dug by villagers using funds from another NGO funder, Oxfam with in kind community contribution of 20% (villagers dug 20% extra without payment, as part of community contribution, *shramdaan*). A similar system was followed in community work paid for by government NREGA funds.





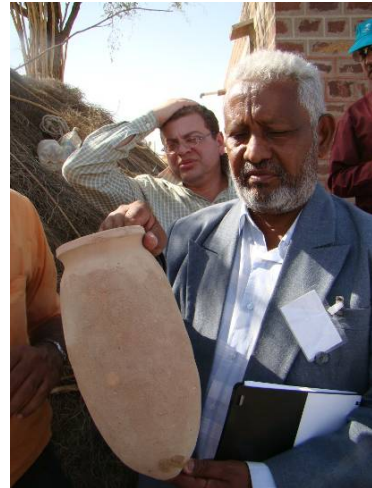
*The team saw channels dug by villagers*



*The homestead horticulture plantation*

**Homestead horticulture:** The team also visited a household that had been provided with a *khund* to harvest rain water (10 metres diameter by 10 metres depth) using a concrete apron, and use this water to irrigate a small plot of fenced-in land planted with around 60 plants of fodder, fruit and timber value.

Discussions with the farmer and his family revealed that they earned additional income of around Rs. 10,000 per year as a result of the horticulture, and since Oxfam had paid for their investment in land and water, they were able to supplement their livelihoods substantially. They also explained that the Oxfam programme was aimed at women's empowerment, because of which the male farmers had to register the land of the plantation in their wives names also.



*Clay pitcher with hole for controlled irrigation*



*Traditional women of Bikaner farmer and his family*



*ENTRO team with the beneficiary*

### Team Discussions and Presentations

In the morning of Monday the 15<sup>th</sup> of March, the team held a meeting with Mr. Arvind Ojha of Urmul Trust in which he clarified several issues that were raised by team members. In particular, he described the steps involved in their system of community participation from pre-planning to planning to implementation and monitoring of a development project (see Box 7).

#### **Box 7: Community Participation in Rural Development Projects of Urmul Trust Organizations**

##### **Pre-planning & Planning**

- Gather information (secondary & primary – e.g., informants)
- Select project area – acc. to organizational strategy (poor & low-caste)
- Build rapport – field workers in village for min 3 months, to understand village dynamics, problems, sitting with all groups (leaders, women, children, men, old, youth), starting by asking about old memories – to assure community of willingness to listen (not just prescribe solutions)
- Collect detailed information: using PRA, with different groups & not just leaders, to list issues, then group them and finally prioritize them
- Share information back with the community: to get agreement on problems
- Draw up proposals: for government or donors
- Detailed action plans: Activities, groups, outputs, time-lines, etc. – written down and agreed with the community

##### **Implementation & Monitoring**

- Action plan implementation through Programme Coordinators, Cluster Coordinators: especially women (though they have low education), who are then trained to take up their responsibility
- CBOs formed: CIGs/SHGs/User Groups
- Capacity building of groups: to build leadership, book-keeping, accountancy, skills, etc.
- Written agreements: with CBOs and GPs on sharing of costs and other resources (e.g., buildings, fuel, ...) etc.
- Monthly meetings to share past experiences: Not inspection (finding fault) but supervision (highlighting positive aspects and finding community solutions to overcome problems); minute-taking by community volunteers
- Annual reviews of community teams: with solutions from within the team
- Transparency meetings: with the community to share information on activities, money spent, (overall & village)

Subsequently, the team broke into groups and prepared their Group Reports, which were presented and discussed after lunch. Around 6 p.m the group checked out of the hotel and visited the nearby showroom of the Weaver's Society promoted by the Urmul Trust, and left by taxis for Jaipur at around 7 p.m and reached the destination at around 1 a.m. The next morning after breakfast, they left for the Institute of Development Studies (IDS) Jaipur for a panel discussion on watershed management issues.



### **INSTITUTE OF DEVELOPMENT STUDIES JAIPUR, RAJASTHAN**

In the morning of March 16, 2010, the team attended a panel discussion on watershed management and related subjects at the Institute of Development Studies in Jaipur. Three Panelists including Professor Surjit, Mr. P.M. Paul, and Dr. Varsh Joshi gave a brief presentation which was followed by discussion with participants.

#### **Professor Surjit Singh, Director, Ids Jaipur**

Professor Surjit Singh of IDS Jaipur welcomed the participants and gave a brief introduction of the mandate and role of IDS, especially in carrying out research and providing policy advice to state and national governments. He then gave a brief overview of watershed development in the state of Rajasthan, and answered questions from the team, which included the following key issues:



- Special institutional support: The Government of Rajasthan set up the Department of Soil Conservation while the Government of India set up the Central Arid Zone Research Institute (CAZRI) to provide technical support to communities and government departments for constructing water harvesting structures keeping in mind technical specifications.
- Integrated approach formulated: to provide linkages between soil conservation, water harvesting and livelihood promotion, e.g., grassland development and breed improvement to improve livestock, and rehabilitation of traditional water harvesting structures, which is an approach that has had considerable success in selected watersheds in the state. Once the community understands that there will be concrete returns from the activity, the community has an interest to participate and preserve the structures.
- Creating space for involvement of NGOs: Government provided space (in the Guidelines for watershed development) to involve NGOs, to improve community participation – as seen for instance, in the case of URMUL Trust in Bikaner – as there is a perceptible difference in quality between the implementation of watershed development projects by NGOs and by government departments.
- Infrastructural support to watershed development: Since without rains there is no water, meaning there is no support for survival and so the provision of rural employment as a key support for rural livelihoods is an important support strategy. Three support mechanisms are (1) the Rural Infrastructure Development Fund (RIDF) is a fund created specifically by another government agency, the National Bank for Agricultural and Rural Development (NABARD) for providing support to watershed development; and (2) National Rural Employment Guarantee Act (NREGA), which uses government funds to create soil and water conservation (SWC) infrastructure at village level, and thus create local employment.
- Improvement is now visible but bottlenecks still present: Rajasthan is one of the best performing states in watershed development as it has a history of designing and creating rainwater harvesting systems. But it is not that all systems are working. Much greater ownership of SWC structures created at the village level, but still problems of social equity (e.g., landless labour, tail end farmers), sustainability (due to exogenous factors such as rainfall and endogenous factors such as community ownership), conversion of grazing land to agricultural cultivation (due to increased availability of canal water) and the consequent shift from nomadic to stall-fed livestock like buffaloes which need more fodder than goats and sheep owned by the landless nomads (who depend on livestock for wool, meat and milk) – leading to large reduction in nomadic populations.
- The frequency of drought years has increased but fewer impacts: from an analysis of rain-gauge station data for the last 100 years, but even the severe drought in early 2000s did not lead to a single death and milk production did not go down.
- Policies can create problems too: Subsidies in power can increase the rate of exhaustion of groundwater through greater use of electrified bore wells – which was not a feature of traditional and sustainable desert livelihoods earlier. Also, promotion of wind mills instead of solar power is not the best suited to the local environment.
- Greater dependence of community on government: The community seems to have lost the ability to look after community assets and public goods such as water

harvesting structures. Also, water has become politicized, and needs an elaborate mechanism to implement new government water policies (e.g., more R&D into less-water intensive crops) but the state needs to facilitate communities to use their traditional knowledge.

### **Mr. P. M. Paul, Cecodecon**

Mr. P. M. Paul from the NGO called Centre for Community Economics and Development Consultants Society (CECODECON) then spoke about processes followed in watershed development programmes implemented by NGOs and answered questions from the group. The key issues from the discussions are the following:

- Community mobilization must be supported by capacity building – not just technical, but also social issues related to conflict resolution, sustainability and leadership.
- Only changes initiated by the community are sustainable: There could be differences between technical experts and community perceptions, but only changes initiated and owned by the community (people-driven changes) are sustainable. The community needs to feel that they are the owners and drivers of the watershed development activities, but need support to set up community groups and federations of such groups.
- Participatory monitoring and evaluation: NGOs carry out participatory monitoring and evaluation but in consultation with rural communities, often using oral perceptions of communities rather than formal written analysis to obtain quick and effective community feedback.
- Cautions about scientific research: The blind acceptance of scientific research is not advisable, given vested interests in the commercial sector, and therefore even NGOs need to understand the motivations of researchers.
- Funding for NGOs: In India, since most NGOs work continuously on improving their interventions for sustainable development at community level, and such continuous thinking helps to keep donor funds coming in for innovative research and implementation. However, NGOs are also on the look out for reducing their dependence on donor agencies and to approach donors that are more willing to support their line of action research.
- Changing role of NGOs: There is now sufficient money with the government and there is no need for NGOs to replicate what government is already doing – as the government is the largest player in the country. Specific roles of NGOs are (1) to demonstrate good practices; (2) to understand community perceptions and design and promote sustainable practices along with the community (rather than imposing approaches from ‘outside’ without taking the community’s perceptions into account); (3) to create and nurture the relationship with the communities they are working with, but to change role as time goes along, depending on the new needs of the community - e.g., market support and linkages, advocating for policy change based on the potential impact on the community (e.g., imports that affect local production and livelihoods by lowering prices) and linkages with research organizations (to highlight problems of disappearing traditional varieties and germplasm and to change research

perceptions from lab-to-land to participatory technology development (PTD), farmer-to-farmer extension and using indigenous traditional knowledge or ITK).

- Main role of NGOs: The main intention however is to demonstrate successful models to government, to be taken up for replication at a larger scale, but also at a smaller scale at community level by other farmers or other NGOs.
- Horizontal learning initiatives: An innovative scheme in Maharashtra to support 'horizontal extension', where the government set up Resource Centres across the state, based on NGOs and even Gram Panchayats that have demonstrated good work, and provided funds for cross-visits: e.g., Rs. 200 per person for villagers to visit these Resource Centres and Rs. 2,000 to bring Resource Persons from these Centres to their own villages to motivate and mobilize their own communities.

### **Dr. Varsh Joshi, Reader, IDS, Jaipur**

Dr. Varsha Joshi gave a brief overview of the issues of gender in watershed management. The key points she made in her discussion are as follows:

- Women are a key stakeholder in watershed management: closely related to the issue of water through their daily lives
- Major shift in women's empowerment: In contrast to the past, women are now participating in village level decision-making at different levels.
- Self-help Groups for women is a major boost: While SHGs give great economic independence for women and space for discussions, these also serve as forums for discussing watershed, food security, nutrition and livelihood issues – and thus as vehicles for routing development interventions (e.g., including vegetables into diets for improved nutrition)
- Women's empowerment leading to men's empowerment: Rajasthan society is a traditionally male-dominant, which made it extremely difficult to empower women, but watershed development programmes were a major source of economic and social empowerment for women. Although there was substantial opposition to allowing women decision-making power and access to credit and other livelihood activities outside their houses, there is now greater acceptance of SHGs and of women in general.
- Watershed benefits a major factor for change: The fact that women were able to leverage loans from their SHGs and banks played a major role in the acceptance by men of the new role of women.
- Innovative support for women: The Government of Rajasthan distributed bicycles for women to enable them to attend school – since the distance to middle and high schools was a major deterrent to their continued education – and this was a big success in bringing girls back to school. Also, providing functional girls toilets in schools is now seen as a major intervention to keep adolescent girls in school

### **Wrap-Up Session**

In the afternoon of March 16, 2010 a wrap-up session was held at the Institute of Development studies in Jaipur. The wrap-up session included a short presentation by Dr.

James on the Common Guideline of 2008, evaluation of the study tour, and closing speech by Dr. Sherif of ENTRO.

Dr. James made a presentation on the Common Guidelines of 2008, highlighting the fact that it is a comprehensive document, detailing all aspects of planning, implementing and monitoring watershed development projects in the country. He pointed out that despite availability of well elaborated guideline, the missing link was motivation of government staff at the district and sub-district levels to invest time and effort in mobilizing the community and ensuring sustainable development using the initial government-provided capital investment in watershed development.

The Participants provided a written evaluation of the study tour.

Dr. Sherif El-Sayed of ENTRO addressed the group, summarizing the benefits he felt from the study tour.

The team flew to Mumbai the same evening and departed to Addis Ababa in the early morning of March 17, 2010.

## 5 KEY LESSONS LEARNT

- **The key principle of watershed management** is that programme funds are a catalyst to triggering off economic prosperity (either through increasing revenues or reducing costs), which in turn can provide the basis for social and institutional development in the rural community as a whole
- **Interventions are socio-technical and not technical alone:** Even the best technical interventions may not succeed if the community does not feel ownership and responsibility for them.
- **Benefits of watershed development can be sustainable only if** the community is actively involved in all stages, and takes ownership and responsibility for the interventions being planned and implemented
- **Community participation can only be assured if** the outside agents, whether government or NGO staff, invest time, energy and creativity in earning the trust of the community, motivating them to participate in the programme and making it possible for the community to build effective technical, social and institutional skills
- **Women's empowerment is key to overall community development:** The economic independence and confidence given by the self-help group movement in India should not be under-estimated, as this is the basis for the emergence of empowered women in watershed management committees, water committees, health committees and even elected local government bodies.
- **Credit at all levels is vital:** The large-scale provision of credit to SHGs was made possible by a large mobilization of rural finance through government micro-finance institutions and rural banks. The watershed programme itself is a grant to the local community, although beneficiary contribution is a necessary condition for its deployment.
- **Livelihood promotion:** There is a limit to which villagers can be called upon to do voluntary work, be it attending meetings or trainings. Also, in uncertain weather, depending on water-based livelihoods alone is not a prudent strategy. The simultaneous promotion of alternate farm and non-farm livelihoods, therefore, should be a necessary accompaniment to watershed development interventions.
- **Supportive interventions are as necessary as direct interventions:** Finally, watershed interventions are embedded in the local economy and infrastructure. Roads, electricity, mobile telephony, health and education are some important supportive interventions that make watershed interventions more effective and sustainable in the long run.
- **Watershed plus:** Move away from a purely engineering and structural focus to a deeper concern with livelihood issues.
- **Participatory Net Planning (PNP):** A planning method followed by WOTR where each holding is visited by the planning team to survey and decides on proposed improvements along with concerned farmers, thus developing a sense of ownership.



- The benefit of weaving gender at all stages of the development process also enhances the capacity of women to participate and contribute in decision making.
- Transparency of program implementation such as posting details of programs on walls of buildings of villages will ensure credibility and acceptance of program. Expenditure details enforce accountability of leaders and committees to the community at large.

## Annexure 1: TOUR PROGRAMME

Details of the programme, as far as they can be specified, are given below.

### Day 1: Monday 8 March

Time	Activity
04:40	Participants arrive from Addis Ababa, Cairo and Khartoum (e.g., by Ethiopian Airlines Flight ET 610, leaving Addis at 21:20 on 9 March)
05:30	Taxis to meet participants and take them to a hotel
06:00	Check-in to hotel in Mumbai
<b>07:00</b>	<b>Breakfast</b>
	<i>Free time for participants to rest; Optional Mumbai sight-seeing and shopping trip</i>
19:00	Taxis to take participants to Mumbai Central Railway Station (packed dinner)
21:05	Devagiri Express from Mumbai Central Station to Aurangabad

### Day 2: Tuesday 9 March

Time	Activity
04:00	Alight at Aurangabad station and travel to hotel
04:30	Check-in to hotel in Aurangabad
<b>07:00</b>	<b>Breakfast</b>
08:00	Briefing Meeting in the hotel: general issues on India, housekeeping and itinerary
09:00	Participant expectations
<b>10:00</b>	<b>Tea</b>
10:30	Presentation and discussion on Watershed Development in India
11:30	Panel discussion with government and NGO staff on watershed development in Maharashtra
<b>13:00</b>	<b>Lunch</b>
14:00	Leave for field visit in Watershed 1
15:00	Arrive in watershed 1: Meeting with local villagers, NGO staff and officials
16:00	Transect walk around watershed and informal discussions with villagers and staff
17:00	Travel back to the hotel
18:00	Reach Hotel; END OF DAY 2

**Day 3: Wednesday 10 March**

Time	Activity
08:30	Leave for watershed 2
10:00	Arrive in watershed 2: Meeting with local villagers, NGO staff and officials
<b>11:00</b>	<b><i>Tea in the field</i></b>
11:30	Transect walk around watershed and have informal discussions with villagers and staff
<b>13:00</b>	<b><i>Lunch in the field</i></b>
14:00	Visit Ellora Caves
15:00	Leave for hotel
16:00	Reach hotel; END OF DAY 3
17:00	Travel back to the hotel

**Day 4: Thursday 11 March**

Time	Activity
08:30	Leave for watershed 3
10:00	Arrive in watershed 3: Meeting with local villagers, NGO staff and officials
<b>13:00</b>	<b><i>Lunch</i></b>
14:00	Leave for hotel
16:00	Reach Hotel
17:00	Panel discussion with resource persons on issues in watershed development in Maharashtra
19:00	END OF DAY 4
22:30	Taxis to Aurangabad Railway Station
23:25	Devagiri Express departs from Aurangabad to Mumbai

**Day 5: Friday 12 March**

Time	Activity
05:55	Devagiri Express arrives at Mumbai Central Station
06:00	Taxis to take participants to Mumbai Hotel
<b>07:00</b>	<b><i>Breakfast</i></b>
10:00	Leave hotel for airport
11:35	Flight to Jaipur
13:00	Arrive in Jaipur
13:00	Taxis to Hotel
13:30	Check in to hotel
14:00	<b><i>Lunch</i></b>
15:00	<i>Optional sight-seeing trip in Jaipur</i>

Time	Activity
20:30	Taxis to station
21:05	Jaipur Hanumangarh Special Express to Bikaner

### Day 6 Saturday 13 March

Time	Activity
04:55	Jaipur Hanumangarh Special Express arrives in Bikaner
05:00	Taxis to take participants to Bikaner Hotel
<b>07:00</b>	<b>Breakfast</b>
09:00	Presentation and discussion on Rajasthan state and its history of watershed development
10:00	Panel discussion with government and non-government officials on watershed development in Rajasthan
11:30	Discussion continued
<b>13:00</b>	<b>Lunch in the field</b>
14:00	Travel to Watershed 4
15:00	Arrive in watershed 4: Meeting with local villagers, NGO staff and officials
<b>15:30</b>	<b>Tea in the field</b>
16:00	Transect walk around Watershed 4
18:00	Travel back to the hotel
19:00	Reach hotel: END OF DAY 6

### Day 7: Sunday 14 March

Time	Activity
<b>07:00</b>	<b>Breakfast</b>
08:00	Leave for watershed 5
10:00	Arrive in watershed 5: Meeting with local villagers, NGO staff and officials
<b>11:00</b>	<b>Tea in the field</b>
11:30	Transect walk around watershed and have informal discussions with villagers and staff
<b>13:00</b>	<b>Lunch in the field</b>
14:00	Travel to Watershed 6
14:30	Arrive in watershed 6: Meeting with local villagers, NGO staff and officials
<b>15:30</b>	<b>Tea in the field</b>
16:00	Transect walk around Watershed 6
17:00	Travel back to the hotel
19:00	Reach hotel; END OF DAY 7

### Day 8: Monday 15 March

Time	Activity
07:00	<b>Breakfast</b>
08:00	Leave to visit Indira Gandhi Canal in Bikaner
12:00	Return to Hotel
13:00	<b>Lunch</b>
14:00	Preparation for country presentations
15:30	<b>Tea</b>
16:00	Country presentations and discussions on useful learnings
17:00	END OF DAY 4
22:00	Taxis to Bikaner Railway Station
22:50	Jaipur Hanumangarh Special Express to Jaipur

### Day 9: Tuesday 16 March

Time	Activity
07:00	Arrive at Jaipur
07:30	Check-in at hotel
08:00	<b>Breakfast</b>
09:00	Leave for Institute of Development Studies, Jaipur
10:00	Discussion on Watershed Development in India: Institute of Development Studies, Jaipur
11:00	<b>Tea</b>
11:30	Discussion continued
12:30	Leave for hotel
13:00	<b>Lunch</b>
14:00	Participant evaluation
16:00	Concluding session
17:00	END OF DAY 9
18:30	Leave for airport
20:40	Flight to Mumbai
22:20	Arrive at Mumbai
23:00	Taxis to take participants to Mumbai hotel

### Day 10: Wednesday 17 March

Time	Activity
02:00	Taxis to take participants to Mumbai International Airport
02:30	Check-in for Ethiopian Airlines flight ET 611 to Addis
05:30	Ethiopian Airlines flight ET 611 to Addis
08:00	Arrive at Addis Ababa





**Annexure 2: PARTICIPANT DETAILS**

	NAME	DESIGNATION	ORGANIZATION	EMAIL	TELEPHONE
1	Tarek Mohamed Abdel Aziz Ismail	Prof. Dr. Eng	Nile Research Institute (NRI), National Water Research Center (NWRC), Egypt	<a href="mailto:AZIZtm@hotmail.com">AZIZtm@hotmail.com</a>	00202-42184229, 00202-0101539963
2	Amr Fawzy	Water Resource Engineer	NBI-National Office, Egypt	<a href="mailto:amrfma@hotmail.com">amrfma@hotmail.com</a> , <a href="mailto:a.fawzy@nws.gov.eg">a.fawzy@nws.gov.eg</a>	0020-22611187, 002-0105645423
3	Ahmed Moustafa Ahmed Moussa	Researcher “Doctor Engineer”	National NBI Office, Nile Water Sector, Egypt	<a href="mailto:w.eldash@nws.gov.eg">w.eldash@nws.gov.eg</a>	0020-171123777
4	Azza Ewis Ismail	Civil Engineer	Water Resource Research Institute (WRRI), Egypt	<a href="mailto:azza_ewis@yahoo.com">azza_ewis@yahoo.com</a>	0020-127204651
5	Rania Kamel El Sayed Sleem	Member of ENSAP Team Work –NBI	NWS, Egypt	<a href="mailto:r.kamel@nws.gov.eg">r.kamel@nws.gov.eg</a>	0020 – 22611187, 0020-105478100
6	Solomon Abate	Regional Project Coordinator	ENTRO, Ethiopia	<a href="mailto:sabate@nilebasin.org">sabate@nilebasin.org</a>	00251-116461130, 00251-911470110
7	Sherif Mohamad y El Sayed	Senior Regional Project Coordinator	ENTRO, Ethiopia	<a href="mailto:selsayed@nilebasin.org">selsayed@nilebasin.org</a>	00251-116461130/32, 00251-911864921
8	Mehari Gebremed	Watershed Management	Agriculture and Rural	<a href="mailto:meharism@yahoo.com">meharism@yahoo.com</a>	00251-344400846,

	NAME	DESIGNATION	ORGANIZATION	EMAIL	TELEPHONE
	hin Gebremariam	Expert	Development, Ethiopia		00251-914724384
9	Alemayehu Tafesse	National Coordinator for Eastern Nile Watershed	Ministry of Water Resources, Ethiopia	<a href="mailto:atafesse@nilebasin.org">atafesse@nilebasin.org</a>	00251-116637015, 00251-911413311
10	Mengistu Hailegiorgis Dadi	Department Head	Agriculture & Rural Development Bureau, Oromia, Ethiopia	<a href="mailto:menghadadi08@yahoo.com">menghadadi08@yahoo.com</a>	00251-113717425 00251-911616210
11	Mohamed Osman Mohamed Nor	Director General	Ministry of Agriculture & Irrigation Gadarif State, Sudan	<a href="mailto:agricmi@gmail.com">agricmi@gmail.com</a>	00249-441844903 00249-123063263
12	Ibrahim Adam Ahmed Balila	Engineer	ENWP, Sudan Component, National Coordinator, Sudan	<a href="mailto:ibrahimbalila@yahoo.com">ibrahimbalila@yahoo.com</a>	00249-122192711 00249919991661
13	Ibrahim Salih Adam	Engineer-Vice Chair for WRTO	Ministry of Irrigation and Water Resources-WRTO, Sudan	<a href="mailto:ibradam75@yahoo.co.uk">ibradam75@yahoo.co.uk</a>	00249-183785045 00249-911143443
14	Abera Mulat Segaro	Head, Natural Resources Process,	Bureau of Agriculture and Rural Development southern Regional State, Ethiopia	<a href="mailto:aberamulatsegaro@yahoo.com">aberamulatsegaro@yahoo.com</a>	00251-62205933 00251-916823022
15	Badreldin Mahmoud Abdalla	Civil engineering	Ministry of Irrigation and Water	<a href="mailto:hrrs_badr@yahoo.com">hrrs_badr@yahoo.com</a>	00249122206828

	NAME	DESIGNATION	ORGANIZATION	EMAIL	TELEPHONE
			resource, Sudan		
1 6	Fekade Wondmag egne Tsegaw	Senior Expert	Ministry of Agriculture and Rural Development, Ethiopia	<a href="mailto:woywond@yahoo.com">woywond@yahoo.com</a>	00251- 116552371 00251- 115517864 00251091148 7114
1 7	Ahmed Ibrahim Mohammed	Director General	Ministry of Agriculture Animal Weals and Irrigation, Sudan	<a href="mailto:Ahmed_samer57@hotmail.com">Ahmed_samer57@hotmail.com</a>	00249- 91264881 00249- 91264881

### **Annexure 3: CONTACT DETAILS OF RESOURCE PERSONS AND FACILITATORS**

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#### **Persons met during the field visit on 09 March 2010**

**Name:** Mr. Yugandhar MANDAVKAR

**Designation:** Trustee

**Organization:** Grassroots Action for Social Participation (GRASP)

**Address:** 57, Shrey Nagar, New Osmanpura, Aurangabad- 431 005, Maharashtra, INDIA

**Telephone:** +91-240-2351224 / 2333294 (office) +91-240- 2352300 (Residence)

**Fax:** +91-240-2451134 (office)

**Email:** [grasp\\_agd@sancharnet.in](mailto:grasp_agd@sancharnet.in) (office); [yugandharm@rediffmail.com](mailto:yugandharm@rediffmail.com) (personal)

**Website:** <http://www.graspindia.org>

**Name:** Mr. Sandeep JADHAV

**Designation:** Executive Director

**Organization:** Watershed Organizations Trust (WOTR)

**Address:** PROJECT OFFICE: 'Paryavaran', Behind Market Yard, Ahmednagar, Maharashtra, 414001, INDIA

**Address:** REGIONAL OFFICE: Masakhi, C-3/82, Town Centre CIDCO, Aurangabad - 431003, INDIA

**Telephone:** +91-240-2486576 (office)

**Email:** [sied@waterotr.org](mailto:sied@waterotr.org); [ahmednagar@wotr.org](mailto:ahmednagar@wotr.org)

**Website:** <http://www.wotr.org>

**Name:** Mr. Kiran SHELKE

**Designation:** Manager, Training and Technical Support

**Address:** 'Paryavaran', Behind Market Yard, Ahmednagar- Maharashtra, 414001, INDIA

**Telephone:** +91-241-2450188 (office)

**Fax:** +91-241-2451134 (office)

**Email:** [kiran.shelke@wotr.org.in](mailto:kiran.shelke@wotr.org.in)

**Website:** <http://www.wotr.org>

#### **Persons met during the Field Visit on 14 March 2010**

**Name:** Mr Arvind OJHA

**Designation:** Secretary

**Organization:** Uttari Rajasthan Milk Union Private Limited (URMUL) Rural Health Research and

Development Trust

**Address:** URMUL Trust, Near Roadways Bus Stand, Bikaner-334001 INDIA



Telephone: +91 151-2523093 and 2522139 (office); +91-9414137093 (Mobile)  
 Fax: +91 151-2522139 (office)  
 Email: [urmultrust@rediffmail.com](mailto:urmultrust@rediffmail.com) (office); [ojhaarvind@gmail.com](mailto:ojhaarvind@gmail.com)  
 Website: <http://www.urmul.org>

### **Persons met during the visit to Institute of Development Studies on 16 March 2010**

**Name:** Professor Surjit Singh

*Designation:* Director

*Organization:* Institute of Development Studies (IDS)

*Address:* 8B, Jhalana Institutional Area, Jaipur 302 004, Rajasthan (India)

*Telephone:* +91 -141 270 5726/ 270 6457 (office)

*Fax:* +91 141 270 5348 (office)

*Email:* [director\\_idsj@dataone.in](mailto:director_idsj@dataone.in)

*Website:* <http://www.idsj.org>

**Name:** Dr. Varsha Joshi

*Designation:* Reader

*Organization:* Institute of Development Studies (IDS)

*Address:* 8B, Jhalana Institutional Area, Jaipur 302 004, Rajasthan (India)

*Telephone:* +91 -141 270 5726/ 270 6457 (office)

*Fax:* +91 141 270 5348 (office)

*Email:* [idsj@dataone.in](mailto:idsj@dataone.in)

**Name:** Mr. P. M. Paul

*Designation:* Director (CECOEDECON)

*Organization:* Centre for Community Economics and Development Consultants Society (CECOEDECON)

*Address:* F-159-160, Industrial & Institutional Area Sitapura, Tonk Rd. Jaipur Rajasthan (India)

*Telephone:* +91 98 29059203

*Email:* [pmpaul\\_2002@yahoo.co.in](mailto:pmpaul_2002@yahoo.co.in)

*Website:* <http://www.cecoedecon.org>

### **FACILITATORS**

Dr. A. J. (Viju) <u>JAMES</u> 9810113698	<a href="mailto:ajjames2005@gmail.com">ajjames2005@gmail.com</a>	+91
Dr. <u>Dushyant BADAL</u> 9212746411	<a href="mailto:dushyant.badal@gmail.com">dushyant.badal@gmail.com</a>	+91
Ms. <u>Parvathy RAO</u>	<a href="mailto:parvathy.rao@gmail.com">parvathy.rao@gmail.com</a>	+91 9899477992

*Organization:* Pragmatix Research & Advisory Services Pvt. Ltd.

*Address:* FF 52 Sushant Vyapar Kendra, Gurgaon, Haryana, INDIA 122002

*Telephone:* +91 124 430 1493 (office)

*Facsimile:* +91 124 405 1338 (office)



## **Annexure 4: BRIEF NOTE ON GOVERNMENT STRUCTURES IN INDIA<sup>10</sup>**

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### *5.1.1 GOVERNMENT STRUCTURE IN INDIA*

#### **5.1.2 Central Government**

The Prime Minister heads the national government in India, along with a cabinet of ministers. Each Union or central government Minister is in charge of a central Ministry, assisted by a senior career bureaucrat from the Indian Administrative Service (IAS), called a Secretary (to the Government of India). Each Secretary is assisted by other junior secretaries to run the several Departments that comprise each Ministry. The Ministry of Rural Development (MORD), for instance, comprises the Departments of Rural Development, Land Resources and Drinking Water Supply. While these are all senior Civil Service posts, there are several Directors, Joint Directors and Deputy Directors in each Department, who take care of day-to-day administrative issues. Senior IAS officers are usually in charge of drafting policies, deciding budgets, preparing answers to queries raised in Parliament, formulating new government schemes, projects and programmes, and collaborating in donor-assisted programmes.

#### **5.1.3 States and State Governments**

Some states are as large as some small countries of the world. Andhra Pradesh, for instance, has a population of 75.7 million<sup>11</sup> and covers an area of 276, 754 square kilometres<sup>12</sup> (Figure 1.4). Each of India's State governments is headed by a Chief Minister, with a cabinet of Ministers, who are answerable to the elected Members of the Legislative Assembly (MLAs).

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<sup>10</sup> This is an extract from a report on the Indian state of Andhra Pradesh, but the overall structure of government is similar across the entire country. See A.J. James, (2004) "India's Sector Reform Projects and Swajaldhara Programme", case study prepared for the IRC International Water and Sanitation Centre, Delft, the Netherlands and available at <http://www.irc.nl/page/23597>.

<sup>11</sup> [www.censusindia.net/profiles/apd.html](http://www.censusindia.net/profiles/apd.html)

<sup>12</sup> [www.aponline.gov.in/quick%20links/apfactfile/apfactmain.html](http://www.aponline.gov.in/quick%20links/apfactfile/apfactmain.html)



*Figure 1.4: The State of Andhra Pradesh*

State government Ministers head Departments (instead of Ministries), which may comprise several smaller departments depending on the size of the state and administrative convenience, and can therefore vary across different states. Thus, the state of Andhra Pradesh has a Minister for Panchayati Raj and Rural Development (PR&RD), while the state of Karnataka has a Minister for Panchayati Raj and another Minister for Rural Development. Each state government Minister is responsible for a state government department (sometimes called 'Line Department') and is assisted by a career bureaucrat from the IAS, called a Secretary – or, depending on seniority, a Principal Secretary or Principal Chief Secretary. In Andhra Pradesh, for instance, Mr. Samarjit Ray retired in June 2003 as Principal Chief Secretary (PR & RD), but was replaced by Mr. Nagi Reddy, whose designation is Secretary (PR & RD), as he is not as senior as Mr. Ray was. Each Secretary is usually assisted by Commissioners, Joint Commissioners, Additional Commissioners, and Assistant Commissioners, assisted in turn by a range of Section Officers, heading different Sections within the Department (Figure 1.5).



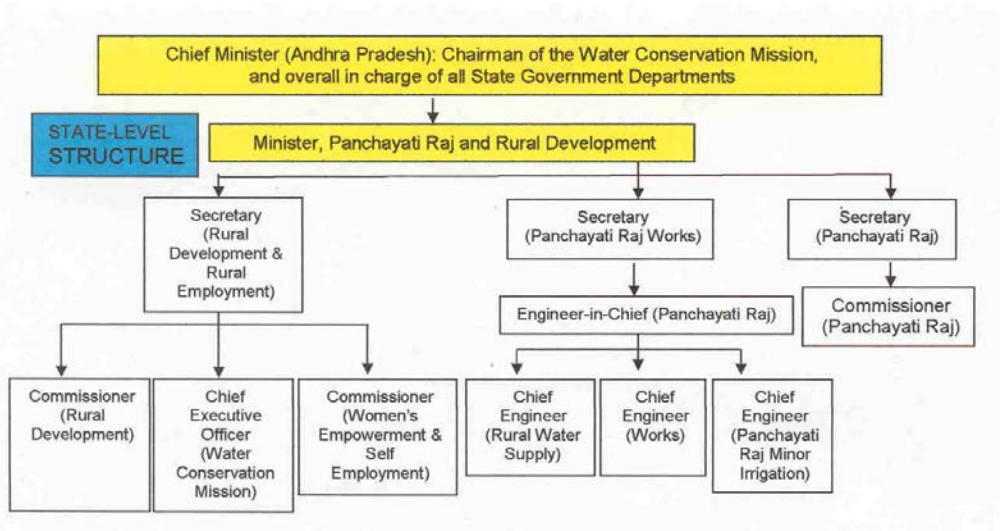


Figure 1.5: The Panchayati Raj & Rural Development Department, Government of Andhra Pradesh

As Figure 1.5 shows, the operational head of rural water supply in the state government is the Chief Engineer (Rural Water Supply), who reports to the Engineer in Chief (Panchayati Raj), who is responsible in turn to the Secretary (Panchayati Raj Works) who finally reports in turn to the Minister for Panchayati Raj and Rural Development.

#### 5.1.4 Districts and District Government

Each state is broken up into several administrative districts. A district can be the size of a small sized country. Anantapur district in Andhra Pradesh, for instance, covers an area of 19,130 square kilometres<sup>13</sup> and has a population of around 3.6 million<sup>14</sup>.

The bureaucratic head of a district is called the District Collector,<sup>15</sup> while the political head is the President of the Zilla Parishad (or District Council),<sup>16</sup> which is a body of elected representatives, including the local MLA. A new post created is that of the Chief Executive Officer (CEO) of the Zilla Parishad (ZP), filled by a career bureaucrat (Figure 1.6).

Each Line Department has a district-level head, such as the Superintending Engineer for the Rural Water Supply Department. Each department also has staff to carry out

<sup>13</sup> [http://envfor.nic.in/naeb/sch/wsl/wsl\\_ap.html](http://envfor.nic.in/naeb/sch/wsl/wsl_ap.html)

<sup>14</sup> [http://www.censusindia.net/cendata1/show\\_data52.php3?j=120&j2=1&j1=28&j3=Andhra+Pradesh](http://www.censusindia.net/cendata1/show_data52.php3?j=120&j2=1&j1=28&j3=Andhra+Pradesh)

<sup>15</sup> This is an old colonial term, which actually referred to District *Revenue* Collector, from the days when this official was responsible for the collection and passing up of land revenue to the British Government in India. Sometimes abbreviated to 'DC', the District Collector is also referred to in some states as the Divisional Commissioner, which also conveniently abbreviates to DC.

<sup>16</sup> In Andhra Pradesh, these are called Zilla Praja Parishads or District *People's* Council.

implementation of work, such as Executive Engineers (EE), Deputy Executive Engineers (DEE), Assistant Engineers (AE), Junior Engineers (JE), Pump Operators, etc. besides clerical staff. All district heads of line departments report to the CEO, ZP, who reports in turn to the District Collector.

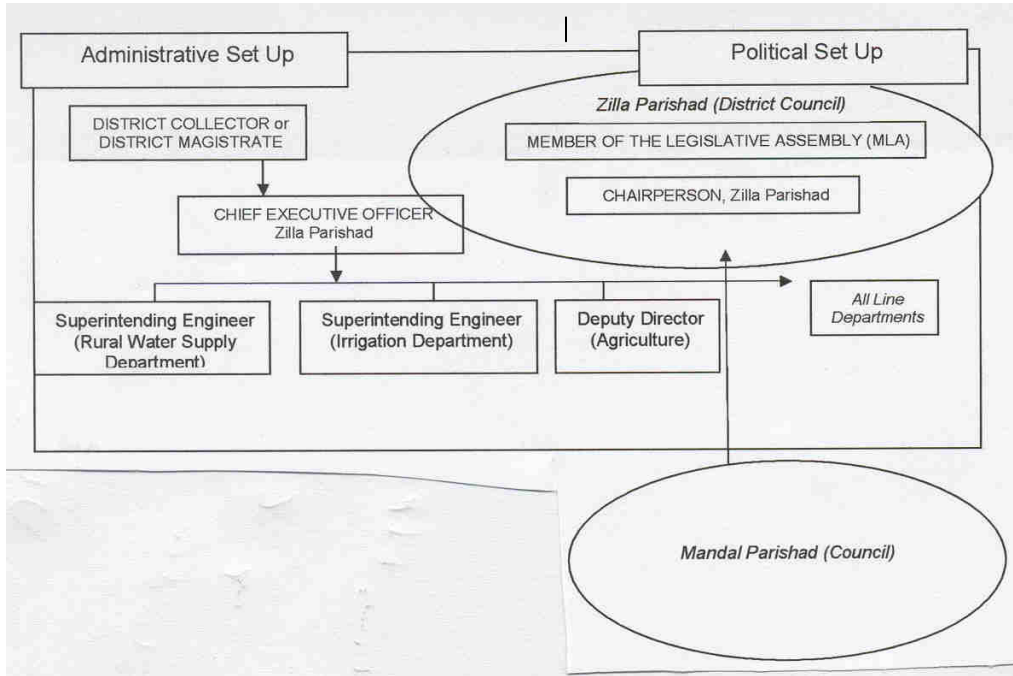


Figure 1.6: District government organisation

A District is divided into several Community Development Blocks, each of which is headed by a Block Development Officer (BDO). Each Block, in turn, is usually divided into several Tehsils, headed by a Tehsildar. In Andhra Pradesh, however, there is a unique administrative unit below the block called a Mandal, which is usually larger than a tehsil, whose administrative head is the Mandal Development Officer (MDO), to whom the BDO reports.

It is probably apparent that the political and administrative set ups are closely interlinked at the district and sub-district levels. For example, the CEO of the Zilla Parishad is a bureaucrat, although the Zilla Parishad itself is made up of elected representatives, including representatives from the Mandal (Praja) Parishads from the different mandals within the district. The Mandal Parishad or Council comprises the heads of the Panchayat Samitis, and some co-opted resource persons. Each Panchayat Samiti, in turn, has representatives from various Gram Panchayats (Village Councils), which is the basic tier of local government (see Figure 1.7).

The upward arrows in Figure 1.7 denote representatives being sent up from lower levels of the political set up while the downward arrow shows that the Mandal Development Officer has several BDOs under his or her charge.

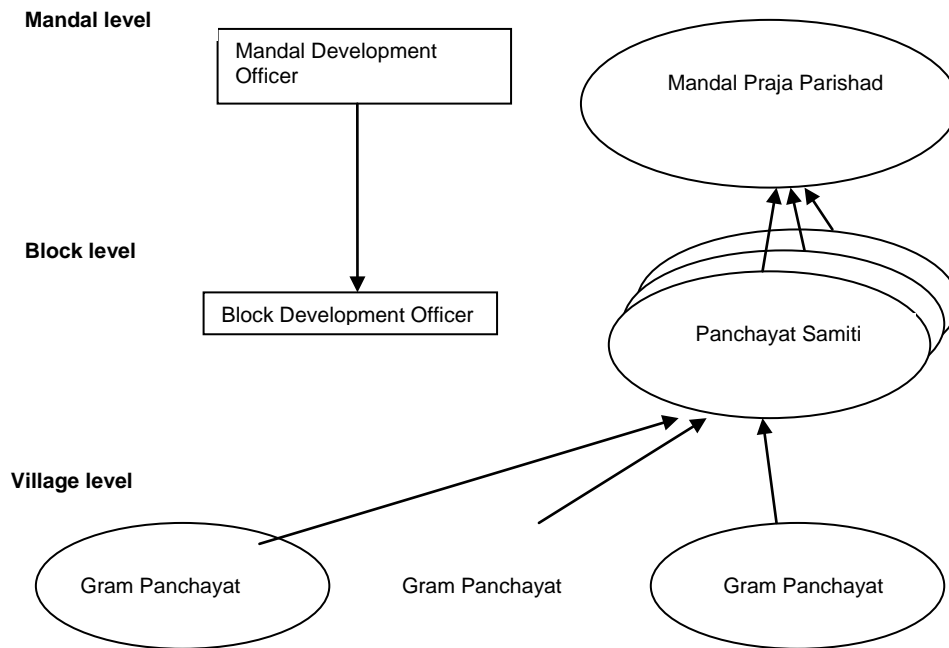


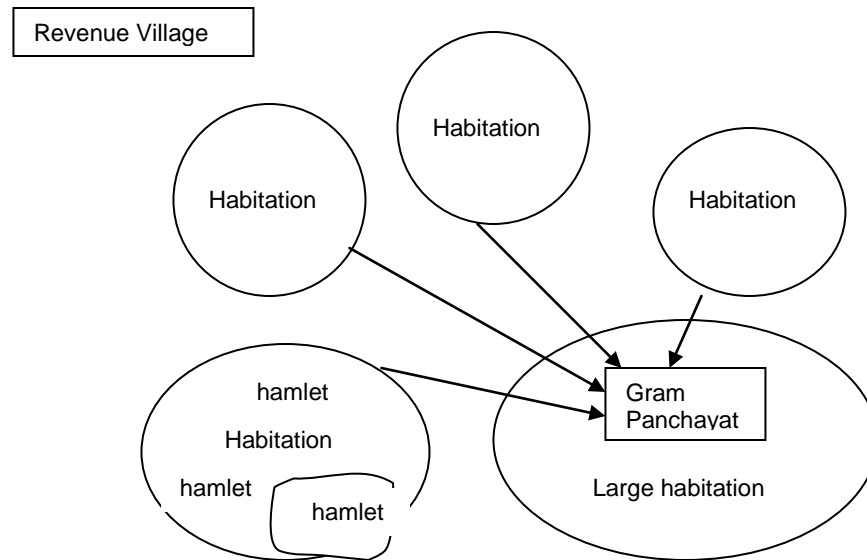
Figure 1.7: Sub-district government organisation

### 5.1.5 Village Government

Gram Panchayats are headed by a Sarpanch, and assisted by a Village Administrative Officer (VAO) or *thalati*.<sup>17</sup> A Gram Panchayat (GP) usually corresponds to a Revenue Village, which is a colonial term referring to a cluster of one or more habitations. Gram Panchayats can vary in size from 50 to 2,500 households. Each GP has members from the cluster of villages or habitations that make up the revenue village. In fact, the Gram Panchayat is usually housed in the largest habitation of the revenue village. Further, each habitation may have several small hamlets (which are variously called *palli*, *phalia*, *dhaani*, etc. in different parts of India). The General Body comprising all adult members of the villages in the Panchayat is called a Gram Sabha, discusses and decides on issues of relevance to the GP.

This is the structure of the Panchayati Raj – or the governance by panchayat (an old Sanskrit term referring to the council of ‘five’ (paanch) elders), which was supposed to look after the interests of traditional ‘village India’ (see Figure 1.8).

<sup>17</sup> *Thalati* is another local term for the Village Agricultural Officer (VAO).



*Figure 1.8: Village level organisation*

## Annexure 5: WATERSHED DEVELOPMENT IN INDIA AND CLIMATE CHANGE<sup>18</sup>

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### Rain-fed Dryland Areas in India

Out of a total of 142 million hectares of net cultivated area (NCA) in the country, 85 million hectares are rain-fed arable land. A total of 146 million hectares of the NCA is degraded private and public land, coming under the jurisdiction of the Departments of Revenue, Forest or Panchayati Raj.<sup>19</sup>

### Watershed Development Programmes in India

The early post-Independence policies for watershed development activities, including soil conservation in River Valley Projects (RVP) in 1962, the national policy on watershed in 1967, the national agricultural policy of the same year and the Rural Works Programme (RWP) of 1971 were targeted at the development of irrigated agricultural. Such a 'watershed' focus to rural development provided for labor-intensive soil and water conservation civil works, afforestation, and the development of irrigation and water infrastructure, but concentrated mainly on raising agricultural productivity.<sup>20</sup> Watershed-based rural development policies for the rain-fed dry lands in India only began from the late 1970s with evolution of the RWP into the Drought Prone Areas Programme (DPAP), the formulation of the Desert Development Programme (DDP) in 1978 to mitigate the adverse effects of desertification and restore ecological balance, the initiation of 46 watershed projects in dryland areas across India by ICAR, the implementation of a World Bank supported project in the mid-1980s on integrated watershed development which was extended to over 2,000 watersheds in 99 districts across 16 states and the initiation of the National Watershed Development Programme for Rainfed Areas (NWDPA) by the Ministry of Agriculture in the late 1980s.

This focus on watershed-based rural development in rain-fed dryland areas of the country was strengthened considerably in the 1990s by the creation of the Department for Land Resources (DOLR) within the Ministry of Rural Development (MORD) and the formulation of Common Guidelines for the National Watershed Development Programme (NWDP) for the three national watershed development programmes of the Ministry of Rural Development, the DPAP, DDP and the Integrated Wasteland

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<sup>18</sup> This Appendix is taken from the Draft Report of the Lessons Learnt from the Andhra Pradesh Drought Adaptation Initiative of the World Bank, and must not be cited without proper acknowledgement.

<sup>19</sup> <http://dolr.nic.in/CommonGuidelines2008.pdf>. Accessed on 23 July 2009.

<sup>20</sup> World Bank (2006), 'Managing Watershed Externalities in India', chapter on 'Evolution of Watershed Development in India', which draws on Vasudha Chhotray (2004), Decentralized Development: State Practices from India's Watershed Development Program, Unpublished Ph.D. Dissertation, University of London. See also, *inter alia*, Farrington, Turton and James (eds.) (1999)



Development Programme (IWDP).<sup>21</sup> The latest addition to this focus on rain-fed dryland areas is the establishment of the National Rainfed Areas Authority (NRAA) in 2007 with the mandate to coordinate the activities of seven national programmes concerning rain-fed areas, including the NWDPPRA, DDP, DPAP and IWDP.<sup>22</sup>

### Approach and objectives

The watershed approach is currently seen as the major theme for development of rainfed areas 'with a view to conserving natural resources of water, soil and vegetation by mobilizing social capital.' (pp. 4-5). This approach is based on a certain view of the problem, but one that does not incorporate a variety of issues, including watershed externalities<sup>23</sup> and climate-change induced variability.

The MORD Common Guidelines of 1994 advocated participatory watershed development to: (1) promote the economic development of the village community through the optimum utilization of the natural and human resources; (2) restore the ecological balance using all means, including traditional knowledge and local materials; and (3) improve the economic and social condition of the resource-poor and the disadvantaged through more equitable distribution of benefits and better access to income generating opportunities. The revised MORD Guidelines of 2001 and 2003 ('Hariyali' Guidelines) retained the primary objectives of the earlier ones, and differed largely in terms of their implementation mechanism and funding provisions. The 'Hariyali' Guidelines for e.g., advocated a greater role to PRIs and included mitigating climate change impacts as part of its ambit (Table A5.1).

<sup>21</sup> Two important pre-cursors to the creation of the DOLR and the Common Guidelines were the establishment of the Hanumantha Rao Committee in 1993 to review the performance of watershed projects in the country and the creation of a High Level Committee on Wastelands Development (the Mohan Dharia Committee) in 1994 which analyzed the degradation of the country's wastelands. The DOLR itself was formed in 1999.

<sup>22</sup> The other programmes are the Soil Conservation in the Catchments of River Valley Project and Flood Prone Rivers, Reclamation of Alkali Soils and Watershed Development Programme for Shifting Cultivation Areas. (<http://www.projectsmonitor.com/detailnews.asp?newsid=12869>, accessed on 27 July 2009)

<sup>23</sup> An externality occurs when 'the activities of one person affect the welfare or production functions of other people who have no direct control over those activities' (Dorfman and Dorfman 1977). Externalities can be either positive or negative and represent a form of market failure when the price mechanism does not account for social costs and social benefits of private production and consumption. Private costs and benefits of an activity are those affecting the person who undertakes the activity. Social costs and benefits are those that affect everyone, including the one who undertakes the activity but others as well. By definition, externalities are characterized by a difference between private and social costs/benefits. Two sources of natural resource management problems in a watershed context are linked to externalities: biophysical (including hydrological) and socioeconomic. The biophysical problems stem from interconnectedness of land uses and productivity of resources between upstream and downstream areas. The socioeconomic problem results because these spatial biophysical relationships transcend land and resource access/ownership boundaries; any given land use in the upper watershed will usually generate unevenly distributed costs and benefits among people living in the lower watershed. A good example is where serious deforestation in the upper watershed leads to increased seasonal water flows and erosion in the lower watershed. World Bank (2006), *Managing Watershed Externalities*, pp. 19-20.

Table A5.1: Hariyali watershed development guidelines 2003

Issue	Provisions
Objectives	<ul style="list-style-type: none"> <li>• Rainwater harvesting for domestic and productive uses</li> <li>• Overall development of rural areas through Gram Panchayats</li> <li>• Employment generation, poverty alleviation, community empowerment</li> <li>• Mitigating adverse climatic conditions on crops, people and livestock</li> <li>• Restoring ecological balance by conserving natural resources</li> <li>• Encouraging sustained community action for asset creation and O&amp;M</li> <li>• Promoting simple, easy and affordable technology and institutional arrangements</li> </ul>
Watershed selection criteria	<ul style="list-style-type: none"> <li>• People willing to contribute cash and kind for asset creation, Operation &amp; Maintenance</li> <li>• Acute shortage of drinking water</li> <li>• Large population of scheduled castes and scheduled tribes</li> <li>• Preponderance of non-forest wastelands, degraded lands and common lands</li> <li>• Actual wages less than minimum wages</li> <li>• Contiguous watersheds that can be developed, average watershed size of 500 ha</li> </ul>
Implementation agencies	<ul style="list-style-type: none"> <li>• District level: Zilla Panchayat or District Rural Development Agency</li> <li>• Field level: Gram Panchayat</li> </ul>
Role of NGOs	<ul style="list-style-type: none"> <li>• Can be contracted for group formation and social mobilization</li> <li>• Implementing agency where GP and/or ZP capacity is not adequate</li> </ul>
Flow of funds	GOI – MORD – DRDA/ZP – Gram Panchayat – Community
Priority action	<ul style="list-style-type: none"> <li>• Development of small water harvesting structures (farm ponds, check dams, etc)</li> <li>• Renovation and augmentation of water sources, desilting tanks</li> <li>• Fisheries development in village ponds and tanks</li> <li>• Afforestation including agro-forestry, horticulture, block plantations, etc</li> <li>• Pasture development, independent or in conjunction with plantations</li> <li>• Soil and moisture conservation (contour bunds, terracing, planting on bunds, etc</li> <li>• Drainage line treatment with vegetative and engineering structures</li> <li>• Repair, restoration and upgrading existing common property assets</li> <li>• Crop demonstrations</li> <li>• Promotion of energy saving devices, energy conservation, bio-fuel plantation, etc</li> </ul>

Issue	Provisions
Funding pattern	<ul style="list-style-type: none"> <li>• 85% Watershed treatment, development, works</li> <li>• 5% Community mobilization and training</li> <li>• 10% Administrative overheads</li> </ul>
Project duration	5 years
Cost sharing	10 % for work on private land, and 5 percent for common property land
Cost ceiling	Rs 6,000 (US\$133) per ha at ZP/DPRA level

*Source:* World Bank (2006), *Managing Watershed Externalities*, p. 9.

The recent Common Guidelines from the Ministry of Rural Development, in effect from 1 April 2008 continue the initial approach to ‘improve rural livelihoods through participatory watershed development with focus on integrated farming systems for enhancing income, productivity and livelihood security in a sustainable manner’.<sup>24</sup> (p. 4). Hence, ‘soil and water conservation, watershed development and efficient water management are seen as the key to sustainable development of rainfed areas.

However, the approach has not yielded the desired impacts. The new Guidelines note that while studies have shown that ‘in several watersheds, the implementation of the programme has been effective for natural resource conservation by increasing the productivity of the land, bringing additional area under agriculture, employment generation and social upliftment of beneficiaries living in the rural areas... these successes have been *sporadic and intermittent* ... *The overall impact at the state and national levels has generally been inadequate*’ (p. 5, emphasis added).

Key additional features in the new Guidelines are largely institutional, including delegation of power to states, a dedicated institutional structure to infuse professionalism in watershed project management (at district, state and national levels), increased duration of the project (4-7 years from 5 years) in three distinct phases (Preparation, Works and Consolidation), a priority to livelihood concerns (especially animal husbandry), a cluster approach increasing the size of watersheds to 1000-5000 hectares (from 500 hectares), greater use of technology (IT and remote sensing) a multi-tiered approach with specific interventions for uplands, slopes and plains. The latest approach is thus centred on removing constraints to increased productivity and incomes from the agro-ecosystem. The additional features are based on the presumption that the ‘inadequate’ performance of the national watershed development programme is basically because of the lack of a strong institutional framework, enabling technologies (IT and

<sup>24</sup> The Guidelines (available at <http://dolr.nic.in/CommonGuidelines2008.pdf>) are to apply to all watershed development programmes in the country. This follows the attempt in 2000 by the Ministry of Agriculture to create Common Guidelines for all national watershed development programme, but the MORD went ahead and revised its own guidelines for the DPAP, DDP and IWDP in 2001 and 2003. The 2008 Guidelines, for some reason, are not on the website of the Ministry of Agriculture, which still continues to show the NWDPRRA Guidelines. Hopefully the newly set-up NRAA will be able to effectively forge common guidelines for all Ministries.

remote sensing), and financial resources. This approach, however, is not adequate to deal with the additional complexity of climate-change induced variability.

### Watershed management and climate change

A recent World Bank review of international watershed management projects finds that while ‘the approaches implemented during the last 15 years have been generally successful in achieving goals of upland soil and water conservation and of intensification of natural resource use to increase the incomes of the upland population in a sustainable way’, there are several areas where ‘changes may improve future watershed management approaches or where further analytic and empirical study is needed to develop good approaches’, including poverty reduction, externalities, incentive structures for resource conservation and climate change (Table A5.2).<sup>25</sup>

Table A5.2: Key areas of additional work needed for effective watershed management

	Area	Finding
1	Poverty reduction	Watershed management programs and participatory processes in general may not always be pro-poor
2	Externalities	A significant disconnect between objectives and downstream impacts
		Little evidence that micro-level activities and institutions upstream actually contribute to improved conditions in the downstream watershed
		Impact of watershed management on water flows have received virtually no attention
5	Incentive structures	Much work remains to be done in creating local-level incentive structures for resource conservation that continue beyond the project and public policies based on the public good impacts of conservation activities
6	Climate change	Very few projects incorporate features to mitigate or adapt to the risks of climate change and dedicated climate change projects lack the broader characteristics of the watershed management approach

Source: World Bank (2009), pp. 90 – 100.

The review notes that watershed management is a complex issue ‘both in natural resource management (dealing with the myriad interactions of land, water, and people within a complex system), and in implementation (requiring elaborate decentralized and participatory approaches, complex financial and subsidy arrangements, and organizational setups involving many different agencies)’ and have a ‘high cost in financial and human resources’, but the impact on larger watershed management

<sup>25</sup> World Bank (2009) *Watershed Management Approaches, Policies and Operations: Lessons for Scaling Up*, Washington DC, p. 99.

objectives has been disappointing'.<sup>26</sup> Appropriate and adequate design and implementation are thus fundamental

On the issue of climate change, the report notes that watershed management projects have a major role to play and recommends the systematic assessment of climate change risks and the incorporation of adaptation measures to reduce these risks (Box A5.1).

**Box A5.1: Recommendations for Watershed Management in the context of climate change**

Although structural changes and increased variability and unpredictability will have economic and social costs, institutional responses can mitigate these costs: The impact of climate change on watersheds depends not only on changes in the volume, timing, and quality of stream flow and recharge or on related rates of erosion and sedimentation, but also on management responses. Although all watersheds and their embedded hydrological systems may experience climate change impacts, institutional responses can mitigate these costs. It is unmanaged systems that are likely to be more vulnerable since, by definition, these systems have no management structures in place to buffer the effects of hydrological variability (IPCC 2001).

Watershed management approaches can also help implement a risk management approach for disaster preparedness. With climate change, it is likely that the incidence of natural disasters will increase. Among the main policy lessons emerging from experience with disasters in recent years is the importance of integrating disaster prevention and natural disaster risk management into development plans. Given the likely high incidence of these disasters in the fragile uplands and the causal connection between natural resource changes in the uplands and downstream disasters, such as flooding, preparing for natural hazards should be an important component of watershed management approaches. These preparations need not necessarily be highly elaborate. They may simply address current risks. For example, when landslides and floods have already been experienced in a watershed, plans and investments can be prepared that reduce the causes of the risk and set up institutional responses to future disasters of the same nature, such as flood emergency plans. Planning should ensure that key infrastructure, human settlements, and livestock are not placed along the most likely paths to be followed by floods or landslides.

An integrated set of management responses can help natural and human systems adapt to climate change, and watershed management can form an important component of these responses.

Watershed management can be per se a very effective set of adaptation measures, provided that these measures form part of an integrated approach throughout the watershed. The ideal is an integrated institutional response based on basin-wide planning that incorporates both integrated land and water resource management approaches and other components of spatial planning, such as planning for infrastructure and urban development. Within this overall planning framework, watershed management approaches can help provide the institutional and investment responses needed for the

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<sup>26</sup> Ibid, p. 97.



upstream areas as part of a coherent response to climate change.

Climate change risk analysis and adaptation options should now be factored in to all watershed management projects. Plainly, watershed management approaches have a major role to play in responding to climate change. In specific, in very high-risk environments (such as the Andean situation), dedicated “climate change adaptation projects” may be needed, which would incorporate watershed management approaches. In less dramatic situations, climate change risks in watersheds need to be analyzed for all watershed management projects as a matter of routine. Project preparation should soon be able to use rapid climate change risk appraisal tools currently being designed to provide a risk assessment of projects. These tools are adapted for the sector and the geographic area where projects are located (World Bank 2006b). If necessary, suitable adaptation measures should be included in the project. These measures can generally be easily incorporated, and should not in most cases lead to higher complexity or extra financing needs. In fact, they are likely to be “no regret” investments, that is, measures that have positive benefits quite apart from their benefit of increasing resilience to climate change and variability (see Table 3).

*Source:* World Bank (2009), pp. 91-92.

Possible measures suggested to address climate change risks in watershed management projects include promoting farm-level risk management, reducing vulnerability to high temperatures and water shortages, increasing water efficiency and productivity, improving irrigation water distribution and withstanding rainwater shortages.

Table A5.3: Possible Measures to Adapt to Climate Change in Watersheds

<i>Adaptation Option</i>	<i>Purpose (both general and climate resilient)</i>
Productive Systems	
Crop diversification	Promoting farm-level risk management, increasing productivity, defending against pest/disease, and reducing vulnerability to high temperatures and water shortages
Land and water conservation practices	Conserving soil moisture, preventing erosion, increasing production per unit of evapotranspiration, reducing runoff, and assuring less variability in production during drought periods
Improvement of agricultural water management	Increasing water efficiency and productivity, improving irrigation water distribution, and withstanding rainwater shortages
Modernization of farm operations and development of extension services	Improving means, awareness, and knowledge of farmers to increase productivity save water, and cope with extreme weather events
Improving forecasting mechanisms	Assisting with farmers’ ability to cope with droughts, floods, and so forth
Water Resources	
Sound planning and	Investing in water regulation and conservation through single

<i>Adaptation Option</i>	<i>Purpose (both general and climate resilient)</i>
investments in additional infrastructure	and multipurpose investments dams to regulate peak flows and provide water in drought periods Investing in interbasin transfers to improve water use efficiency and to increase equity in water distribution
Improved resource use	More efficient management of existing infrastructure facilities. Demand-side management and water-use efficiency
Infrastructure	
Review of hydrological standards and design criteria for hydraulic structures	Updating technical construction standards for reservoirs, bridges, roads, and so forth—to account for higher climate variability and increase climate resiliency
Extreme Weather Events	
Mainstream natural disaster risk management (including emergency plans)	Vegetative stabilization, for example, strategic location of tree buffers in landslide-prone areas. For nonextreme events (that is, lower return period events) the establishment and/or conservation of vegetative cover (especially in combination with appropriate in-channel infrastructure) can reduce peak flows and thus localized flash flooding

*Source:* World Bank (2009), p. 92.

A comparison of approaches shows that the Indian policy framework and approach towards watershed-based rural development is not yet able to handle the complexities of watershed management – given its performance so far - let alone the new complication of climate-changed induced variability in weather patterns.

The possible adaptation measures identified by the World Bank review of watershed development projects world-wide, however, contain several of the features of the pilots initiated under APDAI. Thus, APDAI pilots are steps in the right directions, but they have to be placed within a much improved framework of watershed management and additional policy measures concerning water resource development, infrastructure design and disaster management.

## Annexure 6: BRIEF HISTORY OF AURANGABAD, MAHARASTHRA STATE

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### Cultural heritage

Aurangabad is the only tourist district of India having two-world heritage monuments to its credit. Moreover it is hoped that there will be good addition of two more in near future. Barring these heritage monuments of Ajanta, Ellora, Daulatabad and Bibi-Ka-Maqbara the district is rich in monuments, historical and religious of national importance.

The sculptures of Ellora- Ajanta and Ellora are the creations of dedicated artists of the by-gone days of this region. Besides the groups of the heritage caves there are a large number of caves of exquisite beauty at Pitalkhora, the earliest rock-cut-temples of Western India, at Ghotkacha in the panoramic gorge of Jajla hills and at Aurangabad the sculptural beauty of which is unmatched, on the periphery of the city itself. Besides these cave temples the district has other heritage monuments such as the ancient city of Pratisthan (Paithan) famous for exuberant Paithani sarees, the abode and saint Eknath and also known for the wood-work of the Peshwa period, Elopur the house of Ghrushneswara one of the twelve Jyotirlingas of India and also the “ Gadhi” of the Bhosales, the ancestors of Chhatrapati the architect of Hindavi Rajya, the impregnable fort of Devgiri- Daulatabad , Khultabad the seat of the Sufis and the Roza of the Aurangzeb in the midst his close relatives and preceptor. Besides these there are large number of historical manora and mansions, tombs and maqbaras, Hammamas and gardens, temples and monastores. Prominent among them are Bibi-ka-Maqbara, the tomb of Rabia-Ud Baurchi alias Dilres-Banu- Begam the wife of Aurangzeb also known as Mini Taj, Soneri-Mahal, the Haveli constructed by Pahadsing a noble of orchha, Navkhanda palace, erected by Malik Ambar the prime-minister of Nizamshahi of Ahmednagar who enhanced the status of the city from Khadki a small hamlet to Fateh-Nagar the then capital of Nizamshahi Kingdom, Kile Arq the palace of Aurangzeb, the 52 towering gates interspersed in the fortification wall of the city mainly constructed by Aurangzeb during his over-stay in the Deccan, Pan-Chakki, the water-mill constructed by a sufi-saint a marvel Feet in hydrology.

### History

The District of Aurangabad has over the centuries become a meeting place of life styles as it is centrally located on the map of India. It has witnessed the rise and fall of many dynastic such as the Setavachanas, the Vaustokas, the Chalukyas, the Rastrakutas, the Yadavs spanning fifteen centuries till the advent of Muslim rule at the very end of the thirteenth century.

### *Early history: Tribals*

The district has a long and undeterred history since the Jatava-period to the present day. During the early phase of ancient period it was governed by number of tribes. These

tribal units were united during the prolonged rule of the Satevahana or Shalivahana (230 B.C. to 230 A.D.). The settled history of this region begins with the Satavahanas. Their rule witnessed the era of peace and prosperity and hence the district of Aurangabad then centered at Pratihthan, the capital of the Satvahanas for centuries together, became the hub of socio-cultural activities of the Deccan. The Satvahanas gave incentives to trade and commerce and monopolized Greco-Roman markets for textile goods such as the high-class silken sarees of Paithan. Besides textiles they established hegemony in the trade of spices and ivory, out of which they accrued huge profits which is evident through the material remains of their period scattered all over Western India including Maharashtra as they were the lords of the territory between Narmada to Cavery.

### ***Trade route***

In the intervening years the region began to flourish as it was situated on the caravan routes introduced by the Satvahanas long ago. The capital Pratihthan was linked with the above routes, along with ports and harbors on one hand and land emporia like Sarsvati, Patliputra, Avanti, and Takshashila on the other. During the early centuries of the Christian era, commerce was in the hands of Buddhist community and hence a large number of Buddhist caves were excavated along these trade routes – the ancient Sarthavaha Path. Later on Jain and Brahmanical caves were also excavated on par with Buddhist caves. Ellora is the best example of the caves of all the above mentioned faiths.

### ***Multi-purpose caves***

Caves not only provide residence to the roaming ascetics during the rainy season (Varsha – Vasa) but also promote the cause of their faith. They also attract experts in the field of trade-commerce-agriculture medicine etc. They also served as a education centers devoted to the cause of cultural synthesis and integrity of the stage. Mainly the caves are of two types *Chaityas* (prayer halls) and *viharas* (residential units). They were functioning till the end of 13th Century A.D.

### ***Yadava rulers to Mughals***

Yadava rule witnessed the second era of prospering as far as this District is concerned. Devgiri was their capital where they erected huge fort which is also one of the tourist destiny of the younger generation. However, their fall was unexpected and untimely. The invasion of Allauddin Khilji changed the face of the Deccan. This district was immediately exposed to successive years of Muslim rule. Prominent among them were the Tughluqs, the Nizams of Ahmednagar, and the Mughals and the Nizams of Hyderabad. Mohammad Tughluq tried to shift his capital from Delhi to Daulatabad and attempted therefore to raise the infrastructure of Daulatabad. However, under some geographical constraints (water scarcity), he was forced to change his mind and the fate of Daulatabad was sealed forever.

Malik-Ambar also tried to defend Khadki i.e. the old hamlet of Aurangabad against the mighty Mughal rule but his enterprise proved unsuccessful. In the last phase of the 18th century Aurangzeb tried to develop this city on the lines of Delhi. During his tenure of

first Subhedari the name of the city was changed to Aurangabad (in 1636). During his last stay as a Emperor he perfected the defence apparatus in and around the city. After his demise Chinkilizakhan, the Nizam became the next ruler of this territory and made this city his first capital. However, he migrated from Aurangabad to Hyderabad after a few decades.

*Source: [www.wikipedia.org](http://www.wikipedia.org)*



## Annexure 7: WATER ORGANIZATIONS TRUST (WOTR): A brief profile

HEAD				OFFICE
2nd	Floor,		"The	Forum"
63/2B,		Padmawati		Corner
Pune	Satara		road,	Parvati
Pune	-		411	009
Tel.:				+91-20-24226211
Email:				<a href="mailto:info@wotr.org">info@wotr.org</a>

PROJECT				OFFICE
'Paryavaran',	Behind	Market	Yard,	Ahmednagar
				- 414001
Tel.:				+91-241-2450188
Fax:				+91-241-2451134
Email:	<a href="mailto:ahmednagar@wotr.org">ahmednagar@wotr.org</a>			

[www.wotr.org](http://www.wotr.org)

### ABOUT WOTR

Watershed Organisation Trust (WOTR), India is an NGO established in 1993 to undertake holistic and integrated developmental activities for poverty reduction in resource-fragile and rain-fed areas in India. WOTR's initial mandate was to develop the capacities of various stakeholders for the Indo-German Watershed Development Program.

It is believed that wars in the future will be fought over water. As and how this precious resource gets scarcer, our survival is what will matter more than all the technological and economic developments put together. Finally, it will be man and nature once again – like being back to the basics.

In fact, if you were to undertake a tour of the drought-prone regions of India, you would realise for yourself how water and its availability becomes the prime concern of people staying in a 'dry' area.

Women and children walk for miles in the blistering sun to be able to get just a pot of drinking water. Men dig deep into the hard ground to be able to locate a brackish water resource. Taking a bath or washing clothes is considered a luxury that no one in such regions can afford. Parched throats yearn for a drop of water. And the arrival of a water tanker can even lead to ugly fights.

Farming, a traditional occupation in most villages of India, can become an unreal notion in the face of such water shortages. People therefore begin to migrate to cities in search of livelihoods. Some villages turn to nothing more than landscapes of ruins. Some turn into the final abode of the sick and the elderly who wait for the merciful hand of death.

These then are the realities that led Fr. Hermann Bacher, a Jesuit priest, and Crispino Lobo to establish the Watershed Organisation Trust (WOTR) in 1993. Fr. Bacher had

committed himself to change the lives of the rural people handicapped by the shortfall of opportunities and resources in their villages. Crispino Lobo gave up bright career prospects and instead decided to work for the impoverished. Under them, WOTR organised and capacitated villagers to regenerate their watersheds so as to trap whatever little rain that fell in their area and use it for farming and personal use.

With its head office at Ahmednagar, WOTR has, over the years, turned barren landscapes into forests. And this magic has happened not just because of the technical guidance and funding that it has provided to several villages across Maharashtra but for the fact that it works with a holistic picture in mind. WOTR gets villagers committed to watershed development. It convinces them about the need for collective participation and voluntary labour. WOTR gets the women population involved too in the process of decision-making and governance.

And there's more. With its objective of reducing poverty in villages, WOTR looks at the bigger picture that involves providing educational inputs for children, entrepreneurship opportunities for women, preservation of the environment and creating such a self-sustaining ambience in every village that none of the villagers would want to go to the overloaded cities to eke out their living.

Since 1993, WOTR has also added two more organisations viz. Sampada Trust and Sanjeevani Institute of Empowerment and Development (SIED) to focus on specific activities such as entrepreneurship, micro-credit and implementation. In present times, WOTR has moved on from just watershed development to including the effects of climate change and what needs to be done about this big issue. It has ventured into rural renewable energy and community based rural tourism.

From Maharashtra, WOTR has also spread its reach and work to villages in Andhra Pradesh, Madhya Pradesh and Rajasthan. In statistical terms, WOTR has so far implemented 198 watershed projects in Maharashtra, Andhra Pradesh, Madhya Pradesh and Rajasthan covering an area of 142,000 ha (6/09).

WOTR grew of a fortuitous confluence of factors that arose in India and Germany in the early 1980's. There was also a growing realisation that despite huge amounts spent on poverty alleviation programs, the absolute and relative number of people living in poverty remained stubbornly constant. Both sides realised that despite their best efforts, something critical was missing and had to be addressed if a difference was to be made.

In 1987 the German government launched a special study in India - the Indo German Pilot Program (IGPP) - to assess the effectiveness of official assistance in fighting poverty. Both governmental and non-governmental development agencies involved in policy-making, funding, implementation and research on the German and Indian sides participated. Findings highlighted that aid was most effective when it reached the poor directly, but it had a spread effect when the government ably supported it. Following the German Parliament's resolution to support by way of grant aid any program that addressed poverty reduction, environmental regeneration, self-help and women's empowerment, Fr Hermann Bacher, who was involved in the entire IGPP study, conceived of a large scale community-driven program for poverty reduction, centered on regenerating the environmental space of villagers along watershed lines in Maharashtra known as the Indo-German Watershed Development Programme (IGWDP).

Given Fr Bacher's credibility and experience, he was successful in convincing both the Indian and German governments to accept, approve and fund the project. The first official agreement was signed in 1989 and the Indo-German Watershed Development Programme (IGWDP) was launched in late 1992.

When the IGWDP began, there were barely any capable NGOs who could take up the programme. In 1993, it was decided by a group of prominent NGO leaders to set up a new organisation to cater to the capacity building needs of the IGWDP and to create a movement for participatory watershed development in India. And that's what led to the birth of WOTR on December 20, 1993.

### **Philosophy, Vision and Mission**

**Philosophy:** WOTR believes that land degradation and water scarcity are the most intense and commonly felt needs of a village community that can bring different groups of people together to begin their development process. Community restoration of the natural environment makes sustainability happen. Such community-led efforts help combat and adapt to climate change and mitigate the impacts.

**Vision:** Communities, especially the poor within, are empowered to live in dignity and secure their livelihood in sustainable eco-systems.

**Mission:** To provide committed development support that motivates, energizes and empowers communities, groups, other organizations and individuals, for self-help through integrated watershed development and enhancement of well being on a sustainable basis.

### **Approach**

There is a word in Sanskrit called 'Wasundhara' which literally can be translated as 'the earth' but implies compassion, caring, co-responsibility and harmony. WOTR works on the principles of Wasundhara. The word also implies 'WOTR is Attentive to Social Unity, Nature, Development and Harmony in Rural Areas'. How does this take place in reality? While compassion and caring is what prompted the setting up of WOTR, the action plan behind each project that the organisation takes up is to involve the participation of the villagers. Each watershed project, for example, is for them and by them. The betterment of their future is their responsibility. WOTR is just an agent that sparks the initiative. And harmony is achieved when several factors come together as a whole. This may include regeneration of water sources, farming, increasing livelihood opportunities, literacy, women's role in governance, securing the future of the girl child and so on. The 'Wasundhara' approach has been implemented in 48 villages since the last three years with far-reaching impacts. It has resulted in promoting equity, gender sensitivity and sustainable development. The process continues beyond the project period.

### **Board**

<b>Fr Herman Bacher</b>	Fr Hermann Bacher is known as the ‘father of watershed development movement in Maharashtra’ and the reason is obvious enough. Born in Switzerland, Fr Bacher made Maharashtra his home early in life. Having come into close contact with villagers whose lives had been turned upside down for lack of water resources, he initiated watershed development activities and subsequently co-founded WOTR. His favourite lines have been: “Without watershed development, there is no solution to drought” and “Water is the problem; WOTR, the solution.”
<b>Mr Crispino Lobo</b>	Crispino Lobo’s list of academic achievements is long and impressive. An alumnus of the Gokhale Institute of Politics and Economics, India, and the Kennedy School of Government, Harvard University, USA, Crispino has five academic degrees covering the fields of philosophy, theology, psychology, economics and public administration. In fact, he would have been in a commanding position in corporate circles had his mind and heart not turned him to taking up the cause of the villagers. He is well known in development circles for his knowledge and achievements in the fields of natural resource management, participatory watershed development and integrated water resources management. He co-founded WOTR, together with Fr Bacher. He now heads the Sampada Trust, a microfinance and entrepreneurship development centre.
<b>Mr Asoke Basak</b>	When it comes an understanding of the functioning of government agencies, there is none better than Mr Asoke Basak, now a retired IAS officer who served as the Additional Chief Secretary of the government of Maharashtra, Chairman of the Maharashtra State Electricity Board, Chief Executive Officer of the Zilla Parishad-Bhir, Collector of Nasik and Nanded, Dairy Development Commissioner and has worked with the Maharashtra government in various other positions. He has two Masters degrees in Geology and Business Administration and a Diploma in Systems Management to his credit. His diverse experience in various fields of development administration is what has proved to be of immense benefit to WOTR.
<b>Dr Gunvantrai G Parikh</b>	A well known freedom fighter and champion of the poor, ‘G G’ as he is known to his friends, Dr Parikh is one of the mainstays of the Yusuf Meherally Centre, a centre for rural re-empowerment, located in Tara village, Panvel. At 84, he travels the 90 or so kilometres to Tara in Raigad district, near Mumbai, on a weekly, and sometimes bi-weekly, basis and continues his medical work at his clinic in Mumbai for the rest of the week. Dr Parikh and his wife are also working on a Khadi Gramodyog Andolan. He has been on the Board of Trustees of WOTR since 1996.
<b>Mr Anand Sharma</b>	Mr Anand Sharma is a Co-Founder of the TBM Consulting Group, Inc., a consultant to manufacturing companies, and serves as its President and Chief Executive Officer. Immediately prior to establishing the TBM Consulting Group, Mr Sharma served as Executive Vice President of Productivity Inc., and headed its consulting and training practices. Mr Sharma served in a number of line and staff positions with American Standard, Inc., before becoming Vice President of Operations for one of its

	leading operating divisions. He has more than 20 years experience within the manufacturing industry.
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## Organisation

An organisation has to be structured but also needs to provide enough space for its members to provide creative inputs across departmental borders and feel proud about the milestones crossed over the years. This is particularly so when the primary focus concerns changing the lives of people who have been short-changed by nature and the lack of opportunities. WOTR is all that and more.

And so, there is a team of more than 180 people, many of them highly qualified and experienced who report to the Executive Director and commit themselves to leaving their footprints on the road of development and social transformation. These are people who bring to WOTR a diverse range of expertise in areas such as social sciences, watershed technology, finance, media, administration, research and so on.

Some of the interesting sectors that they are involved in are watershed management which helps in harvesting rain water and properly utilising scant water resources in a village; women's empowerment which enables women to start businesses of their own as also have a say in local governance; human resource development which helps tap the skills and knowledge of the villagers; knowledge management that translates indigenous skills and information into practical projects; renewable energy which helps utilise non-conventional sources of energy such as solar power, biogas and wind; community-based eco tourism that turns villages into hotspots for urban tourists to enable them to have a taste of rural India; sustainable livelihoods which create opportunities for generating revenue; information technology which guides people about how to use computers and communications so as to make them reach out to the world.

WOTR is headed by its Executive Director, **Dr Marcella D'Souza**. A physician by profession, she chose to give up a lucrative medical career in order to dedicate her life to serving the poor in rural India. Dr Marcella D'Souza is an alumna of the Government Medical College, Nagpur and a Takemi Fellow of the Harvard School of Public Health. Of the almost 22 years of working in rural areas, six of these were spent on the mountains of Peru, South America. Here she organised a large-scale community-led, indigenous knowledge-based health care system across large areas of the South Andes. As a programme coordinator for women's promotion, Dr Marcella was responsible for developing the pedagogy for empowering women through self help group formation and federations at the village level, as well as mainstreaming women into the decision-making structures of the village.

## NGO Networks

WOTR has a partnership with 184 NGOs/Govt. PIAs across the country. That apart, WOTR has developed an excellent network with government agencies and professionals, all of whom are dedicated to the welfare of the impoverished. Essentially this stems out

of WOTR's strong belief in collective participation. When like-minded people get together, things begin to move. Theories get translated into action plans. And change happens for real. After all, here networking is a mission – one that implies doing things to help the villagers create a present and a future worth living in and looking forward to.

### **Policy Impact**

A famous footwear brand has a logo that says, 'Just Do It' - three simple words that can give deep meaning to life. In fact, these three words mean much more than all the self-development jargon that gurus regularly dish out. At WOTR, there is a very similar approach. Do something that creates an impact in the lives of the villagers. Don't just talk and plan on paper. Create change.

And so when we talk about watershed development and women's empowerment and entrepreneurship and climate change and so many other issues, it's not just talk. WOTR, over the last 15 years, has been toiling hard at the ground level to turn fragile and resource-deprived villages into 'green' icons of sustainability. And there are hundreds of projects to prove this. Further, what WOTR also pursues very actively is to push government agencies into re-thinking about policies so that benefits meant for the poor reach them in the measure and form they were intended to.

For example, WOTR designed and implemented a large scale, focused and integrated Capacity Building Programme that is now accepted and adopted by other programmes in the country as a pre-condition and integral part of watershed programmes. This has led to WOTR being branded as 'Mother NGO' in Ahmednagar district.

Further, WOTR has developed and operationalised a process called the Participatory Net Planning Method (PNPM) for involving the farmer couple in the development of their farms and lands. This is now common practice (with local variations) in all major watershed programs and is increasingly seen as a tool not only for planning but also for the mobilisation of people.

Concepts and processes developed and adopted by WOTR such as Ridge-to-Valley treatments, site specific and community determined measures, people's ownership and civil society-public sector partnership, systems for public accountability, transparency and community contribution have been incorporated in government-run watershed programs and are now widespread across the country and part of the normal developmental discourse.

Permission to treat degraded forest land was also obtained by WOTR for the Indo-German Watershed Development Program (IGWDP). This was a singular achievement as such lands come under the purview of the Forest Conservation Act, which is a very strict Act.

A major structural initiative from the replication and upscaling point of view has been the setting up of the National Watershed Development Fund (NWDF) by the Government of



India (GOI) at NABARD. This idea was presented by the then Executive Director of WOTR (Mr. Crispino Lobo) as well as the then Chairman of NABARD (Mr. Y.C.Nanda) to the Govt. of India. It was accepted and included in the Budget of 1999 with the intent of replicating the experience of the IGWDP across 100 of the poorest rainfed districts in the country. WOTR has supported NABARD in this role by conducting training and exposure programs for its officers, govt. officers as well as participating NGOs from different states of the country.

### **Awards**

1. WOTR wins the Kyoto World Water Grand Prize 2009 awarded during the World Water Forum in Istanbul.
2. Four WOTR-adopted villages in Maharashtra were awarded the Nirmal Gram Puraskar by the Government of India in 2008.
3. Mr Crispino Lobo was honoured with the Citadel Achievement Award for exemplary work in the social development sector in August 2008.
4. A WOTR supported project, the Mhaswandi watershed, was awarded the Aakar Jal Puraskar Award 2006 on March 21, 2006, by Hon R R Patil, Deputy Chief Minister of Maharashtra.
5. Dr Marcella D'Souza, Executive Director of WOTR, has been awarded in April 2008 the Indian Merchant Chambers' Ladies Wing 'Woman of the Year 2007- 2008 Award', for her outstanding and significant contribution in the field of water conservation.
6. Dr Marcella D'Souza, Executive Director of WOTR, has been honored with the prestigious Noble Laureate Award - Karmaveer Puraskaar - for developing pedagogy for the empowerment of women and creating a means for women to be creators of community wealth in March 2007 presented by the Indian Confederation of NGOs – Khemka Foundation.
7. Mr Crispino Lobo, Co-Founder and Managing Trustee of WOTR, was honoured with the prestigious Noble Laureate Award - Karmaveer Puraskaar - for pioneering work in empowerment of the grassroots in March 2007 presented by the Indian Confederation of NGOs – Khemka Foundation.
8. Mr Crispino Lobo, Co-Founder and Managing Trustee of WOTR, received the prestigious Outstanding Social Entrepreneurship Award in November 2005 given by the Schwab Foundation, Switzerland.
9. WOTR awarded the Government of Maharashtra's Vasant Rao Naik Award in July 2001 for outstanding work in soil and water conservation.
10. Fr Herman Bacher, Co-Founder and Chairperson of WOTR, received the Krishi Bhushan Award, Government of Maharashtra, at the hands of the Governor of Maharashtra, Dr P C Alexander on October 2, 1994 for his invaluable contribution in the field of agriculture and rural development.

11. Fr Herman Bacher, Co-Founder and Chairperson of WOTR, received the Federal Cross of the Order of Merit, Germany's highest civilian award, in recognition of his services and contribution to development cooperation between Germany and India at the hands of the Minister of Development Cooperation, Dr Carl Spranger, on February 12, 1994.

## ISSUES

### Watershed Development

To be able to explain what watershed development is, imagine, to begin with, an arid and dusty village land-locked in the middle of a ring of hills. The village has hardly had any rainfall over successive years. The once fertile earth has now turned into a cracked surface which looks as if it has become totally lifeless and completely unable to support any vegetation.



The wells have run dry. And life, for the villagers, is a story of interminable misery, brought on by lack of livelihood and starvation. Most of the young inhabitants of the village have migrated to towns and cities in search of employment. There is nothing but isolation and death that faces the old and sick villagers who have stayed back.

And then one day, a team from WOTR arrives to take stock of the situation. "This village cannot lose hope," its members declare. "There will be water in the village to carry out farming and there will be plenty left over to drink and use it for personal use. The barren land will once again sprout plants and trees. People will be able to grow vegetables, pulses and fruits in abundance. The young shall return to the village. And life will be a journey of happiness forever," they add. Do the villagers dare to believe this? Some of them do, some are reluctant. And thereby begins a process that goes through the phases of conviction, participation, implementation and execution. One day, the vivid dream comes true. That's what watershed development is all about.

A watershed, simply defined is the catchment area of a particular stream or drainage network. When rain falls in this catchment it runs down the slopes and collects into rills, rivulets and streams that merge into rivers.

A watershed, ecologically speaking, consists of a hierarchy of nested niches constantly influencing and interacting with each other. Similarly, those living within the watershed do not institute a homogeneous human community but an agglomeration of distinct groups or alliances in continual interchange with each other. Thus, both the watershed and the watershed community living therein are distinct networks of dynamic relationships constantly in flux and in ever changing configurations and permutations both in relation to themselves and each other.



The process of watershed development consists in harvesting rainwater wherever it falls, regenerating the environment, increasing green cover and adopting sustainable land husbandry



practices in the watershed. It implies making bunds, digging trenches, building gullies etc in a way that will arrest the rapid flow of water from hill slopes to the ground. This is necessary because during the few days of rainfall, the tendency of water is to gush down the slopes and also take the top soil cover along with it. This means that there is no water conservation and precious fertile soil is lost too. When this flow is reduced or made to go through steps, water percolates into the ground at various spots and increases the underground water table. At the bottom of the hills, it collects to form water reservoirs. And while flowing down slowly it helps turn patches of land green.

In order therefore to have effective mobilisation along watershed lines, it is necessary to have the full participation of the watershed community as well as the local milieu in which the watershed community dwells. This means the evolving and establishment of enabling and positive relationships resulting in enduring partnerships. For reality experienced, is, after all, nothing but relationships. Till date, WOTR has implemented 198 watershed projects in Maharashtra, Andhra Pradesh, Madhya Pradesh and Rajasthan covering an area of 142,000 ha (6/09).

### **Water and Food Security**

Watershed development and implementation is one way of ensuring that regions that receive less rainfall than required for farming are not deprived of water resources. This community-based watershed development approach adopted by WOTR to tackle drought mitigation, environmental degradation, water scarcity, deteriorating livelihood sources and poverty alleviation has had a significant impact not only on those living in the watersheds but also on the policy and national level..



Since watershed development in India is viewed as a strategic input to stabilising rain-fed farming systems, the need for capacity building of various participants has increased significantly.

The learning, insight and methodologies developed by WOTR and its partners have

contributed significantly to shaping the way resources at the national level are allocated and spent for watershed development. At the state level (Maharashtra), WOTR's experience has also informed and set the tone of the partnership in a large government-funded Watershed Development Program involving NGOs. WOTR is today training people from all over the country (and also internationally) in the skills and approaches for community-managed watershed



management and self help group promotion. When it comes to providing food security, regular living wages (more than survival and with something to save) is a way of ensuring that poverty and hunger are kept



at bay. The implementation of project works provides wage labour throughout the project period. Women and men are paid the same for an equivalent work output. Following land and drainage line treatments along watershed lines, water availability increases significantly and intensification of agriculture takes place. Thus livelihood opportunities increase from agriculture and allied activities alone.

The prevalence of hunger is best noted in the most vulnerable – children of 0-5 years of age. Increase in agriculture production, promotion of kitchen gardens and increase in income have a direct impact on reducing hunger. Besides food availability, health and nutrition information is essential for improving the nutritional status of children. Together with its sister organisation, The Sampada Trust, WOTR promotes the growth monitoring of children of the age group 0-5 years linking the anganwadi (day care center / crèche) with the women's self help groups.



## Gender and Women Empowerment

Women hold the key to sustainable development. Poverty can only be sustainably rolled back if women are drafted into the effort and empowered with the opportunities, resources, legal entitlements and necessary authority. Despite the crucial role they play in the family and the community, they are largely voiceless, severely discriminated against, have hardly any leisure and often go hungry as they are the last to eat.



## Local Self Governance

Good governance is crucial for reducing poverty and fostering inclusive development. And robust, representative, accountable and empowered local institutions are the key to good governance, especially in rural areas. These local institutions are community-based organisations (CBOs) and Gram Panchayats (GPs) or village councils.

The important issue in local self governance is: 'How to make the Gram Panchayats and the village responsible for their own development and to plan according to their priorities and needs. Especially in terms of how they include their own poor and marginalised communities'.



WOTR has piloted in 48 villages a step-by-step capacity building and institutional empowerment strategy called the Wasundhara Approach (which means 'the earth' and connotes caring, compassion) that helps these institutions identify their needs and developmental deficits, understand the underlying causal relationships, envision their highest achievable good, generate a community-wide consensus of what is to be done and how, affix responsibilities and actively access official and other resource agencies in order to fulfill their needs and realise their dreams and aspirations. The success of this approach can be gauged from the fact that these village institutions have been able to leverage over Rs 100,00,000 from public sources to date with more in the pipeline.

An exciting and major breakthrough in this regard is the partnership WOTR has entered into with a large business entity (ITC) and the government of Maharashtra to operationalise the National Rural Employment Guarantee Program (ostensibly the largest employment guarantee program in the world today) covering two blocks of Jalna district

which will involve at least 50 Gram Panchayats and leverage funds in excess of Rs 50,000,000 over the coming year. This will not only provide employment opportunities to the needy but also build up the infrastructure and assets especially in the area of soil conservation, water harvesting, watershed development, ground water recharge, afforestation and rural connectivity.

### Climate Change

A recently released study of the UN titled 'Humanitarian Implications Of Climate Change' has identified India as a hotspot particularly vulnerable to extreme weather events - droughts, cyclones, floods and so on. While the effects of climate change impact the country and the globe at large, those who will be particularly affected and most hit will be the poor and rural India. Already, climate variation is affecting tens of millions of people, especially those living in dry zones, who depend on rain-fed agriculture and livestock for a living. The recent severe droughts, changing rainfall patterns as well as floods have resulted in severe crop, livestock, and livelihood losses, destruction of homes and property and large scale uprooting of villagers. Rising temperatures, increasing droughts, water shortages and pest attacks are expected to cause a decline in agriculture productivity ranging from between 15 per cent to 50 per cent particularly in dry land areas in the years ahead. The incidence and spread of diseases in both humans and animals will rise and thus further add to the burdens and deprivations of the poor.

WOTR's major area of intervention is in building the adaptive capacities of rural communities to respond to the effects of emerging climate changes by regenerating the eco-systems they live in, diversifying livelihood sources in order to reduce risks, and adopting new agricultural and renewable energy technologies. WOTR's role and impact in regard to community-led climate change adaptation has been specifically referred to in publications of the prestigious World Resources Institute, Washington ([www.wri.org](http://www.wri.org)). These include: World Resources Report, 2005: The Wealth Of The Poor: Pgs 124-130; Weathering The Storm: Options For Framing Adaptation And Development (2007): Pgs 6-7, Annex Pg 45; Roots Of Resilience: Growing The Wealth Of The Poor (2008): Pgs 68-70, 78-79, 222/Para 6.

### Renewable Energy

There is an enormous gap in the fuel and energy demand and their supply and its availability in India and in particular the state of Maharashtra. The cost and the





availability of electricity and Liquid Petroleum Gas (LPG) have gone beyond the reach of the rural poor. Most rural households continue to use traditional fuel sources such as fuel-wood, kerosene and agro-waste to meet their energy demand.

At the outset WOTR has initiated renewable and alternate energy initiatives. The objective of this unit is to make available renewable sources of energy to address the domestic energy requirements (for cooking and lighting) of rural households. Our ultimate goal is to make a village smokeless and to provide for the cooking and lighting needs to every household in the villages selected.

Three watershed project villages (Naralewadi, Aundhewadi and Wanjarwadi) were selected initially in different areas with different socio-economic conditions. The technologies used were biogas plants with attached toilets, biogas lights and solar home lighting systems. Of the three villages selected one village has been very successful and WOTR has constructed biogas plants with attached toilet and installed a biogas lights in 30 of the 34 households in the village.

Also every household in this village have a solar light installed, thereby completing the objective of creating a model village WOTR had set out to achieve. In the other two villages 5 biogas plants with attached toilets and 118 solar lights have been constructed and installed respectively.

Based on this experience, awareness generation and mobilization is being done and the idea is catching up in other villages too. Micro finance and differential pricing schemes are also being used as a tool to enable the poorer sections and others to avail these technologies. Through this support, over 1,100 solar lamps have been provided to the poorer families in Sampada villages and around 633 solar lights have been installed in WOTR villages as of date.



A new stove has been designed and developed by WOTR based on bio-gas technology. It will use biomass pellets manufactured out of agro-wastes as a fuel source. This stove is in the initial stage of implementation. Around 400 stoves have been provided to rural households in Sampada villages (Ahmednagar district) and there is great demand for the same.

In most parts of Maharashtra rural households still use traditional fuels (kerosene, cow dung and fuel wood) for their domestic energy needs. The sources of energy – MSEB electricity supply and LPG - used by urban areas are beyond the reach of the economically weaker section of rural Maharashtra. The electricity supply is provided for 12 – 14 hours at best and the LPG supply is poor and

too

expensive.

Just to illustrate the enormity of the problem, consider the following numbers – on an

average each rural household of 5 to 6 members use 5 litres of kerosene per month and 3 kgs of fuel wood daily. This translates to 60 litres of kerosene and 1,095 kgs of fuel wood per year. Now multiply this with hundreds of thousands of rural households and we can only begin to see the bigger picture.

In this year alone WOTR / Sampada has electrified more than 1,700 rural households in its project areas and plan to provide 5,000 homes in the next 6 month with alternative cooking stoves to replace the hazardous traditional fuel wood. Let's look at a few numbers again – even if we can reduce the traditional fuel usage by 65 per cent in these rural households, we will save at least 66,300 litres of kerosene and 3,558,750 kgs of fuel wood per year.

WOTR has been working with the renewable energy for over a year. Change and impact is seen at each individual household level. Here the positive impact these technologies have had on the education of a rural child or the effect they have on the health and drudgery of rural women, convince us that these technologies have to be implemented on a much larger scale.

## SISTER CONCERNS

### 1. Sampada Trust



Sampada organises women into Self Help Groups (SHGs) and federates them into Apex Bodies (also called joint Women's

Committees or SMS

for short) at the village level. These SHGs and their federations are organised around savings and credit operations to begin with, and graduate to undertaking various social developmental activities that impact, in particular, the area of health, sanitation and hygiene of children, individuals, families and the community.



These activities are organised in a manner that also facilitates the mainstreaming of women in the decision-making process in the village.

We provide rural women an access to credit through small loans for entrepreneurial livelihood and consumption purposes through their SHGs and SMS. These loans are used and managed by the SHGs themselves. A part of the service charge is given to the SMS so that gradually a fund, at the village level under the control of the women themselves, is built up. The SHG members and the rural youth are provided training, guidance and escort services for undertaking of various income generating and livelihood activities.

They are also helped to access the formal financial network and also provided the forward and backward linkages along with market-related information. Sampada Trust has provided a retail urban outlet, Amhi Leki Ahilechya, for the sale of the products of rural SHGs and artisans at Ahmednagar.



## 2. Sanjeevani Institute Of Empowerment and Development



A spin-off sister organisation of WOTR, the Sanjeevani Institute of Empowerment and Development (SIED) was established in May 2007 with the objective of focusing on the implementation of projects in rural Maharashtra. Its preference is for the tribal and backward regions especially where the environment is degraded. The thematic areas addressed are (a) poverty reduction (b) natural resource regeneration and management (c) livelihood development and (d) community and institutional development.

The head office of SIED is at Aurangabad. It has 10 project cluster offices at Ahmednagar district (Ahmednagar & Sangamner), Amravati, Aurangabad, Dhule district (Pimpalner), Jalna district (Bokhardan and Jaffrabad), Pune district (Shirur), Wardha district (Karanja) and Yeotmal. Currently SIED is implementing 88 projects independently and some in collaboration with WOTR.

## 3. School for Sustainable Living and Livelihoods

The School for Sustainable Living and Livelihoods (SSLL) is WOTR's response to the growing unemployment in rural areas. There is a serious mismatch between the skill sets of rural youth, hence the near non-employability of most of them in industry and the formal sector.

Simultaneously, adaptation to climate change is no longer a long term response option only to be used as a last resort. For rural communities





that are already vulnerable to existing climatic hazards, it is already an urgent imperative. While climate change is not the only threat to natural resources and livelihoods, climate-induced changes to resource flows will affect the viability of rural livelihoods unless effective measures are taken to protect and diversify them through adaptation and other strategies.

Hence, to address this urgent and relevant need for the rural communities to rapidly build capacities to adapt to impending shocks of climate change, the SSSL has developed a robust pedagogy that is both theoretical and practice-oriented and that meets the rural requirements. The training is holistic, addresses skill development, personal growth and inner self integration, and is oriented towards practice and achieving results and outcomes. The students gain a systemic understanding of climate change and prepare their communities to adapt to the same by managing and promoting local resources and building their capacities.

Currently the SSSL offers the following courses: (a) Eco community organisers (ECO); (b) Rural Chroniclers; (c) Women Health Promoters and; (d) The School Strengthening Program (for anganwadi workers and primary school teachers).



#### 4. Grassroutes

Grassroutes is a responsible rural tourism movement building a network of village tourism destination across India, which are owned, managed & run by the local village communities.

Our prototype villages Kohane & Purushwadi are located in Ahmednagar district of Maharashtra.

Grassroutes identifies villages with tourism potential and then goes to work to responsibly develop this potential with the consensus and cooperation of the villagers. We enable and direct the village and its institutions to independently provide quality hospitality services to tourists. We assist the villagers in



the training and development necessary for this purpose. Our goal is to make it possible for local people to manage tourism effectively as a means of community livelihood while protecting and preserving their culture, tradition, and environment.

Our plans for the next 3 years include expansion into another 6 villages.

Log on to [www.grassroutes.co.in](http://www.grassroutes.co.in) to find out more information.







## **Annexure 8: GRASSROOTS ACTION FOR SOCIAL PARTICIPATION (GRASP): A brief profile**

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V-18, New Shreya Nagar, Aurangabad – 431005  
Phone and Fax: +91-240-2351224 and 2333294  
Email: grasp\_agd@sancharnet.in  
www.grasp.org.in

### **ORIGINS AND CONTEXT**

Grass-Roots Action for Social participation (GRASP), a Civil Service Society was established in 1992 to empower rural men and women and to professionalize the process of rural development at the grassroots by providing an interactive platform for the stakeholders. GRASP since its inception has been deeply involved in natural resource management (including human) through various programmes with government and non-government support. While managing the resources a special focus was on capacity building of community and local NGOs. The organization is also involved in socio-economic empowerment of community, especially women and development of livelihood opportunities for the poor and marginalized.

Tribals, and socially and economically disadvantaged sections of rural areas are the target group of GRASP. In community-based natural resource management (CBNRM) projects like watershed development, where entire village community is included, positive discrimination in favour of such disadvantaged men and women is emphasized. In all projects special attention is paid to provide enabling support to women.

### **VISION**

“Empowerment of men and women in rural areas to manage their resources in a scientific and environmentally sound manner.”

**MISSION** statement to achieve the stated vision is:

“To work for holistic development of the poor through community action, capacity building of grassroots level organisations, institution building, networking, policy advocacy and action oriented research.”

### **PRINCIPLES AND APPROACH**

GRASP, in pursuit of the above Mission, lays emphasis on:

- Working for **poverty eradication** in an environment friendly manner.

- **Community Action Programmes (CAP)** as basis of community empowerment with an integrated watershed framework for holistic development of the area and the community.
- Participatory planning and action for **Watershed Development (WD)** to regenerate the natural resources and enhance the quality of life for the families, especially the poor, in the rural areas.
- Providing development support through its **Development Initiative Support Programme (DISP)** to grassroots level voluntary organisations with a strong commitment. DISP is designed to provide support for building organisational skills and capabilities to handle the intricacies of the development processes, besides making available basic administrative infrastructure. This is helping large-scale replication of the watershed approach by newly promoted voluntary organisations (VOs) and Community Based Organisations (CBOs). DISP anchors the philosophy of building and creating locally based organisations to focus on natural resources management, women's empowerment, micro-finance, preventive and curative aspects of health and education, especially in the rural hinterland.
- Developing strategy for research, networking and strengthening advocacy for influencing policy level interventions in Natural Resource Management (NRM). **Team for Research, Evaluation and Development (TREAD)** is facilitating these changes.
- Strengthening the spirit of competitive collaboration among the network members (GRASP's partner organisations) for the benefit of the society. The initiative has led to promotion of the network, **Guild for Regional Associates for Community Empowerment (GRACE)**, which is active for last five years.

## GOALS

- To strengthen the participatory management of the natural resources and to regenerate the degraded lands to promote sustainable livelihoods for rural men and women.
- To develop regional plans for watershed development and Participatory Environmental Resources Management (PERM) and to implement them.
- To promote grassroots level organisations and community based organisations and to build capacity for Community Based Natural Resources Management (CBNRM)
- To develop strategic focus in identifying the technical and managerial needs of grassroots level organisations.
- To develop the strategy for research, network building and policy advocacy for broad basing the concept of community empowerment using PERM as a tool.

## REGISTRATION

GRASP is registered at Aurangabad (Maharashtra) as follows.

- Under Societies' Registration Act, 1860. Reg No: MH/266/93 Date: 6<sup>th</sup> Oct 1993

- Under Bombay Public Trust Act, 1950. Reg No: F-2782 Date: 4<sup>th</sup> Feb 1994

GRASP is registered under Foreign Contribution (Regulation) Act, 1976, with Registration No: 083750050 dated 23 February 1996.

## ORGANISATIONAL STRUCTURE

GRASP is managed by a Governing Board, which operates through Chief Executive Officer and team of competent professionals. The Governing Board periodically sets forth the policies and priorities for GRASP. The members of the Board take keen interest in the projects and activities, and are available for advice and guidance.

**Governing board:** The Governing Board of GRASP comprises of 8 members, including four office bearers.

	Name	Designation	Qualification	Board Member since
1	Tapan Chakravarty	Chairperson	B. Tech. Indian Institute of Technology (IIT) Kharagpur	August 1993
2	Rajinder Singh Nijjar	Vice-Chairperson	M.Sc. (Nuclear Physics), Indian Institute of Technology (IIT) Khargpur	August 1993
3	Yugandhar Mandavkar	Executive Secretary	Post-Graduate Diploma in Rural Management, Indian Institute of Management, Ahmedabad (IIMA)	August 1993
4	Sanjay Nagesh	Treasurer	M.Sc (Geology), Indian Institute of Technology (IIT) Khargpur	August 1993
5	Shrikant Joshi	Member	Bachelor in Engineering	August 1993
6	Sudha Kannan (Ms)	Member	Post-Graduate Diploma in Rural Management, Indian Institute of Management, Ahmedabad (IIMA)	July 2005
7	Hemant Joshi	Member	Bachelor in Engineering (BE) & M. Tech	August 1993
8	Ujjwala Masadekar (Ms)	Member	MA (Social Work), Tata Institute of Social Sciences, Mumbai	July 2005
9	Pravin Mahajan	Member	M.A. (Economics)	August 1993

**Office infrastructure:** GRASP has a central coordination office at Aurangabad and field offices at Kannad, Akola and Kolaras. These are equipped with computers, audio-visual aids, vehicles and other facilities.

**Field offices:** GRASP has branch office at Kannad to carry out activities in micro-finance, women's development and watershed management. At Akola, a field unit is placed for the Social Action Research Project, with brick workers. GRASP has recently opened an office at Kolaras (District Shivpuri, MP) to facilitate District Poverty Initiatives Programme of Government of Madhya Pradesh.

**Staff strength:** GRASP has a total 18 staff members, comprising of 13 professionals (7 women), three administrative and two support staff. One of the professionals is working part-time. In addition, three members of the Board are closely involved in the projects. Current staff include the following:

	Name	Educational Qualifications	Years of experience in the development field
1.	Mr. Yugandhar Mandavkar	PGDM (IIMA)	20
2.	Mr. Sham Deshpande	M. Sc. (Environmental Sc)	7
3.	Mr. Arun Garud	M.Sc. (Botany)	9
4.	Ms. Tara Bahire	B. A.	5
5.	Ms. Vandana Raut	BSW	3
6.	Ms. Veerangana Ingole	BSW	3
7.	Mr. Shirish Jadhav	MSW, DLL	7
8.	Ms Amita Sawant	B.Tech (Agri)	1
9.	Ms Suchita Bhuskade	B.Tech (Agri)	1
10.	Mr. Santosh Mule	B.A.	7
11.	Mr. Macchindra Mhaske	M.A.	5
12.	Mr. Govardhan Maher	10 <sup>th</sup>	4
<i>Other field staff assigned for GRASP's project implemented through partner NGOs: 7</i>			

## PRIMARY FOCUS AREAS

The primary focus areas of GRASP include the following, on which GRASP has been working for last eight years, both at programme and policy advocacy levels. Major achievements in these focus areas are presented below.

- **Participatory environmental resources management** focussing on community participation in management of the land, water and biomass resources, with user groups planning and implementing appropriate activities of watershed development.
- **Women's empowerment** with gender focus, through interventions in the fields of economic, health, education, etc. and also bringing them into the mainstream activity by providing them enabling support to increase their participation in decision making in social and economic fields

- **Micro-Credit** with the view to provide credit for rural women linked to their savings, GRASP initiated the women's credit groups in all its projects as an entry point. This also helped in formation of cohesive force within the community to deal with market.
- **Resource Support for Institutional Development** for capacity building of local youths and second line personnel from different Village Organizations (VOs) working in the region and training them on community resource management as a tool to empower the deprived, through Local Initiative Support Team (LIST) of GRASP.
- **Joint Forest Management:** GRASP is the first VO under the Indo-German Watershed programme to involve villagers in forest treatment and management of forest lands. The Joint Forest Management (JFM) practice has taken shape only through continuous efforts and follow-up by villagers, FPCs and GRASP.

## KEY STRENGTHS

- **Proven in-house experience:** GRASP has shown exceptional expertise in community mobilisation, training and capacity building, action-research and networking.
- **Community mobilisation :** The operational programmes of GRASP like various *Participatory Environmental Resource Management Projects* have a focus on the community involvement in the management of local resources. This begins with identification of the long-term development needs of the people, and goes beyond to address the livelihood security issues. GRASP has also been working on participatory technology development and promotion in dryland farming, bio-fertilisers, organic farming, water utilization and management. *Women's empowerment* attempts, with gender focus, interventions towards meeting their practical and strategic needs.
- **Resource Support for Institutional Development :** GRASP is working for capacity building of local youths and second line personnel from different VOs working in the region, with the idea of enabling them to use their knowledge for integrated development for their own area. GRASP's own Local Initiative Support Team (LIST) provides leadership development and related support. GRASP has been active in capacity building of partner organizations (NGO personnel) in process skills like moderation and gender, and also in organization development.
- **Action oriented research :** with a purpose is to provide a stronger scientific base to the community empowerment efforts and to develop as a *knowledge network*. GRASP has worked on dryland farming, bio-fertilisers, organic farming and indigenous technology in brick sector. As a basic support to this function, GRASP has formed a Team for Research, Evaluation & Development (TREAD) to plan and initiate to enhance the role of communication within the network and outside.
- **Networking:** GRASP promoted a network of Voluntary Organisations (VOs) working in Marathwada region on natural resources management. This network,

called Guild of Regional Associates for Community Empowerment (GRACE), has been active for last five years, and would also be paying an important role in the proposed PACS programme.

- **Systems in place for technical and financial management:** GRASP has been implementing different projects supported by various agencies, according to which the reporting requirements vary. GRASP has established information and control systems to cater to these varying needs. The basic management system is based on systematic field records, which are generated by the operational staff. These are processed at the project level by the respective Coordinators or Managers, and further collated at the organizational level by the CEO with the help of core team. The procedures and methods are constantly improved, and we are in a process of finalizing operational guidelines for record keeping, monitoring and reporting. Most field records and the project level analyses are computerized.

Computers are also used for financial management, where GRASP is using an elaborate software called “VolAc”, which permits overall decision support for control and analysis of expenses, budgets, projects and receipts. Further, for the analysis of micro-finance activities and SHGs, a software called “McFinancer” is in use.

## PROJECTS IMPLEMENTED

5.1.5.1.1.1.1 Name	Purpose or Focus	Supported by
Jalsandhraran	Water conservation	Government of Maharashtra
Adarsh Gaon Yojna	Community development & participatory watershed development	Government of Maharashtra
Indo-German Watershed Development	Participatory natural resource management & women empowerment	GTZ-WOTR Kfw-NABARD
DPAP	Natural resource conservation	Central & state Government
Management of Environmental Resources by Community	Resource support, capacity building of local NGOs, developing resource utilization pattern watershed villages	Aga Khan Foundation (India)
Gender in NRM & Capacity building	Capacity building in Gender	Community Aid Abroad
Rural Drinking Water Supply	Identification, planning & installation of drinking water wells	Indo-German Social Services
Rural Water Supply & Sanitation Project	Environmental and social analysis	Government of Maharashtra
Education, Training and Motivation Project	Create better educational environment in the villages	Child Relief & You (CRY)
Social Action Research Project	Understand and address the socio-economic issues of people in brick	MITCON



	making sector	
Bio-fertiliser Research	Identify, develop and promote use of bio-fertilisers in the state	Aga Khan Foundation (India)
Natural Resource Management & Institutional Support	Resource conservation and provide support to local NGOs	Community Aid Abroad

## BRIEF OUTLINE OF RECENT ACTIVITIES (2006 – 2009)

### 1. Aquifer Water Management Pilot in GPP-1 (Buldhana)

**Background :** The Government of Maharashtra (GoM) is implementing Jalswarajya – Rural Water Supply and Sanitation Project aiming to implement a decentralised, demand-led approach by empowering village communities to plan, design, implement, manage, operate and maintain their own water supply and sanitation facilities on sustainable basis. As a part of this project, GoM launched Aquifer Water Management Pilot (AWMP) in six districts to promote community level water management on the basis of scientific, rational and efficient unit of aquifer.

After successful completion of the planning phase in 2006-07, the Govt of Maharashtra (GoM) decided to implement the pilot in three aquifers in Districts Aurangabad, Buldhana and Pune. Grass Roots Action for Social Participation (GRASP) was selected as a Support Organisation (SO) for providing services for capacity building of stakeholders in the area falling in watershed GPP-1 in Taluka Sindkhed Raja, District Buldhana.

**Main features of the project:** The main features are:

- Villages' partnership
- Gender equity
- Social auditing for transparency
- Defined roles and responsibilities for groups/ agencies involved
- Capacity building
- Participatory planning
- Decentralised decision making

**Implementation methodology:** The entire project is in two phases namely 1. Capacity building and 2. Main phase (physical implementation).

Under the **Capacity building** phase the villages were organised in various groups to take decisions, plan and implement. The groups then capacitated on aquifer water and its management along with sanitation aspects.

The second phase focused on the implementation of the village action plans prepared by the villagers along with NGO team. The physical measures so as to strengthen the water resource in the aquifers and meet the crucial requirement of drinking water involved measures like Water conservation structures, drinking water systems (including wells), soil conservation wherever necessary to support the water harvesting structures. This ultimately would enhance soil moisture content and arrest rainwater for further percolation.

The village level committees called Village Water and Sanitation Committees (VWSC) are responsible for implementation in villages and are represented in an apex body named Aquifer Water Management Sabha (AWMS). The **fund flow** is also according to the structure i.e. from top to bottom.

**Women empowerment committees** are also formed for women and they have separate provision of funds. The physical estimates prepared by technical support group need to approved by **Gram Sabhas** and fund instalments only provided if the **Social Audit Committees recommends** so.

**Area coverage:** 20 identified drought prone villages falling in GSDA's GPP1 watershed in Sindkhed raja block of Buldana district (Vidarbha region), Maharashtra.

Planning of this project was completed by 2006-07 and thereafter the implementation phase has begun and is expected to be completed by March 2010.

## **2. Preparation of Plans for drinking water supply, nursery and review of livelihood plans for nine villages of North Sikkim District, Sikkim, India.**

**Main features of the project:** This assignment was taken up in Jan 2009 and the main features are the following:

- Assess the drinking water requirements of the community for throughout the year and estimate the difficult periods of availability.
- Study the existing system for drinking water and suggest cost- effective measures for making available drinking water to the villagers during difficult times
- Suggest appropriate measures for water supply and prepare the plan and cost estimate
- Develop action plan and timeline for implementation of the water supply measures
- Suggest community based mechanisms for the management of water supply by the community
- Explore livelihood options based on agriculture, horticulture and livestock promotion
- Review the livelihood plans prepared by the team for agriculture, horticulture and livestock promotion and comment on appropriateness of the same, including changes required
- Review the proposed plan for nursery and guide on the technical options , complete lay-out and plan for the nursery and demonstration unit.

### **3. NABARD supported Holistic Watershed Development Programme (NHWDP) in Vidarbha under Watershed development fund (WDF).**

This programme consisted of Capacity Building Phase (CBP). The two clusters namely Wapti-Kupti are in Karanja, Dist Washim and consisted of 6 villages.

#### **Main features of the project:**

- Capacity building of the villagers ( Cluster Level Committee, Village Level Committee)
- Area Treatments
  - Afforestation
  - Crop Cultivation
- Wadi Development
- Supervision
- Training and Demonstration

### **4. Planning for plantation on community land in Akola District for ABN AMRO Bank and Carbon Credit Potential of the same Jointly carried out with Collector and other line departments of Akola.**

The assignment was taken up in 2007-08.

### **5. Study of Role and Potential of Groundwater in Urban water supply of Aurangabad Municipal Area.**

Study of the water scenario and the socio- economic aspects of groundwater in the city of Aurangabad was undertaken. The study aimed to assess groundwater usage through:

- Taking stock of the current role that groundwater plays in urban water-supply- Volumes extracted, resource use, levels of investment and operational costs involved
- Making an appraisal of quantity and quality status of groundwater resources-
- The sustainability and constraints on existing use and the potential (if any) for further groundwater development.

### **6. Study of community management of ground water**

Case study of two villages namely Shivni and Hiware Bazar funded by GW-MATE and carried out for the World Bank in 2007-08

**7. Training of Senior Officials of line departments of Government of Maharashtra on Micro-Planning conducted by YASHADA, the state rural development training academy, Government of Maharashtra.**

**8. Poorest Areas Civil Society (PACS) Programme**

This program was taken up in four clusters in 23 villages in Aurangabad District with the aim of enabling the community, especially women and empower them socially-economically and politically to address their pertaining issues. The two main objectives are the following:

A. Livelihood enhancement in the form of

- Agriculture- Increased production, improved cropping, Scientific knowledge and technology transferred to women and promoting income generation activities primarily the local resource based
- Livestock- Nutrition, dairy development, better management practices
- Business Development- Agro-processing, packaging

B. Strengthening Livelihood Support System would entail motivating community for

- Land- erosion control, quality improvement and conservation
- Water- augmentation, recharge and utilization
- Biomass- plantation, crop choices and scientific farming practices

**9. Drought forum coordinated activity of NGOs of Aurangabad District on Awareness creation and Advocacy on drought issues.**

Organized training programmes for drought warriors for monitoring of drought situation in 100 villages.

## Annexure 9: NOTES ON WATERSHEDS VISITED IN AURANGABAD

### **I. KACHNER WATERSHED (WOTR, WASUNDHARA, VILLAGE DEVELOPMENT PROJECT)**

The project is being implemented in 7 villages, Kachner village and its surrounding hamlets. The project area is in Marathwada region of Maharashtra. It is 45 km from Aurangabad towards *North East*. The area is specifically selected taking into consideration the poor quality of life of the people. This is due to several problems related to agriculture, employment, health, nutrition and education. It has been declared as one of the backward districts of Maharashtra State. The target group comprises of around 680 households (total population 4013) who in majority belong to the Nomadic tribal group -Lamani. They are significantly socially and economically deprived

The region has moderately to gently sloping undulated topography. The area falls in the Godavari basin. The region is occupied by basaltic lava flows of the Deccan Trap of upper cretaceous to Eocene age. The major part forms the moderately dissected basaltic plateau, which has moderate to good groundwater potential. The area is suitable for groundwater exploitation through dug wells. The climate of the region can be divided into three seasons as: a) Moderately warm wet season during June to Sept., b) Cool dry season from Oct. to Feb., and c) Hot dry season from March to May. The average temperature is ranging from 20°C during winter to 41°C during summer. During greater part of the year, the climate is quite pleasant. It receives rainfall mostly from Southwest monsoon. Rainfall is not uniform in all parts of the region. The average rainfall ranges between 500 mm to 550 mm. The soils of the region are black with considerable variation in texture and depth.

#### **PROJECT DETAILS**

<b>Project start:</b>	November 2008
<b>Status:</b>	On going
<b>Implemented by:</b>	Sanjeevani Institute for Empowerment & Development (SIED) & Village Development Committee
<b>Supported by:</b>	Watershed Organization Trust (WOTR)
<b>Funded by:</b>	KKS – BMZ, Germany

#### **LOCATION AND DEMOGRAPHIC DETAILS**

The project is being implemented in 7 villages, Kachner village and its surrounding hamlets. The project area is in Marathwada region of Maharashtra. It is 45 km from Aurangabad towards *North East*. The area is specifically selected taking into consideration the poor quality of life of the people. This is due to several problems related to agriculture, employment, health, nutrition and education. It has been declared as one of the backward districts of Maharashtra State. The target group comprises of

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### **PROJECT OBJECTIVES**

The overall goal of the project is to improve the quality of life of the target group by a sustainable management of resources and by the development of long-term preventive existential measures through improved agriculture and similar activities as well as through non-agriculture initiatives.

### **PROJECT ACTIVITIES**

It is expected to reach this overall goal through the following measures:

1. Increase and diversification of agricultural production by strengthening adapted and sustainable cropping systems, by adoption of improved agro technologies as well as by the introduction of new crops.
2. Soil and water conservation activities through various measures on private and public land.
3. Activities for women empowerment / strengthening equal social participation of women.
4. Activities to increase human security for especially deprived and marginalized groups of society such as women, single parents and landless.
5. Development and management of livestock farming.
6. Development of agro-tourism.
7. Promotion of renewable household energy

### **MEASURES UNDERTAKEN UNDER WOTR WASUNDHARA PROJECT (as on 31<sup>st</sup> December 2009)**

The activities are planned in consultation with the villagers and considering the sanctioned plan.

The annual action plan is prepared on quarterly basis and is revised based on the sanctioned plan and achievement in each quarter. The following activities have been implemented -



## 1. Water and Soil Protection

- Soil and water conservation activities were initiated in the beginning of November 2008. This gained momentum in March and April. A total of 669.4 ha land has been treated under different soil and water conservation activities.
- The treatments are being carried on ridge to valley principle and as per the sanctioned participatory net plan (PNP). The PNP has been completed for the selected area by involving the farmer couple and their knowledge and inputs are also considered.
- Out of the 669.4 ha treated area 614.4 ha is cropped land treated with treatments like farm bund / contour bund and stone outlet. Thirty-one ha land has been treated under grassland with tress with treatments like water absorption trenches (WAT), contour trenches stone gully Plug (GP), earthen gully plug, 24 ha is agro horticulture with plantation of sweet orange, mango etc. The measures have been taken on wasteland as well as agricultural land. The quality of the work done is good.
- Two cement check dams are constructed as per plan.
- The total expenses incurred on the watershed activities are Rs 3,895,353. The local contribution collected by villagers is Rs 608,666 through actual work done in the field. The total expenses from the project funds are Rs. 328,6687.
- Receipt of the work done and payment were given to labourers and this has helped to maintain transparency as well as increase participation of community and improvement in quality of work. The village development committee (VDC) has opened a bank account and funds for soil and water conservation are transferred to VDC account. The VDCs make payment to the labourers. All the accounts are properly maintained by VDC.

**Table 1: Village wise physical progress**

	Name of village	Total area (in ha)	Net treatable area (in ha)	Treated area up to Dec 2008 (in ha)	Treated area during Jan-Dec 2009 (in ha)	Cumulative till December 2009 (in ha)
01	Abdulpura	689	551.9	20.80	117.5	138.9
02	Kachner Tanda-1	303	238.8	6.90	91	97.9
03	Kachner Tanda-2	466	366.75	17.40	115.8	133.2
04	Kachner Tanda-4	339	280	10.20	108.5	118.7
05	Kachner Tanda-6	220	175.75	20.00	64.9	84.9
06	Shivgad	450	345	12.40	84	96.4
	<b>Sub total</b>	<b>4383</b>	<b>1958.2</b>	<b>87.70</b>	<b>581.7</b>	<b>669.4</b>

## 2. Activities aiming at agriculture and livestock farming

It was planned to organize demonstrations on improved fodder variety in the project villages. Accordingly two varieties of fodder grass hybrid Napier (Krishna) and stalo hemata have been planted.

The fodder demonstration was organized during last year in all the project villages (1 each). The farmers who had taken the plot realized the benefits of the demonstrations. The results of fodder demonstrations are very good. Other farmers are also willing to take up such fodder plots. Farmers who have irrigation facility, planted improved grass variety Krishna – an improved variety which sprouts after cutting and in a year 12 cuttings can be done.

Crop demonstration has been carried out in 4 villages during the reporting period. Farmers in these villages were not familiar with potato cultivation. The VDC has decided to take up demonstration of potato and they have selected 30 farmers and they have been potato seed of 5kg each. The growth of potato crop was very good. After harvesting farmers are motivated to cultivate potato crop.

### **3. Activities aiming at Livelihood Development / Micro Credit**

Livelihood assessment for the identified villages has been carried out by Sampada Trust. Sampada trust has prepared report of livelihood assessment. Based on the report this activity will carried out during the coming year. During the last year VDC of Shivgad Tanda collected Rs.10,000 for fish farming and have cultivated fish in village pond. They have got a profit of Rs.8,500/- in this activity

### **4. Renewable Energy Products**

Under the renewable energy component it has been planned for installation of RE products such as Biomass stove and solar home lighting system ( 100% of total households). But due to some problems faced in operation and maintenance of biomass stove, presently it has been decided not to implement the activity. Villagers of Wanjarwadi (Abdullapur) are willing to implement community based solar home lighting system. Detail survey has been carried out with the assistance of the professionals and cost estimate has been prepared.

### **5. Village Development Fund**

Under this component establishment of maintenance fund is one of the activity. For release of maintained fund guidelines has been prepared. Accordingly at least 70% families have to contribute Rs.100 per year per family towards maintenance fund. A collection of Rs.100 from eligible family is in progress and till Dec 2009 about 60 % families have contributed towards maintenance fund. Maintenance fund will be released from project, after fulfillment of the minimum criteria. A separate account has been opened for maintenance fund by the VDC of Wanjarwadi, Shivgad Tanda, and Kachner Tanda no 2, remaining VDC are in process of account opening.

## **6. Development and Strengthening of Local Institutions**

Under this component different activities such as establishment of required CBOs and their registration, constant support through training and promotion, cluster level melava, establishment of maintenance fund were planned.

**a) Establish required CBOs-** It has been planned for formation of required groups such as SHGs, SMS and VDC in each village and registration of at least 2 CBOs/village. Till the end of the year all these CBOs are formed in each village. The VDC's are registered as subcommittee of grampanchayat (PRI). Registration of other VDC as subcommittee of gram panchayat helps VDC as democratic organization in village development. Till the end of Dec 2009, 31 SHGs have been formed with 401 members and have a saving of of Rs. 464,923. Also the Samyukta Mahila Samitee (SMS), an apex body of SHGs is formed in all the villages.

**b) Exposure for community-** Two exposure visit ,one for VDC member and one for SMS member involving 70 participants has been completed. VDC member's exposure visit was taken to Mahatma Phule Agricultural University, Rahuri and farmers co-operative dairy, Sangamner Dist- Ahmednagar. They have also visited micro farming plot developed by WOTR at Sangamner. The women SMS exposure was taken to developed watershed projects-Hivare bazaar and Mhaswandi in Ahmednagar . This exposure helped for mobilization of CBOs member and strengthening the CBOs

**c) Constant support to CBOs through training and promotion-** The SHG training has been conducted for all the SHGs in the project villages during the year. But all these training have been conducted in village itself, so expenses are not incurred. Also major focus was given to village envisioning process during the year. It has been decided to prepare village perspective plan through LFA method. The problem tree and objective tree are completed for 4 villages till the end of quarter. Project planning matrix will be prepared in next quarter. This process helps village people to understand their problems-cause –effect relationship. Once project planning matrix is prepared. Each village has their own vision of development and they can approach to different government department besides project intervention.

During the reporting period different awareness programmes were organized in all the villages for community mobilization .These programme helped to bring awareness among community on sanitation ,health ,hygiene and importance of natural resources.

### **d) Cluster level Melawas of CBOs**

One cluster level melava was organized to discuss progress of the project, difficulties and challenges at Kachner Tanda no 4.Participation of youths was encouraging in the melava.

### **e) Workshop with GOs and CBOs**

Activities related to village envisioning have given main focus during the year. matrix has been prepared by organizing two day workshop of selected villagers at Aurangabad

and Paithan. Different government department were involved in preparation matrix. This process has helped relationship. Each village has their own vision of development and they can approach to different government department besides project interventions Village (Vision 2020).

### **7. Capacity Building Agriculture and Livestock Farming**

Training and awareness camp of livestock owners is completed for all the villages. During the training programme discussion was held on proper way of feeding the animal, quantity and type of fodder requirement for different animal, fodder treatment etc. livestock camp for livestock care and awareness was organized for all the villages.

It was planned to organize exposure visit of farmers for improved agricultural technology. Exposure visit of interested farmers was conducted to dairy farm and agricultural research centre. Dairy activity is not prominent in the project villages. However after watershed work fodder is available for cattle and also there is huge demand for milk in the nearby towns. Considering the above points VDC has decided to promote dairy activity. So the exposure was conducted to motivate farmers for taking dairy activity. During the exposure farmers have visited village called Savargaontal (District-Ahmednagar) where dairy activity is successfully done. There was sharing of experiences among each other. After the exposure dairy farmers of project villages have decided to start dairy activity.

### **8. Capacity Building Women Empowerment**

Expected output of these activities is quality of life enhancement and activities related to drinking water health, sanitation etc has been taken up. After several meeting and discussion with women few activities are identified. These are Hot water chullha, bathroom, and individual toilet. Till the end of the reporting period 77 hot water chullha are installed in Kachner Tanda no 6 and Shivgad. This activity helped for saving in the additional fuel requirement for getting hot water. During the last year demonstration of smokeless hot water chullha (Yashwanti Chullha) has been carried out in all the villages. Landless poor households are selected for demonstration. Yashwanti chullha helped to reduce smoke in cooking area. It also helped to reduce fuel requirement due to higher efficiency. There is demand from all the women to this chullha.

Also work of bathroom construction is under progress in Kachner Tanda no 2. WOTR head office has given sanction to Sanyukta Mahila samitti (SMS) and released Rs.248000/- to SMS account. Villagers have to contribute Rs.149500/- according to wealth ranking category. This activity will be completed by end of March 2010. Drinking water project is completed at village Wanjarwadi and in progress at Kachner Tanda no 2 with support from another agency called as AROGAMME.

## IMPACTS OF WORK DONE

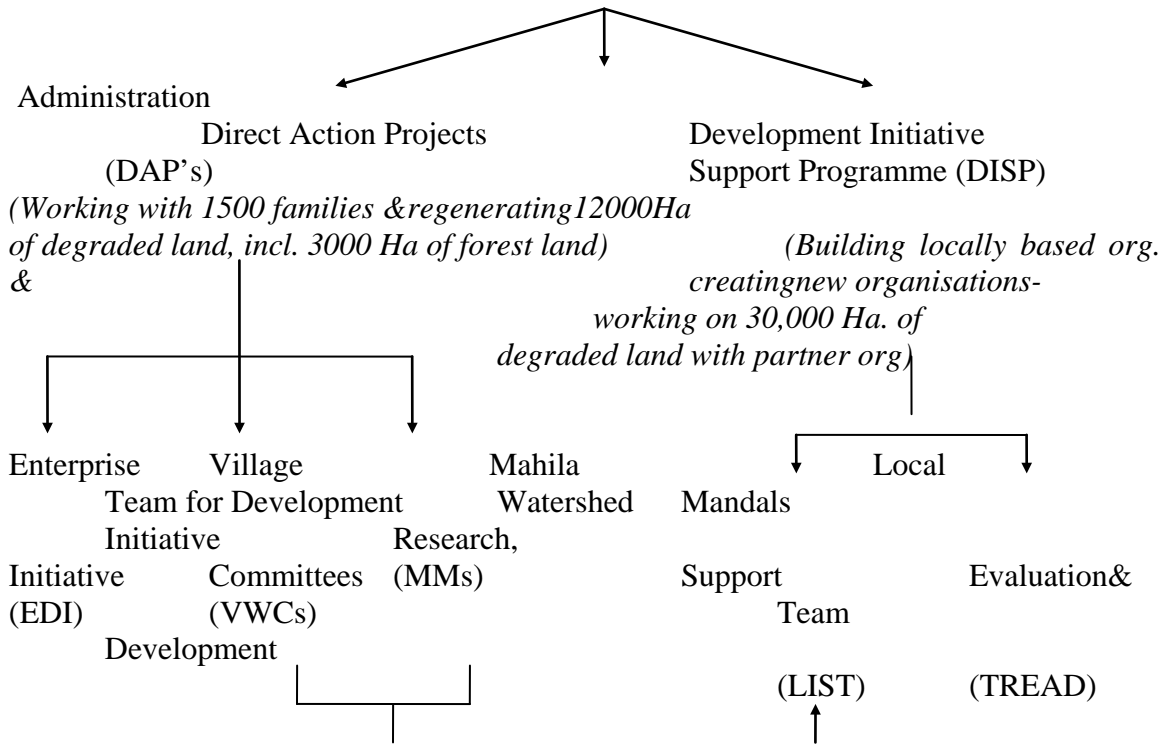
- **Increase in water table** -Impacts of soil and water conservation work has been seen during the reporting. Though the rainfall is less than the average, Water table has been increased in the treated area. Also insitu moisture conservation helped to good crop growth.
- **Diversification of cropping pattern-** Different project activity helped to diversify cropping pattern. Around 25 ha of rainfed land is converted into irrigated land and cropping pattern has been changed from cereal mono crop to agri horticultural crops. Fruit plants such as mango, sweet lime, sapota; custard apple etc has been planted in 25ha.
- **Increase in agricultural production:** Agricultural production has gone up in treated area due to insitu soil and water conservation work. Though the rainfall is less than the average, water table has been increased in the treated area. From the data collected, it has been observed that agricultural production has been increased by around 20-25 % in rainfed area. Also 35-37 ha area has been come under double cropping due increased water availability.
- **Diversification of cropping pattern:** Due to SWC measures undertaken there was change in land use. Around 11 ha of rainfed land is converted into irrigated land. Also cropping pattern has been changed from *cereal mono crop* to *agri- horticultural* crops. Fruit plants such as *mango, sweet lime, sapota; custard apple* etc has been planted in 25 ha. land

## II. BOLTEK WATERSHED PROJECT UNDER IGWDP (GRASP)<sup>27</sup>

### Institutional Arrangements

GRASP with its professionalism mode promote sustainable system while combining its professional competence with social commitment

#### GRASP



- The DAP alleviates poverty while protecting the environment in an integrated watershed framework with an emphasis on holistic development of the region. Working with 1500 families and regenerating 12000 Ha of degraded land (which includes 3000 Ha of forest land).
- VWCs focus on building local capacities to maintain the resources created and work on forward linkages.
- MMs initiated to increase direct participation of women in economic and developmental programme.
- Community banking system- to provide micro-credit to rural poor and a consecutive step towards empowerment of women as a cohesive force. Forest Protection Committees (FPCs) have been formed to save the resources by controlling biotic interference under Joint Forest Management (JFM) act.

<sup>27</sup> Extracted from "Boltek Watershed- A Collective Effort" published by Development Support Team of Grass Roots Action for Social Participation (GRASP), Aurangabad in 2002.



- The DISP anchors the philosophy of building locally based organisations and creating new organisations to replicate the work in hinterland.
- TREAD develops research strategy, foster institutional linkages through networking and advocate policy level decisions. It undertakes potential related studies and prepares regional strategic plans for optimum utilisation of natural resources.
- The technology is demystified and local educated youth trained to become 'barefoot technicians' who act as link between the formal skills of science and local community.
- The key strategy is using watershed development as a tool to mobilise community participation; building leadership and entrepreneurial skills.
- The idea behind its inception is also to strengthen the planning, coordination and monitoring of the local administration and significantly expand the involvement of the beneficiaries and introduce an integrated approach for planning and implementation of multi-sectoral activities.

### **Approach**

All through the past, India has followed mostly a *delivery approach* to rural development. This has led to such synonyms as *beneficiaries & managers*. A need was felt at GRASP to be more of a *Partner* rather than a regulatory or, relief oriented disbursement functioning. The delivery approach has by and large not worked, basically because the community has no control over the delivery agents. Those who may be somewhat motivated and self regulated, such as the managers of the delivery system, are either too far away from the community to learn about the latter's problems, or too dependent on the delivery agents to effectively regulate them. In any case, the most critical tasks in development are catalyzing change and expanding the capabilities, than the typical extension worker brings.

The development agency in such a scenario is an enabling rather than a delivery agency. It neither directs, not delivers, mainly facilitates. It may demonstrate new ideas, promote new approaches, mobilize the community, experiment jointly with the community, demystify concepts and technologies, mediate to bring about collaboration within and outside the community, and impart skills and foster conditions for reflection and learning.

GRASP has been initiated with this perspective. The idea of GRASP's Local Initiative Support Team (LIST) itself is inspired by the belief that capable and caring people should work at the grassroots helping the poor fight the menace of poverty. If education liberates, we felt that educated can and must help break the shackles that bind others; one could not possibly remain liberated in isolation. Now, many liberated and experienced persons, trained in different professions would like to work in villages for the upliftment of the underprivileged if given space, guidance and support. GRASP is created to enable such persons to work with rural communities. This will remain our guiding philosophy, while the approaches and mechanisms for grassroots work will evolve with experience.

Our agenda is to expand around well established projects and themes, enlarge and broad-base the pool of leadership in the organisation, and sharpen our approach as an enabling rather than a delivery organisation.

The idea behind its inception is also to strengthen the planning, co-ordination and monitoring of the local administration and significantly expand the involvement of the beneficiaries, and introduce an integrated approach for planning and implementation of multi-sectoral activities. The main objective is to contribute towards social empowerment through comprehensive area development approach. The key strategy is using integrated watershed development approach as a tool to mobilise community participation; building leadership and entrepreneurial skills. The technology is demystified and local educated youth trained to become the 'barefoot technicians' who act as link between the formal skills of science and local community.

### **Main features of GRASP**

- Our major emphasis is on eradicating poverty while protecting the environment.
- We facilitate community action projects to enhance the incomes of poor households while protecting the environment, in the rural areas through comprehensive planning and action thereof.
- We provide development support to grassroots level organisations (for broad basing the concept) which, though having strong base in the field, lacked the required infrastructure, organisational skills and capabilities to handle the technicalities of the development activities.
- We emphasise on developing research strategy, networking and henceforth advocating and influencing policy level decisions related to the issue of community resource management.

### **LOCATION AND CHARACTERISTICS OF THE WATERSHED**

The Boltek Watershed is typical of semi-arid area with moderate but erratic rainfall, undulating topography, poor soil, low irrigation potential and has the economy largely based on rainfed agriculture. The watershed covers 1345.73 hectares spread over six villages, viz., Boltek, Boltek Tanda, Chapaner Tanda, Chapaner, Shirjapur and Gudma of Kannad block, district Aurangabad is located between 75 35' to 75 40' E longitude and 20 0' to 20 5' N latitude, 64 km from Aurangabad. It is between 594 mts. to 823 meters above mean sea level (MSL). The area drains towards southwards in Shivna river which is a tributary Godavari Basin. Boltek watershed is the highest point of Godavari Basin. The average annual rainfall is 600 mm, of which 82% is received from southwest monsoon.

**Table: Land type and area distribution**

<b>LAND TYPE AND ITS AREA (Figures in hectare):</b>		
1. Revenue land - 2.50	4. Irrigated land - 35.42	7. Non treatable - 33.88
2. Govt. forest - 405.00	5. Unirrigated land - 626.27	
3. Submerged land - 57.58	6. Culturable waste - 185.08	

The unhealthy soil, not so proper crop planning, absence of regulated irrigation and continuation of backward technology had rendered the area low in agricultural productivity. Which result to widespread poverty, leading eventually to migration. The effects of environmental degradation were all too well noticeable. Activities of man like deforestation, unsuitable farming techniques, livestock over-grazing and faulty land use led to massive resource depletion. These were leading to other environmental problems like soil erosion, and water scarcity.

**TABLE: ANNUAL RAINFALL IN BOLTEK WATERSHED**

Year	1995	1996	1997	1998	1999	2000
Annual Rain - fall in mm	322.50	396.50	874.10	840.00	553.40	735.00

The villagers are tribals who were migrated from elsewhere in search of livelihood, nearly six decades back. The forest department had given them the land for agriculture. Their economy is mainly based on rainfed agriculture, the activity being limited to mono-cropping during the monsoons, characterized by an absence of value-addition facilities. Migration is a common phenomenon for livelihood. Most of the families used to migrate for eight months as sugarcane cutting labour, as a result of widespread poverty and low educational status. The people in the watershed have low income levels due to low productivity of land and water resources and limited employment opportunities in agriculture and allied sectors of economy.

## **APPROACHES USED AND THEIR IMPACTS**

### **▪ Gender sensitisation as a point of intervention**

GRASP initiated saving & credit groups with the view to provide micro credit for Boltek women based on their local savings, thereby improving their livelihood. Imbibing a spirit of formation of group and self help technology tie-up were considered the first step towards women empowerment. Today, 03 groups are functioning in the project area with nearly 1.0 lac rupees of savings, entirely from their own meagre resources. For consecutive two years, the groups have succeeded in taking up nursery activities as income generating programme. The pool grows by providing immediate soft loans to the needy. These groups have been highly successful in making a breakthrough in socio-economical factors. These groups are presently enhancing their access to credit and managing it to meet their crucial demands. The groups have also started thinking to

provide agricultural inputs in terms of seeds and fertilisers at the time of sowing, to the farmers.

The common meetings, sharing of experiences between the groups, continuous training programmes and exposure visits have encouraged the groups to grow vertically in making a move towards planning of Community Banking -- the consecutive step towards empowerment of women as a cohesive force.

These groups has also generated DWCRA funds (a Government of India's programme) and initiated long-term, sustainable income generation activity. Here GRASP's role initially was towards promotion, which is evolving into Institutional Building through networking and strategic alliances with various grassroot organisations in the said region.

#### A CASE STUDY OF A WOMAN AT BOLTEK

**Name** : Mrs. Sakhubai Karbhari More  
**Age** : 55 yrs  
**Occupation** : Housewife, Agriculture  
**Family background** : Two sons and two daughters, all married, total 8 members.  
**Position held in IGWDP** : President, Village Watershed Committee.

#### **a] How was the family life before IGWDP ?**

Routine was the household work, like fetching of water from a distance of about 2 Km, preparation of food and agriculture. The agriculture land of 10 acres (rainfed) out of which mere 2-3 acres land was under cultivation with major crop as Bajra and very little livestock. The yield from agriculture was merely suffice for home consumption .

#### **b] Do you see any difference since IGWDP programme started implementing?**

The programme started in 1994 when GRASP perons came into our village, my son Atmaram was appointed as village level worker taking into consideration that he is educated, hardworker and he belongs to tribal community as GRASP's emphasis was on upliftment of poor tribals. This acted as one source of income to our family. As I gained still more developmental clarity specifically agriculture development I approached to the bank for loan for a well and the work is about to complete with the receipt of next instalment. This way I can bring maximum possible land under irrigated cultivation, which will largely make positive impact on gross annual income of family. Similarly the activities like Nursery, Women's Saving Groups, DWCRA etc. contributed a lot in income generation and entrepreneurship development

#### **c] How come you become the President of VWC?**

Since GRASP entered the village they found myself the only person who came forward and understood the significance which later I could disseminate. The villagers respect me also due to my involvement in spiritual acts. The nature tribal always tried to keep a distance from the GRASP people who for them were new

and being a only literate also carried great importance. Considering all these factors tribal community proposed her name unanimously to lead the VWC.

**d] Now, what is your impression regarding the ongoing developmental activities?**

Our livelihood mainly was dependent on sugarcane cutting, forest products and agriculture at very small extent.

Now the villagers could earn good wages regularly, adding to agricultural income.

People migrated for sugarcane cutting which affected their stability, health and education.

Presently as IGWDP started the scenario is completely different, people stopped migrating living as one unit which I think is a major achievement in itself and started giving inputs in their lands, their children can be seen in the school.

There is school but classes were never held as there were no children who can attend those.

As above said due to the families stabled and the amount of awareness generated now our children regularly attend the school.

Even if tribals possessed bullocks, carts and other agri related equipments, most of their lands remained fallow and very small part cultivated , say around 25 paise from a rupee.

Through the process of development people were exposed to latest agriculture practices and as migration phenomenon almost stopped land under cultivation increased, people are going in for multi cropping and microirrigation.

Villagers never took care of their clothes, cleanliness, never knew bath soap and rarely used footwear. Today I can see them dressed with clean clothes, wearing chappals or shoes, buying soaps for cleanliness of body and the clothes. In brief living standard is considerably improved.

There was no proper approach road to the village and within village also. We unitedly through Shramdan prepared the road of one Km from the village we have to take more efforts on its development. Today Shramdan has become a part of routine activity

Above all, through Shramadan on fields and regular meetings, villagers got confidence of achieving anything when are united, and the sense of ownership.

▪ **Integrated watershed development approach as a tool to empower community**

GRASP along with Watershed Organisation Trust “WOTR”, NABARD, KfW and GtZ (under Indo-German Watershed Development Programme) initiated integrated watershed development programme, “to improve physical quality of life of the people by increasing their earning capacity and to regenerate the ecology by increasing vegetative cover for drought-proofing”. The idea was to strengthen the resource base for increasing the productivity and stabilise farm incomes, increasing availability of bio-mass for

consumption and market (food, fodder, firewood, fibre and manure), and ensuring year-round availability of employment opportunities and economic avenues, particularly for women.

**PROPOSED LAND USE TYPE AND ITS AREA (Figures in hectare)**

1. Afforestation	- 405.00	2. Crop Cultivation	- 426.77	3. Agroforestry	- 240.00
4. Horticulture	- 180.00	5. Submergence	- 57.58	6. Non-trteatable	- 36.38

The watershed area is to be facilitated under various treatments like continuous contour trenching (CCT), and farm bunding (FB). Also area treated under afforestation (AF), Agro-forestry and dry land horticulture. While the drainage line treatment is done through Check weirs, gabions, loose boulder structures (LBs).

**Table: Physical achievements of the project**

Area Treatment	WAT and Plantation	Farm Bunding	Agro-forestry	Horticultr e	Grass Developme nt
<b>Units completed</b>	245 ha	810 ha	100 ha	60 ha	30 ha
<b>Drainage Treatment</b>	Gully Plugs	Loose Boulders	Gabion	Repair of Nala bunds	Check Weirs
<b>Units completed</b>	1163 cum	169 no.	14 no.	1 no.	7 no.

The Aga Khan Foundation (India), New Delhi contributed for 3 check weirs as a need in water conservation under MERC project for Central-West India. Our role in the development programme is to organise people's institutions in the proposed area and facilitate and train them to involve in various stages of development viz. planning, implementation and management.

**Table: Average family income in percent as compared to the reference year (1993)**

Year	1993	1994	1995	1996	1997	1998	1999	2000
<b>% Income</b>	100	175	380	600	890	660	870	N.A.

The analysis of above table reveals that, there is noticeable rise in the income of the families i.e. by nine times in 1997 to that of in 1993 through integrated watershed development activities. In 1998 it is reported that there was a lag in the implementation activities, which is also reflected in the table showing employment generated.

**Table: Yearly employment generated in person-days**



Year	1994	1995	1996	1997	1998	1999	2000
Person-days	816	5,712	9,769	16,879	11,530	12,330	18,862

The data reveals that major work months in a year are May, June, July and December during pre-monsoon period and after *Kharif* season. The person-days corresponding to the project period, show an ascending trend.

#### ▪ Joint Forest Management

GRASP is the first NGO under the Indo-German Watershed programme to participate villagers in forest treatment and management. Forest Protection Committee is formed at the watershed level and forest area of 315 hectares is treated. Though the government agrees principally and has drawn up government programme for the same, actual implementations have hundred hurdles. The Joint Forest Management (JFM) practice has taken shape only through continuous efforts and follow-up by villagers, FPC and GRASP. A proper technical report was prepared and treatment measures were formulated in a participatory mode.

#### ▪ Agriculture Support

Agriculture plays an important role in rural India. These downtrodden communities can find their only source of livelihood through improved agriculture. Agriculture suffered a lot in the drought years and the after effects because of migration were devastating, nearly 70% of the lands lay fallow. Now since the community has a reason to stay back for their livelihood, agriculture has again taken turn. GRASP, from last three years, has initiated community managed crop schemes for reviving agriculture for better future.

#### ▪ Access to Credit

Credit is usually the single most important missing link in the case of income generation programme for the poor. There also usually exist credit links with either input suppliers, output purchasers or plain moneylenders, though the effective rate of interest paid by the producer is very high. Under such conditions, access to low interest credit goes a long way towards increasing the income of the self employed producer, in addition to freeing him from the psychological burden of being dependent on the money lender under onerous terms. In the context of proposed programme, the farmers can purchase seeds and fertilisers at low cost and on time, can stock up the agricultural produce, waiting for the favourable price and refrain from making distress sales. Access to credit also frees him from being dependent on the exploitative traders who supply him input on credit. The entire set-up requires a flexible line of credit, with peaks and troughs in the amount drawn, depending on the time of the year.

GRASP has started providing credit to villagers to support them in agriculture. We initiated by providing them interest free loan for seeds and fertilisers purchase. The

villagers return the loan after selling the agriculture produce in the market i.e. in the month of December/ January. As a need from our rural partners GRASP undertook activities for promoting and supporting agriculture in watershed projects. This activity is further extended within its network 'GRACE'. GRASP has mobilised resources for the villages in GRACE for agriculture credit, irrigation wells, pipeline, water harvesting structures, micro-irrigation, dairy, etc.

GRASP succeeded in convincing and establishing institutional set-up for credit facilities through self help groups by first demonstrating in its project area and then with GRACE partners. Credit support to village SHGs was also mobilised from banks. Credit support valuating Rs. 19,42,000 has been mobilised in last three years. Watershed Organisation Trust, Ahmednagar, the nodal NGO in IGWDP is now supporting its partners.

#### ▪ Training

During the process we identified enthusiastic local youths and second line personnel from different NGO's working in the region and planned for their training in natural resource management with watershed principles with the intention that they will facilitate the watershed works. Continuous training programmes were organised to build the capacity of the village mobilisers who act between the formal skill of science and village community. So far nearly 50 barefoot technicians are trained and are working in their respective watersheds. These are on-job training programmes, conducted where watershed development works are in the progress. The idea is to directly involve the trainees in the programme and their direct involvement with the villagers would help them to build a strong base.

We envisage training as a major component as the people have to be upgraded in knowledge, skill and awareness. The approach must aim at self-sustained development, helping people become more effective technology developers themselves. This way, the people are encouraged to generate and evaluate indigenous technologies and to choose, test and adopt external technologies on the basis of their own knowledge and value systems.

To sustain and to replicate the natural regeneration programmes, resource persons are vital. They have to be trained as facilitators of the reversal process with sound skills in eco-development. It is better to have them as co-practitioner in the project. GRASP organised number of comprehensive training programmes for leadership development on planning methodology and implementation process of integrated watershed development for the objective to develop a "core team" or, "social carriers of the technology" to implement the watershed programme in their respective areas.

The training design was framed to provide comprehensive information about watershed development so as to generate skills to undertake planning and implementation of soil and water conservation works for community managed watershed development and the need to understand the social values imbibing the technological processes.

Here the issue was discussed in three sectors:

- Development of appropriate techniques, which can be adopted in a specific socio-economic surroundings.
- Skill training in resource management techniques and related income generation activities.
- Motivation and awareness training, so that different development programmes can be aligned to support the villager's effort in resource development projects.

Three functions were attained by three activities:

- ⇒ Technology planning: to identify technological need, linkage and sources to match the target group and to provide extension support.
- ⇒ Technology modulation: to modify technology in the form of techniques, which can be adopted by the target group.
- ⇒ Technology transfer: to facilitate villagers through intensive practice and providing necessary tools and implements so that they gain competence and confidence in the use of new technologies in their own socio-economic surroundings.

- **Shramdan (people's contribution) to the Gramkosh (village fund)**

During implementation of any kind of programme, for enhancing the income or assets or even *ownership* of a community, we insist that a part of the investment be contributed by the partner, up front, usually in the form of labour. Since most project participants are from chronically deficit house holds and depend substantially on wage income, the mix of financing could be decided on the principle of assuring a subsistence earning from the work done for creating a livelihood stream. The most important is the feel of sense of ownership for the programme. Today, Shramdan (or People's contribution) has become a disciplinary practice within the local community. The village community has contributed a total of Rs. 612,901 for project works.

- **Social fencing**

The major reasons for the after effects of low rains in drought prone areas are deforestation, soil erosion and excess run-off. The complimenting measure for technical treatments for sustainability is social fencing for uncontrolled tree felling '*kurhadbandi*' and uncontrolled grazing '*charaibandi*'. After continuous efforts and exposure the villagers have agreed to maintain a discipline of social fencing. The village watershed committees and FPCs have taken up the responsibilities. The acceptance of social contract against cattle grazing in the plantations is the example of lateral relationships in the community in the context of ongoing projects.

### ▪ Wild Life

The watershed covers 405 hectares of forest area, which forms the major ridge part. The conservation treatments for 355 hectares have been completed, 255 hectares under IGWDP and 100 hectares by the forest department. Soil conservation treatments, grass development and social fencing have today enhanced vegetative cover and changed the scenario of the forest area, which has attracted the wildlife. In the last four years 35 wolves, 30 deers, few dozen eagles, hundreds of rabbits and thousands of different birds have made it their abode.

### ▪ Peoples organisations or Community-based Organizations (CBOs)

The emphasis is towards partnership approach for empowerment in the development process rather than a regulatory or, relief oriented disbursement functioning. For GRASP as an organisation, the most critical task are catalysing change and expanding the capabilities of the communities. Today, an appropriate organisational structure has been created at village level to carry out the programme. Technology is demystified and a number of local educated youths is trained to become the barefoot technicians, who are acting as a line between the formal skills of science and local community. The Village Watershed Committees (VWCs) are totally involved in the planning methodology and implementation process of the programme. The functioning of project and financial management is done by the VWC.

### ▪ Anti-alcoholism movement

One important aspect of social discipline is anti-alcoholism movement. The tribals have a culture of alcohol brewing and consumption. GRASP educated the women folk about the hazards of alcohol. The women organised under the *Mahila Mandal* leadership and took up anti alcoholism drive. Alcohol brewing has been stopped and alcohol drinking has been controlled to a large extent. This was possible only because the women organised themselves for a fight against social evil.

### ▪ Migration

The community is the poorest of poor and effected by successive drought years. They had to seek for their livelihood through temporary or permanent migration. The whole of the village migrated to distant places in Maharashtra and Gujarat around 500 km away. These migrations had severe effects on health, education and social structure of the community. Since the implementation, migration decreased drastically from 95% to 5% and some of the families who had migrated permanently have started returning to the village.

**Table: Number of families migrating every year**

Year	1993	1994	1995	1996	1997	1998	1999
Number of families	74	26	18	12	4	1	1

The following case study reveals that the villagers migrate for subsistence and not for income. They were left with no choices but to migrate, still they have not broken their ties with their native village, Boltek, and therefore despite of some many hardships and problems due to migration they return back by May or June. The agriculture is driven by the evil market forces and they were as good as bankrupts because the unsociable practices.

### **A case study on migration**

Name of the village : Boltek and Boltek Tanda  
 No. of households : 56(31+25)  
 Population : 550  
 Average family size : 9.50  
 Occupation : Agriculture, Farm labour, Watershed workers.

#### **a) Reasons for migration**

It becomes very important to have a look on villages' socio-economic condition at the time of GRASP's intervention.

The people of Boltek and Boltek Tanda are mainly of Bhill and Banjara community respectively, both tribals. Tribals have a history of wandering in search of livelihood. The people of the area mainly migrated for sugarcane cutting to the districts of western Maharashtra, a sugarcane belt of the state and Gujarat as well. This is a temporary kind of migration, predominantly from Oct - June. The low income in agriculture which led to migration was due to lack of resources, dependency on rains and knowledge. In Maharashtra and adjoining part of Gujrat has suitable agroclimatic condition for sugarcane cultivation and it is strongly supported by co-operative movement viz-a-viz. The policies of fast growing sugar industries promote the cultivation of this crop in that farmers have been assured of net returns. Under these conditions demand for sugarcane cutters has increased.

Sugarcane cutters have been made sure that they would get reasonable wage rates. Apart from the surety of wages the landlord arranges for food, their cattles get free grazing land wherever and whenever they move with. In present days facilities being provided are undergoing improvements e.g. taking care of their children etc. The earnings during the season were sufficient to cultivate Bajra and other household needs of the family at least for next 3 months. The needs for rest of the period which also includes marriages like functions demanding extra monetary inputs were being satisfied by the money lenders.

#### **b) What all are the risks involved?**

People remained unaware of the changes taking place around e.g. they couldn't participate even in Panchayat elections, as they remained absent in the village during the period. They always remained cornered from the main stream and unfabricated society existed. As they move taking along their children who remained deprived of education. From their health point of view no proper

sanitation methods followed, their perspective towards diseases was more of superstitious kind.

As they arrive on the onset of the monsoon (June) many a times they could not cultivate Bajra which resulted in fallow land. As the earnings can fulfill their regular needs for max. 3 months for rest of the period they had to rely upon the moneylenders who again were ready to exploit in next season. It became inevitable for people to work for them. This way people were entangled in an evil cycle and became almost bonded.

In very few cases cultivation was possible, though the land was cultivated they could hardly get single crop like Bajra thinking of second crop was just impossible. In case of Bajra, it was unaffordable for them to apply necessary fertilizers, pesticides and do weeding which resulted in low yield.

Similarly, as they migrate taking cattles with them it restricted livestock development at managing them was difficult.

For process sugarcane cutting requires much hard work as against the wages they used get. Involving in such activities means making themselves almost like a bull but with two legs.

**c] Since the percentage of migration is reduced, what are the reasons?**

Four years back i.e. in 1994 GRASP adapted the village under IGWDP, the measures included were surveys, digging trenches, nala bunding, afforestation etc. which labour intensive work. The returns were quite suffice staying in their own villages. This employment generation went on increasing every year with time to time increase in wage rates solved the problem of livelihood generation from elsewhere.

By staying back parents when on fields could think of schooling their children and awareness regarding cleanliness, education and other related issues brought them in mainstream.

Increased awareness regarding agricultural practices and the attention they could pay towards their lands brought about dramatic improvements in their per capita income and living style.

Through watershed different schemes added into their annual income and employment identifying and focusing different groups e.g. DWACRA, Nursery etc.

By not going for sugarcane cutting and holding the assets in their village itself families found stability, started living as one united community with others, gained confidence and identity as an individual.

These were the responsible factors determining the rate of migration.



## ▪ Complementary efforts

### *Promotion of Micro-Irrigation Systems*

By forging active collaboration between government organisations, resource institutions like International Development Enterprises (IDE) and other NGO's working for the same cause, GRASP is trying to facilitate the process of mutual learning and mutual sharing.

International Development Enterprises (IDE), a non-governmental organisation is promoting micro-irrigation systems in a semi-arid zone of West Central India and Himachal Pradesh. IDE's mission is to improve the social, economic and environmental conditions of the poorest of the poor by developing and marketing affordable technology that can be manufactured and marketed under local conditions. The follow-up strategy is to develop grassroots linkages with efficient marketing system.

The types of affordable micro-irrigation systems developed are as follows:

- Bucket Kit
- Drum Kit
- Micro sprinkler kit
- Overhead sprinkler kit
- Customised micro-tube system

One of the GRASP's experienced personnel was involved in social and economic impact study of IDE promoted micro-irrigation systems. Also he studied the technical and financial feasibility, project sustainability and replicability and its relation with other developmental efforts. The study showed a positive impact on the farmers lives also on the lives of women because of its micro-subsistence base.

GRASP has forged an active collaboration with the organisation for broad-basing the use of technology. We together, along with farmers chalked out a plan of action to implement the schemes in a much organised fashion. 50 micro-irrigation systems have been installed in Boltek village. The responsibility was mainly taken up by women groups. These have been provided to the individuals as per the growing interest towards agricultural development. The systems have been provided to them on loan basis. The villagers have shown great interest in utilising the technology. The promotion of micro-irrigation system provides direct benefit to the community in terms of their income and nutritional intake. Farmers are going to cultivate vegetables on their land.

With the interest to build linkages between the NGO's and resource institutions and also for making policy flexible towards grassroots development, GRASP initiated the process while developing dialogues with IDE and various other institutions for broad basing the use of technology.

### *Water Harvesting Structures and NADEP*

After the noticeable work in environmental resource management especially in soil conservation the time has come to have similar focus on water conservation. Since the

soil, however well endowed it may be, is incapable of any biotic production in the absence of moisture, the management of water lies at the very heart of land management. The land suffers basically from two major ailments - denudation and erosion, which results in the loss of the topsoil through the action of water and wind. Therefore, there is no doubt that lands subject to erosion constitute the biggest threat. For not only do such lands suffer an increasing loss of productivity because of the progressive loss of the fertile top-soil but they also contribute to the loss of a great deal of water by way of excessive surface run-off along denuded slopes. This run-off, loaded as it is with soil also causes a great deal of damage by contributing to the causation of floods and the premature siltation of riverbeds. With these scientific treatment of upper ridges is a must and soil conservation is a prerequisite to development.

The need is to incorporate Water Conservation Structures complimenting to Soil Conservation Programme and Software Components of Watershed programme, to provide a holistic approach. Water conservation for ground water downstream (which is the country's major irrigation infrastructure today), its loss is a major cause of droughts. As in the case of all scarce resources, the management of water demands that special attention should be paid firstly, to its conservation to the maximum possible extent and secondly - in the present context - to its optimum utilisation for agricultural production.

IGWDP in support of this incorporates the water conservation practices that are still more strengthened with the support from **Aga Khan Foundation (I), New Delhi**. For tapping the vital natural resource three WHS have been constructed benefiting hectares of agriculture land through well recharge. As a result of watershed development and recent emphasis on water harvesting there is increase in number of wells from three to five. Also the practice resulted in bringing more and more area under cultivation with new crop varieties. The drinking water scheme of the village falls in the command area of one of these structures which will help a lot in assuring the availability of water in longer run. Similar kind of complementary effort has been tried in many watersheds facilitated by GRACE partners.

Viewing that chemical fertilisers have posed threat to environment, awareness regarding the organic manuring needs to be given at this stage so as to create more positive impact and enhance the productivity. The NADEP technology with traditionally proven principles and new effective technique will save the further degradation of environment. The Aga Khan Foundation has supported the NADEP promotion, which has been completed in the fields of our second partner organisation VJVM in Nanded district with wide social acceptance. AKF(I) has also supported a study to document organic farming practices and bio-fertilisers.

### ***Non-conventional energy resource for income generation***

Solar energy as a non-conventional energy source is available in ample. GRASP in collaboration with Maharashtra Energy Development Agency (MEDA), a government agency to promote use of non-conventional energy sources, has taken up a venture on experimental basis for income generation. Two 'STILL' units for production of distilled

water using solar energy have been installed in Boltek. We are in the process to build-up marketing tie-up with educational institutes, hospitals, industries etc. for distilled water use.

### ***PROJECT IMPACTS AT A GLANCE***

A comparative analysis between before and after Watershed Project implementation is depicted in the table below.<sup>28</sup>

<b><i>Pre-Project Scenario</i></b>	<b><i>Post Implementation</i></b>
<p><b>1. Land and Soil</b></p> <ul style="list-style-type: none"> <li>• High erosion. Status 'e4'</li> <li>• Low fertility with high lime and negligible organic content, Low moisture content with poor water retention capacity</li> <li>• Low productivity, 4.4 Q/ha of Bajra</li> <li>• Land value around Rs. 10,000/- per ha.</li> <li>• Poor land management system</li> <li>• 70% fallow land</li> <li>• 90% of cultivable land under mono crop</li> <li>• 5% of total cultivable land was irrigated</li> <li>• No treatment on crop land</li> </ul> <p><b>6</b></p>	<p><b>1. Land and Soil</b></p> <ul style="list-style-type: none"> <li>• Erosion controlled. Status 'e1'</li> <li>• Increased fertility with reduced lime and enhanced organic content, Increased moisture content with improved water retention capacity</li> <li>• Enhanced productivity, 10.2 Q/ha of Bajra</li> <li>• Land value around Rs. 75,000/-per ha.</li> <li>• Improved land management system</li> <li>• 5% fallow land</li> <li>• 30% of cultivable land under mono crop</li> <li>• 15% of total cultivable land was irrigated</li> <li>• Improved varieties and new crops introduced (Cotton, Vegetable, Horticulture)</li> <li>• Farm bunding – 810 ha.</li> </ul>
<p><b>2. Water</b></p> <ul style="list-style-type: none"> <li>• Drinking water available for 8 months</li> <li>• Water fetched from 5 km for 4 months</li> <li>• <b>Well irrigation for 5% area</b></li> <li>• Slightly alkaline</li> <li>• Low recharge</li> <li>• High run-off loss</li> <li>• Limited water harvesting</li> </ul>	<p><b>2. Water</b></p> <ul style="list-style-type: none"> <li>• Drinking water available for 12 months</li> <li>• (Due to conservation &amp; increased percolation)</li> <li>• Well irrigation for 15% area</li> <li>• Neutral</li> <li>• High recharge (t.c. – 45 days)</li> <li>• Controlled run-off</li> <li>• 12 water harvesting structures (LBS</li> </ul>

<sup>28</sup> From a Note prepared in May 2001 by GRASP

<b>Pre-Project Scenario</b>	<b>Post Implementation</b>
	– 174, GP – 1185 cum, GB – 14)
<b>3. Vegetation</b> <ul style="list-style-type: none"> <li>• Degraded and denuded forest</li> <li>• Scrub and thorny vegetation</li> <li>• Rainfed crops</li> <li>• Low availability of fodder grass</li> <li>• Dominance of spearhead grasses</li> <li>• Negligible number of farm trees</li> <li>• High dependence on forest fuel wood</li> <li>• Low availability of crop fodder</li> <li>• Lack of timber trees</li> </ul>	<b>3. Vegetation</b> <ul style="list-style-type: none"> <li>• Treated and developed forest</li> <li>• Plantation of 2,25,000 seedlings</li> <li>• Rainfed crops with protective irrigation</li> <li>• Surplus of fodder grass</li> <li>• Reduction of spearhead grasses</li> <li>• Increased number of farm trees</li> <li>• Dependence on agro waste fuel</li> <li>• High availability of crop fodder</li> <li>• Plantation and regeneration of timber trees</li> <li>• Ban on free grazing and tree felling</li> <li>• Horticulture &amp; agro-forestry – 200 ha</li> </ul>
<b>4. Animal Husbandry</b> <ul style="list-style-type: none"> <li>• Overgrazing due to high temporary in-migration from adjoining villages</li> <li>• Low productivity of milk and flesh</li> <li>• Mismanagement of livestock</li> <li>• Lack of work animals</li> <li>• Indigenous varieties</li> </ul>	<b>4. Animal Husbandry</b> <ul style="list-style-type: none"> <li>• Total ban on in-migration</li> <li>• Enhanced productivity of milk and flesh</li> <li>• Well managed livestock</li> <li>• Increased proportion of work animals</li> <li>• Introduction of cross-breed varieties</li> </ul>
<b>5. Human</b> <ul style="list-style-type: none"> <li>• Unemployment</li> <li>• Low awareness</li> <li>• Inaccessibility to basic amenities</li> <li>• Poor health and hygiene conditions</li> <li>• High illiteracy</li> <li>• Low credibility and poor relations</li> <li>• High seasonal migration, 95% families</li> <li>• Low and exploitative wage rate</li> <li>• Lack of skills</li> </ul>	<b>5. Human</b> <ul style="list-style-type: none"> <li>• Increased employment opportunities</li> <li>• High awareness</li> <li>• Accessibility to basic amenities</li> <li>• Improved health and hygiene conditions</li> <li>• Increased literacy</li> <li>• Enhanced credibility and relations</li> <li>• No migration</li> <li>• Socially justified wage rate</li> <li>• Acquired skills</li> </ul>
<b>6. Economic</b> <ul style="list-style-type: none"> <li>• Limited income sources</li> <li>• Lack of livelihood opportunities</li> <li>• Low agriculture returns</li> <li>• Exploitation by money lenders,</li> <li>• Inaccessibility to market</li> <li>• Contractual wood cutters</li> </ul>	<b>6. Economic</b> <ul style="list-style-type: none"> <li>• Widened income sources</li> <li>• More livelihood opportunities</li> <li>• Increased agriculture returns</li> <li>• Relieved from clutches of money-lenders</li> <li>• Accessibility to market</li> </ul>

<b>Pre-Project Scenario</b>	<b>Post Implementation</b>
<ul style="list-style-type: none"> <li>• Prevalence of middleman</li> <li>• Bonded contracts for sugarcane cutting</li> </ul>	<ul style="list-style-type: none"> <li>• Contractual system demolished</li> <li>• Extent of dependence decreased</li> <li>• Freed of bonded contracts</li> <li>• Wage employment generated worth Rs.38,00,000/-</li> </ul>
<b>7. Social</b> <ul style="list-style-type: none"> <li>• Poor and deprived tribals</li> <li>• Lack of infrastructure facilities (road, electricity, farm implements &amp; machinery)</li> <li>• Living habits (lack of nutritive food, torn and dirty clothing)</li> <li>• Habitat (Thatched huts)</li> <li>• High occurrence of addictions</li> <li>• Lack of social awareness</li> <li>• Practice of child marriage</li> <li>• Social indiscipline</li> <li>• Lack of ownership on resources</li> <li>• Social ostracisation</li> </ul>	<b>7. Social</b> <ul style="list-style-type: none"> <li>• Resource rich tribals</li> <li>• Improved infrastructure facilities (road, electricity, farm implements &amp; machinery)</li> <li>• Living habits improved; intake of nutritive food, reasonable clothing</li> <li>• Improved housing</li> <li>• Complete abolition of alcoholism</li> <li>• Socially aware and empowered</li> <li>• Control over child marriage practice</li> <li>• Social discipline</li> <li>• Legitimate ownership of resources</li> <li>• Social acceptance</li> <li>• Gender Development</li> <li>• Promotion and establishment of SHGs</li> </ul>
<b>8. Others</b>	<b>8. Others</b> <ul style="list-style-type: none"> <li>• Agri – promotion loan</li> <li>• Micro- Irrigation Kit</li> <li>• NADEP</li> <li>• Non-formal Education</li> <li>• DWACRA</li> <li>• Thresher</li> <li>• Dairy development</li> </ul>

### **III. KADAVANCHI WATERSHED (MSSM AND KVK)**

Marathwada Sheti Sahayya Mandal (MSSM), Jalna, Krishi Vigyan Kendra, Jalna sponsored by Indian Council of Agricultural Research (ICAR) New Delhi and established by MSSM, a non-government voluntary organisation, initiated extension activities from 1993 in small village called Kadwanchi, in Jalna tehsil in Jalna district of Maharashtra.

#### **LOCATION AND DEMOGRAPHIC DETAILS**

Kadwanchi village, situated in Jalna Tahsil is 18 km away from Jalna city, having a population of 1,954 and 1,191 ha of cultivable land. The soils are shallow (5 -25 cm) and undulating and rainfall ranges from 220-1000 mm. Kadwanchi watershed consists of three villages namely Kadwanchi, Waghru and Nandapur with area 1607.64, 28.40 and 252.03 hectares respectively. Kadwanchi watershed is situated between latitude 19°53' N and longitude 76°00' E. Information about Kadwanchi watershed is given in Tables 1 to 4.

**Table 1: General description**

Name of the Watershed	Kadwanchi
Latitude	18° 53' N
Longitude	78° 00' E
Villages Covered	Kadwanchi, Nandapur and Waghru
Taluka & District	Jalna
Major drainage system of watershed	River Purna (upper)
Watershed identification code	GP-33 (as per GSDA classification) <sup>29</sup>
Highest elevation In the Watershed	600.0m MSL
Lowest elevation in the watershed	520.0m MSL
Elevation difference	80.0 m
Length	18.50 Km
Breadth	4.15 Km
Shape Index	1.07
Circularity Index	3.41

**Table 2: Details of the area of the watershed**

Description	Village – Wise Area (ha)			
	Kadwanchi	Nandapur	Waghru	Total
<b>PUBLIC LAND</b>				
Government Forest Land	--	--	142.19	142.19
Other Revenue Land	78.22	8.25	7.14	94.61
Panchayat Land	3.83	0.00	0.00	3.83
Habitation	12.79	0.00	0.00	12.79
Institutional Land	57.21	0.00	0.00	57.21
Submergence area due to Tank/Ponds/Nalla bund	28.82	--	--	28.82
Sub Total	181.97	8.25	149.33	339.55
<b>PRIVATELY OWNED LAND</b>				
Irrigated cultivated area	167.89	0.00	0.25	174.14
Non-irrigated cultivated area	1153.65	11.64	28.52	1191.81
Culturable waste	68.63	8.51	69.89	147.03
Area not available for cultivation	35.50	0.00	0.04	35.54

<sup>29</sup> GSDA is the Groundwater Survey and Development Authority of the Government of Maharashtra, based in Pune.



Description	Village – Wise Area (ha)			
	Kadwanchi	Nandapur	Waghru	Total
Sub Total	1425.67	20.15	102.70	1548.52
<b>TOTAL GEOGRAPHIC AREA</b>	<b>1607.64</b>	<b>28.40</b>	<b>252.03</b>	<b>1888.07</b>

**Table 2.1: Demographic details (Reference Year: 1995-96)**

1	Total number of households/families	455
2	Average family size	5.8
3	Total number of landless households/families	47
4	Total number of single parent households	23
5	Total number of absentee landlords	76

**Table 2.2: Age-wise and Sex-wise population distribution**

Age group	0 - 5	6 - 14	15 - 40	41 - 60	61 above &	TOTAL
Males	235	394	458	174	79	1390
Females	241	372	373	191	72	1249
<b>TOTAL</b>	<b>526</b>	<b>766</b>	<b>831</b>	<b>365</b>	<b>151</b>	<b>2639</b>

**Table 2.3: Age-wise and Sex-wise Educational Distribution**

Education-Age	6-14		15-40		41-above		Total	
	Male	Female	Male	Female	Male	Female	Male	Female
Literate only	2	1	0	0	1	0	3	1
Primary	270	242	169	83	60	12	499	337
Secondary	38	13	114	14	10	0	162	27
Matriculate	0	0	15	1	2	0	17	1
Graduate & above	0	0	8	0	0	0	8	0
<b>Total</b>	<b>310</b>	<b>256</b>	<b>306</b>	<b>93</b>	<b>73</b>	<b>12</b>	<b>689</b>	<b>366</b>

**Table 2.4: Socio-economic distribution**

	Scheduled Caste	Scheduled Tribes	Others	TOTAL
Number of households	81	1	374	455
% to total	17.80	0.01	82.19	100

**Table 3: Land holding pattern**

Land Holding Class	Households		Land hold	
	Number	% to Total	Ha	% to Total
A. EXISTING GROSS HOLDING (ha)				
1 Land less	81	8.81	0.00	0.00

Land Holding Class		Households		Land hold	
		Number	% to Total	Ha	% to Total
2	0-1	59	12.97	42.36	2.74
3	1-2	124	27.25	179.58	11.60
4	3-4	130	26.57	350.72	22.85
5	4-8	67	14.73	335.88	21.98
6	More than 8	44	9.67	589.98	38.10
TOTAL		455	100	1548.52	100
Average gross land holding per household = 8.40 ha					
B. After converting irrigated area to equivalent dry land area (ha)					
1	Land less	74	18.29	0.00	0.00
2	0-1	49	10.77	54.15	2.14
3	1-2	104	22.88	147.70	9.27
4	3-4	108	23.74	301.27	18.90
5	4-8	70	15.36	391.63	24.57
6	More than 8	50	10.99	719.37	45.13
TOTAL		455	100	1594.12	100
Average land holding (dry land – cultivable) per household =8.50					

\*One hectare of irrigated area equivalent in the proportion of yield per hectare of major cereals under irrigation and rainfed conditions. (1 ha of perennially irrigated land = 4.0 ha and 1 ha of seasonally irrigated land = 2.5 ha of rainfed area).

#### Table 4: Climatic data

1. Nearest Metrological station or observation : Tahsil office, Jalna  
from which the data has been obtained
2. Distance from project site : 15 Km
3. Normal Rainfall of the area in a year (mm) : 685.4 mm
4. Highest Intensity/hr of Rainfall in the last 10 years (mm) : -
5. Highest Rainfall in 24 hours in the last 10 years (mm) : 180 mm on 5/10/1987

	Year	Total annual rain fall
1	1985	578.2 mm
2	1986	519.0 mm
3	1987	1023.0 mm
4	1988	1001.9 mm
5	1989	761.0 mm
6	1990	961.0 mm
7	1991	645.0 mm
8	1992	811.0 mm
9	1993	859.0 mm
10	1994	468.0 mm
11	1995	987.0 mm

12	1996	756.5 mm
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## INITIATION

As per the mandate given by ICAR, training of farmers, farm women, rural youth and extension functionaries, conducting Front Line Demonstrations (FLD) on oilseed, pulses and other crops, On Farm Trials (OFT), etc. were also conducted by KVK.

Initially, awareness camps and trainings of farmers and rural youth were conducted, for motivation. Self-help groups of women were established to initiate the process of women empowerment. Field visits, *kisan melas* (farmers' camps), *mahila melas* (women's camps) were organised to have constant touch with farmers to get specific feedback on problems of the village. During interaction with community it came to realization that water scarcity is the major constraint in getting expected yield of crops, to conserve soil and to maintain soil fertility.

Watershed development was the only way to bring out the village from this situation. This was the appropriate time to introduce watershed concepts amongst the farmers. Krishi Vigyan Kendra availed this opportunity and changed its way of working. Watershed development was given due importance. The village was taken under the Capacity Building Phase (CBP) supported by GTZ-WOTR and subsequently proposed for Full Implementation Phase (FIP) supported by KfW-NABARD, under Indo-German Watershed Development Programme.

## PARTICIPATORY PROJECT PLANNING

Net planning survey and drainage line survey were conducted to identify different land use patterns, land capability classification, number and stages of gullies, grade of drainage, farming practices. Socio-economic survey was undertaken as a benchmark to analyse the impact of watershed management on socio-economic aspects of villagers. In this survey income, entertainment facilities, migration, health & hygiene, kitchen sanitation, harmony among people, literacy and community-based facilities were taken into account.

The project was phased for five years with 'ridge to valley' approach. Total grant utilisation is Rs. 1,22,08,860/-, Rs. 6,466.55 per hectare and Rs. 4626.30 per head.

## SOIL AND WATER CONSERVATION

Soil and water conservation measures were undertaken in participatory and scientific manner to an extent possible considering the needs and views of the villagers. The physical



achievements and financial utilisation is mentioned in Table 5 & 6.

Soil conservation treatments: Soil conservation treatments were carried out with priority in order to conserve soil, enhance soil moisture, support vegetative growth, check sedimentation, control run-off velocity, strengthen ground water regime, create employment opportunities, etc. Major soil conservation treatments are trenching and bunding with vegetative cover.

1) *Trenching:* To treat the ridges, first all hilly within watershed area are treated with contour continuous trenches (CCT) followed by plantation, grass seed sowing on the soil mount. Water absorption trenches (WAT) were excavated between CCT. CCT & WAT control erosive velocity of water along with an opportunity to infiltrate the water resulting in recharging of ground water. Private wastelands were also treated with contour bunding and contour continuous trenches and dry horticulture. In all 157.71 hectares of area was treated under trenching.

2) *Bunding:* Land under crop cultivation (CC) was treated by proper peripheral and compartmental bunding, plantation, grass seeding on bunds and proper spillway installation to drain out excess run-off to natural drains. Compartmental and peripheral bunds serve the purpose of soil and water conservation equally and are socially acceptable. Agro-forestry, agro-horticulture was adopted along with crop cultivation in 1337.13 hectares.

Water conservation treatments: These treatments were implemented step by step from ridge to outlet of watershed drain in congruency with hydraulic conditions.

1) *Water velocity retarding structures:*

- Gully plugging: Gullies on hill-slopes were treated by constructing rubble gully plugs to control erosive velocity of water. Gully plugging was done also in fields emerging into gully formation. Numerous gully plugs upto 4250 m were implemented.
- Gabions: This structure is a compact enmeshed rubble gully plug constructed in gullies at those positions where ordinary rubble gully plug cannot sustain the force of flowing water, in order to retard the velocity of runoff.

2) *Water disposal treatments:*

- Ceramic pipe Bund spill way: To dispose excess run-off of field, ceramic pipes were installed under bund at proper height and location.
- Stone bund spill way: To dispose excess run-off from large area instead of ceramic pipes the stone spill ways were constructed at the proper location of fields.
- Water ways: To assure safe disposal of excess water of field, artificial water ways were excavated to connect with natural drains and subsequently either it was pitched by stone or covered with grasses.

3) *Water harvesting structures:*

- Earthen Nalla Bund: Wastelands liable to come under submergence are utilised for water harvesting by making earthen embankment across the waterways. These locations provide soil for embankment. To ensure safety to nalla bund by-pass spillway is created to join upstream and down stream of NB in U.C.R. masonry work.
- Masonry Gully Plug (MGP or check weir): Matured gullies with minimum grade and maximum depth were installed with masonry gully plug in order to retain and to harvest water. Retaining of water for longer duration recharges the wells in surrounding and increases ground water table. In all 10 MGPs are constructed.
- Check Dam: On large drains because of its high discharge, it is advisable to install cement concrete water harvesting structure, to sustain thrust of voluminous storage of water. It is particular to select the site with hard strata for strong foundation of check dam, or also pervious strata on upstream for recharge. Such nine check dams are constructed in the watershed area.
- Vegetation protection treatment: Cattle proofing trench surrounding the vast area of fallow land, waste land and pasture land, subsequently brought under plantation in a wake of interruption to grazing the field by cattles. The trenches were reinforced by planting those varieties of vegetation that are abhorrent to cattle such as prosopis, agave, parkin soniya, etc.

## SUMMARY OF TREATMENT MEASURES

The treatments given and physical and financial states are given in Tables 5 – 6 below.

**Table 5: Treatments and area covered**

	Treatments	Sanction Ha/No.	Work completed	Type of work done
<b>(A) Area treatment</b>				
01	Afforestation	157.71	157.71	Continuous contour trenching, seed sowing and plantation.
02	Agro forestry	251.00	211.00	Farm bunding. Dry horticulture plantation
03	Agro Horticulture	132.90	130.79	Farm bunding, horticulture plantation
04	Crop cultivation	1000.00	995.34	Farm bunding, grass seeding on bunds
<b>(B) Drainage line treatment</b>				
01	Gully plugs	3640 m	4250 Mt	Collecting the loose rubbles and constructed in designed form
02	Gabions	168 m	54m	Constructed by loose rubbles in mesh wire.
03	Masonry gully plug (check weir)	10 Nos	10 Nos	Constructed in UCR by mason

	Treatments	Sanction Ha/No.	Work completed	Type of work done
04	Check dams	09 Nos	09 Nos	Constructed in plumb concrete
05	Repair of N B	09 Nos	11 Nos	Constructed spill way by U.C.R.

**Table 6: Physical and financial status**

Treatments	Sanctioned		Achievements	
	Physical Units (Ha or Nos.)	Grant sanctioned (Rs)	Physical Units (Ha or Nos.)	Grant sanctioned (Rs)
<b>A. Area treatments</b>				
1. Afforestation	157.71	13,28,000	157.71	12,19,968
2. Agro forestry	251.00	13,74,700	211.00	9,07,694
3. Agro Horticulture	132.30	8,41,800	132.30	2,98,465
4. Crop cultivation	1000.00	40,15,000	1000.00	36,04,239
5. Supervision	8 %	5,23,000	--	3,89,071
<b>Sub Total (A)</b>		<b>80,82,500</b>		<b>64,19,438</b>
<b>B. Drainage line treatment</b>				
1. Gully plug	3640.00	5,62,480	4620.00	4,10,076
2. Gabionhs	168.00	1,29,629	54.00	36,374
3. Check weirs	10	4,89,210	10	9,09,603
4. Check dams	09	21,76,255	09	27,19,336
5. Repair of Nalla bunds	09	1,51,920	11	53,392
6. Supervision	8 %	3,07,103	--	78,273
<b>Sub Total (B)</b>		<b>39,16,597</b>		<b>42,07,052</b>
<b>TOTAL (A+B)</b>		<b>1,19,99,097</b>		<b>1,07,26,490</b>
<b>C. Project Management overheads</b>		15,99,600		15,82,370
<b>GRAND TOTAL (A+B+C)</b>		<b>1,35,98,697</b>		<b>1,22,08,860</b>

## IMPACT OF WATERSHED PROGRAMME

Impact of watershed programme was felt during second year of inception of programme in terms of change in land use planning by farmers, rise in water level as seen in wells because of soil conservation treatments. During later years of programme, impact was felt in terms of productivity and fertility of land, irrigation potential, adoption of new agricultural technologies regarding farming practices, irrigation, seed, fertilizers, marketing, group farming and farm machineries

Socio-economic conditions of villagers improved to the extent that they could purchase household facilities (Motorcycles from 4 to 57, TV sets from 02 to 136 & 25 new telephone connections) because of increase in their savings due to good agricultural production. Individual hygienic habits improved (Table 7).



**Table 7: Socio-economic change**

	Particulars after impact	Pre-development	Post-development
01	Two wheeler motorcycle	04	57
02	Jeeps	02	04
03	Matador/Tempo	Nil	02
04	Television	02	136
05	Phones	Nil	25
06	Latrines	Nil	64
07	Soak pits	Nil	14
08	Improved cooking stoves (Smokeless chulla)	Nil	30
09	Cooking Gas (LPG)	02	13
10	Flour mill	02	07
11	Boring machines (horizontal)	Nil	03
12	Electric pump sets	161	261

Change in land use is spelled by increase in area under cultivation to 111%, seasonally irrigated two crops to 897 ha, perennial irrigation to 190%, vegetables 240%, decrease in fallow lands by 58%, increase in use of farm implements and 294 micro-irrigation sets are in use (Table 8). In addition, 110 Vaibhav sickles are in use for farm practices and also 64 latrines, 14 soak pits, 30 smokeless chullas & 13 LPG connections were installed after social interventions through watershed activities.

**Table 8: Change in land use pattern**

	Particulars	Pre-development	Post-development
01	Under cultivated area	1365.95 ha	1517 ha
02	Fallow area	147.03 ha	62.03 ha
03	Under Two seasonal irrigated area	398 ha	897 ha
04	Under perennial irrigation	174.14 ha	330 ha
05	Under vegetable cultivation	107 ha	257 ha
06	Tractors	2 Nos	07 ha
07	Tractor operated seed drill	Nil	04 ha
08	Threshers	02 Nos	18 Nos
09	Power sprayers	21 Nos	151 Nos
10	Chaff cutters	Nil	07 Nos
11	Adjustable harrow	Nil	08 Nos
12	Vaibhav sickle	Nil	110 Nos
13	Sprinkler irrigation set	02	97 Nos
14	Drip irrigation set	07	197 Nos

Agriculture has shown a new avenue to the people. Area under coarse cereals reduced by half and new crops are introduced like horticulture, ginger, etc. The crop yield for pearl millet & grams is increased by 150% while area under cotton & wheat increased from

199 to 347 & 28 to 99 hectares respectively (Table 9). Area under horticulture increased from 3 to 198 hectares (Table 10).

**Table 9: Change in crop production and area**

	Name of the crop	Previous Status		Present Status	
		Area (ha)	Production in tons	Area (ha)	Production in tons
01	Pearl Millet	526.41	428.50	303.2	363.60
02	Black Gram	1.4	0.70	42	33.70
03	Green Gram	128.31	52.86	161	92.40
04	Cotton	199.47	125.27	347	242.90
05	Soarghum (R)	373.95	209.81	361	252.70
06	Wheat	27.70	28.59	99	118.80
07	Bengal gram	4.80	2.84	35	24.50
08	Ginger	Nil	Nil	02	25.00

**Table 10: Change in horticultural crops**

	Horticulture crops	Previous status (ha)	Present status (ha)
1	Grapes	3.00	62.00
2	Pomegranate	Nil	98.00
3	Aonla	Nil	11.00
4	Tamarind	Nil	17.00
5	Custard Apple	Nil	10.00

These improvements were supported due to strengthening of groundwater regime with water tables rising from 5.5 m to 10.97 m in post-monsoon period and from 1.06 to 3.35 m in summer season, respectively (Table 11).

**Table 11: Change in water table** (Location No.3, Well No.6 February May October)

	Year	Rainfall in mm	Location No.3, Well No.6		
			February	May	October
01	1997	501.50	2.63 M	1.06 M	5.50 M
02	1998	901.00	3.04 M	1.06 M	6.09 M
03	1999	582.00	2.43 M	1.09 M	4.09 M
04	2000	450.00	1.98 M	1.06 M	5.09 M
05	2001	686.00	6.09 M	3.04 M	10.67 M
06	2002	694.00	6.09 M	3.35 M	10.97 M

Savings & credit habits are well imbibed with the community and as of today 79 members are involved in SHGs. They have built their core incrementally and also participate in household decision making, are given due recognition from women folk (Table 12).

**Table 12: Savings and credit SHG of women**

	Name of the self help group	Total members in group	Total saving as on 30 <sup>th</sup> June 2001
01	Amrapali	10	9,300
02	Savitribai	10	10000
03	Maha Laxmi	09	6,255
04	Renuka	10	5625
05	Pragati	10	4100
06	Sant Mira	15	750
07	Jhansi Rani	15	900

There has also been an increase in livestock and fodder availability in the village (Tables 13 & 14).

**Table 13: Change in livestock**

	Name	Previous status	Present status
01	Cross breed cows	161	236
02	Indigenous cows	166	055
03	Work animals	401	299
04	Buffaloes	44	33
05	Sheep	228	212
06	Goats	29	23
07	Poultry	109	309

**Table 14: Change in fodder availability**

	Source	Pre-watershed		Post-watershed	
		Area (ha)	Total yearly production (T)	Area (ha)	Total yearly production (T)
01	From agricultural crops				
	a) Kharif	986.45	862.18	911.00	846.00
	b) Rabbi	256.81	122.32	386.00	237.00
02	From grazing land	142.19	NA	107.80	539.00

## SUCCESS STORIES IN KADWANCHI WATERSHED

### 1) Group farming and marketing of pomegranate and grapes

Due to soil and water conservation measures followed in the village, increase in water table was observed. Top soil was maintained thereby increasing the soil fertility level. Mean while the farmers were convinced by training and group discussions to adopt the concept of group farming in horticultural crops so that the water will be utilized effectively and with full potential.

As a result the farmers made different groups in pomegranate and grapes. At present there is 98 ha area of pomegranates covering 148 gardens. Similarly, 200 farmers brought under grape cultivation 62 ha of area. These farmers consist of small, marginal and

medium farmers. They adopt all improved package of practices for these crops as a group activity under the technical guidance of KVK scientists. Necessary trainings and interventions are being organized as per the requirement of the group. The farmers' sell their produce in distant markets thereby fetching higher rates than the local market. KVK provides necessary guidance and assistance to the group for marketing.

Kadwanchi village is now famous for grapes and pomegranate. As a result, most of the government schemes related to horticulture are implemented in this village. As well as the farmers from this village have a special identity in the government offices, banks and dealers and in the market.

### 1) Employment generation due to increased availability of water in the village

Before starting of watershed activity in Kadwanchi village it was noticed that most of the marginal farmers were working as labour with some progressive farmers of the village. Landless labourers were migrating towards big cities like Mumbai, Surat etc. for searching employment.

After completion of watershed, the change has been observed that most of the families migrated from the village again came back to their own village and now they are fully engaged in agricultural activities. They are getting potential work in the village. The same is true for marginal farmers who were previously working with progressive farmers of the village as a labourers and have now established their own grape and pomegranate gardens (see Table below for two such examples).

	Name of the farmer	Total holding land (hectares)	Horticulture crop	Area under crop (hectares)	Gross income (Rupees)
01	B A Jare	1.20	Grapes Pomegranate	0.60 0.50	1,50,000 60,000
02	C S Kshirsagar	1.40	Grapes Pomegranate	0.80 0.40	2,00,000 60,000

## Annexure 10: A BRIEF HISTORY OF BIKANER, RAJASTHAN STATE

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**Bikaner state** was founded in the 15th century and persisted until shortly after India's Independence in 1947. Earlier this region was known as **Jangladesh** which was a region of northern Rajasthan state in India. It included the present-day districts of Bikaner, Churu, Ganganagar, and Hanumangarh. It is bounded on the south by Marwar and Jaisalmer regions, on the east by Ajmer-Merwara region.

### Early history

Prior to middle 15th century rule, the region that is Bikaner was a barren wilderness called "Jangladesh". The territory forming the boundaries of Bikaner was ruled by Jat dynasty of Jats: The north-eastern and north-western Rajasthan, known by the name Jangala Desh since Mahabharata times, was inhabited by Jat clans ruled by their own chiefs and largely governed by their own customary law.<sup>[3]</sup> The chiefs enjoyed a large amount of autonomy, from their nominal overlord, the sultanate of Delhi.

The whole of the region was owned by six or seven Jat cantons namely Sihag, Punia, Godara, Saran, Beniwal, Johiya and Kaswan. Besides these cantons there were several sub-castes of Jats, simultaneously wrested from Rajput proprietors for instance Bagor, Kharipatta, Mohila or Mehila,<sup>[6]</sup> Bhukar, Bhadu, Chahar.<sup>[7]</sup> According to History of Bikaner State and by the scholars, the region was occupied by Jats with their seven territories. It is said about Jat territories that *Saat Patti Sattavan Majh* (means seven long and fifty-seven small territories).

### The rise of Rao Bika

About 1465 Rao Bika, a Rathor Rajput, and a junior son of Rao Jodha, king of Marwar, provoked by a stray comment by his father, left Marwar (Jodhpur) with a small contingent of Rathore warriors (500 soldier and 100 cavalymen) to create his own kingdom. He was accompanied by his uncle, Rawat Kandhal, who provided politico-strategic advice.

Encouraged by the mystic Karni Mata, who he had meet early in his travels he took advantage of the internal rivalries of the Jat clans so that by 1485 he was able to establish his own territory and build a small fort called Rati Ghati at the city which still bears his name. In 1488 he began the building of the city itself. In the beginning the neighboring Bhati chiefs were suspicious of the new growing power in their vicinity. Karni Mata, who had become the *kuladevi* of Rao Bika brought the rivalry between the Rathore & Bhaties to an end by inspiring Rao Shekha - the powerful Bhati chief of Pugal, to give the hand of his daughter in marriage to Rao Bika. This consolidated Rao Bika's power in the region and proved to be a milestone in the history of the state.

Upon Rao Jodha's death in 1488 Rao Bika stormed Mehrangarh Fort,<sup>[11]</sup> an event that was to lead to 200 years of intermittent wars between Marwar and Bikaner.

According to James Tod, the spot which Rao Bika selected for his capital was the birthright of a Nehra Jat, who would only concede it for this purpose on the condition that his name should be linked in perpetuity with its surrender. Naira, or Nera, was the name of the proprietor, which Bika added to his own, thus composing that of the future capital, Bikaner.

Remains of the original small fortress Rao Bika built can still be seen around the walled city, near Lakshminath ji temple. The royal family of Bikaner lived there, till Raja Rai Singh Ji built a new fort called “Chintamani” (now Junagarh) between 1589 to 1593 AD.

According to legend Bika consulted a holy man called Jamboji, who foretold that Bika's line would reign for 450 years. While Bika was pleased with this prediction, his uncle when he heard of the prediction thought a longer period of power should have been prophesied. He confronted the holy man while he was in a deep trance and roused him by thrusting burning incense under his nose.<sup>[13]</sup> Jamboji told him 'All right take 50 years more or less but of trial and tribulation'.<sup>[14]</sup>

Rao Bika died in 1504. His successors benefited from the weak rule of Suraj Mal of Marwar and the disruption caused by Babur's invasion of India to consolidate and extend their possessions<sup>[15]</sup> until by the 17th century all the Jat clans (including the powerful Godara clan) had accepted the suzerainty of the rulers of Bikaner.<sup>[16]</sup>

One of the most successful earlier rulers was Jait Singh (1526-39) until he was killed by the forces of Rao Maldev of Marwar. He was succeeded by his son Kalyan Mal (1539-71) who under pressure from the Marwar forces retreated to the Punjab where he joined with Sher Shah Suri who expelled the Mughal ruler Humayun in 1540. With Sher Shah Suri's support Kalyan Mal was able by 1545 to recover his lost territories from Rao Maldev.

### **The Mughal Era**

The return of Humayun to power meant that Bikaner due to its involvement with Sher Shah Suri came into conflict with the Mughals again. However Kalyan Mal by using all the advantages of the harsh desert environment around Bikaner was able to defeat any invading Mughal army.<sup>[17]</sup> The coming of Akbar to power saw the Mughal empire turn to diplomacy instead of force to bring the individual Rajput states into the empire. As a result Raja Rai Singh, the sixth ruler of Bikaner was among the first Rajput Chiefs to make an alliance with the Mughal Empire. As a result during the reign of the Mughal emperor Akbar the rulers of Bikaner were esteemed among the most loyal adherents of the empire and held high ranks as Mansabdars of special order in the imperial court. They served as military commanders in various Mughal campaigns all over the Indian sub-continent. In 1570 Akbar married a daughter of Rao Kalyan Singh. Kalyan's son, Rai Singh, who succeeded him in 1571, was one of Akbar's most distinguished generals and the first Raja of Bikaner; his daughter married Salim, afterwards the emperor Jahangir. Two other distinguished chiefs of the house were Raja Karan Singh (1631-1669), who in the struggle of the sons of Shah Jahan for the throne threw in his lot with Aurangzeb, and



his eldest son, Anup Singh (1669-1698), who fought with distinction in the Deccan, was conspicuous in the capture of Golconda, and earned the title of maharaja. With the decline of Mughal power in India with the death of Emperor Aurangzeb in 1707 AD, the bonds of Mughals-Rajput relationship slowly dissolved. Sujan Singh (1700-35) formally broke the connection with the Mughal throne and from 1719 based himself within his kingdom.

From this time forward the history of Bikaner was mainly that of the wars with Marwar, which raged intermittently throughout the 18th century, most notably in 1722 when Abhai Singh of Marwar invaded Bikaner and in 1739. During the latter conflict Bikaner was only saved by the intervention of Maharaja Sawai Jai Singh of Jaipur, which led to a close alliance between Bikaner and Jaipur. Maharaja Gaj Singh (1746-87) made peace with Marwar which was seen as a sign of weakness by his nobles (thakurs), who rebelled, which led to several years of conflict before he reestablished his authority.

### Early and middle 19th Century

In 1802, during the last of the wars between Bikaner and Marwar, Mountstuart Elphinstone was passing through Bikaner on his way to Kabul; when Maharaja Surat Singh (1788-1828), applied to him for British protection, which was refused. In 1815 Surat Singh's tyranny led to a general rising of his Thakurs, and in 1816 the maharaja again applied for British protection. On 9 May 1818 a Treaty of Perpetual Friendship was signed between the Bikaner ruler and the East India Company,<sup>[18]</sup> and order was restored in the country by British troops. Ratan Singh, who succeeded his father in 1828, applied in vain in 1830 to the British government for aid against a fresh rebellion of his Thakurs; such that during the next five years banditry became so rife on the borders that the government raised a special force to deal with it (the Shekhawati Brigade), to which over the next seven years Bikaner contributed part of the cost. Henceforth the relations of the maharajas with the British government were increasingly cordial.

By the middle of the 19th century the years of internal strife together with the financial and military demands put on Bikaner by the British had put the kingdom in debt. A sharp turnaround in the fortunes of the kingdom occurred in 1842 when Maharaja Ratan Singh took advantage of a shortage of pack animals to supply Bikaner's renowned camels at considerable profit to the British for their Afghan expedition. This turnaround was such that by 1844 he was able to reduce the dues on goods passing through Bikaner. He also gave assistance in both Sikh campaigns to the British. His son, Sardar Singh (1851-1872), was rewarded for help given during the Revolt of 1857 by an increase of territory. In 1868 a rising of the Thakurs against his extortions led to the despatch of a British political officer, by whom affairs



were adjusted.

### **Dungar Singh**

Sardar Singh had no son, and, upon his death in 1872, his widow and the state's principal ministers selected Dungar Singh, (adopted by Sardar Singh), with the approval of the British government as his successor. The principal political event of his reign was the rebellion of the Thakurs in 1883, owing to an attempt to increase the dues payable in lieu of military service; this led to the permanent location at Bikaner of a British political agent. Dungar Singh's reign was notable for the establishment of a modern administrative system, a police force, the state's first hospital, and Bikaner's becoming (in 1886) the first Indian Princely State to introduce electricity. <sup>[19]</sup>

Dungar Singh died in 1887 without a son; but he had adopted his brother, Ganga Singh (born 1880), who, with the approval of the British government, succeeded him as the 21st ruler of Bikaner.

### **Ganga Singh**

Ganga Singh was educated at the Mayo College at Ajmer and was invested with full powers in 1898. He attended King Edward's coronation in 1902 and accompanied the British army in person in the Chinese campaign of 1901 in command of the Bikaner Camel Corps, which also did good service in Somaliland in 1904. For his conspicuous services he was given the Kaisar-i-Hind medal of the first class, made an honorary major in the Indian army, a G.C.I.E., a K.C.S.I., and A.D.C. to the Prince of Wales. The military force consisted of 500 men, besides the Imperial Service Corps of the same strength.

The reign of Maharaja Ganga Singh was notable for great socio-political and economic development in every sphere of life, namely, education, health, sanitation, water supply, power generation and electricity, irrigation, post and telegraph, roads and railways, trade and commerce, etc. The state owes to this ruler the opening up of new railways across the great desert, which was formerly passable only by camels and the tapping of the valuable coal deposits that occur in the territory. The railway from Jodhpur had been extended towards Bhatinda in the Punjab; on the northern border, the Ghaggar canal in the Punjab irrigated about 5000 acres (20 km<sup>2</sup>).

Drought is a common occurrence, and the region faced the most severe famine in 1899-1900 which was so severely felt that by 1901 it reduced the population to 584,627, a decrease of 30%.

When Maharaja Ganga Singh died in 1943, he was succeeded by Maharaja Sadul Singh. he was the colonel of the Regiment of 2nd lancers.

### **Independence**

After the end of the British Raj, Maharaja Sadul Singh was one of the first rulers of the princely states, to sign on 7 April 1949 the instrument of accession with India, and Bikaner became a part of India. After the reorganization of states in 1960, Bikaner became a part, and the largest desert city in the state of Rajasthan.

### **Rulers of Bikaner**

- Rao Bika (1485-1504)
- Rao Jait Singh (1526-39)
- Kaylan Singh (1539-1571)
- Rai Singh (1571-1611)
- Dalpat Singh (1611-1631)
- Karan Singh (1631-1674)
- Maharaja Anup Singh (1674-98)
- Maharaja Sujan Singh (1700-1735)
- Maharaja Zorawar Singh (1736-1746)
- Maharaja Gaj Singh (1746-1787)
- Maharaja Surat Singh (1788-1828)
- Maharaja Ratan Singh (1828-1851)
- Maharaja Sardar Singh (1851-1872)
- Maharaja Dungar Singh (1872-1887)
- Maharaja Ganga Singh (1887-1943)
- Maharaja Sadul Singh (1943-1949)
- Maharaja karni singh (1943-1987)
- Maharaja Narendra Singh(1987- 2004)
- Maharaja Raviraj Singh(2004-)

**Annexure 11: THE INDIRA GANDHI CANAL PROJECT<sup>30</sup>**

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The Indira Gandhi Canal is one of the biggest canal projects in India. It starts from the Harike Barrage at Sultanpur, a few kilometers below the confluence of the Sutlej and Beas rivers in Punjab state. It runs south-southwest in Punjab and Haryana but mainly in Rajasthan for a total of 650 kilometers and ends near at Ramgarh, near Jaisalmer, in Rajasthan.

Its construction started on 31st March 1958, and was built with the aim of converting part of the Thar desert from wasteland to agriculturally productive land. Earlier known as the Rajasthan Canal, its name was changed to the Indira Gandhi Canal on 2nd November 1984, soon after the assassination of Mrs. Gandhi on 31 October 1984.

It uses water released from the Pong dam in Himachal Pradesh and provides irrigation facilities to the north-western region of Rajasthan, a part of the Thar Desert. Known locally as the Indira Gandhi Nahar Project (IGNP), it traverses seven districts of Rajasthan: Barmer, Bikaner, Churu, Hanumangarh, Jaisalmer, Jodhpur, and Sriganganagar.

The project objectives include drought proofing, providing drinking water, improvement of environment, afforestation, employment, rehabilitation, development and projection of animal wealth and increasing agricultural produce

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<sup>30</sup> Source: [www.wikipedia.org](http://www.wikipedia.org), accessed on 24 Mar 2010.

### Construction details

Indira Gandhi Nahar Project was designed to utilise 9,367 Mm<sup>3</sup>/yr of the total 10,608 Mm<sup>3</sup>/yr allocated to Rajasthan from the surplus waters of the Ravi and Beas rivers. The construction of the project has been divided into two stages.

**Stage I** consists of a 204 km long feeder canal, having a head works discharge capacity of 460 m<sup>3</sup>/second, that starts from the Harike Barrage. 170 kms of the feeder canal lie in Punjab and Haryana and 34 km in Rajasthan. The entire system of stage-I consists of the 204 km long feeder canal, 189km long main canal and 3454 km long distribution system, is concrete lined, and serves 553 kha of culturable command area, out of which 46 kha are served by pumping to a 60 m lift, through four pumping stations. In addition to irrigation and domestic water supply through this project, the Rajasthan State Electricity Board (RSEB) proposes to install a total of 12.76 MW of mini hydro electric power stations to utilize the available water fall in the canal. One such power station, with an installed capacity of 2.2 MW has already started functioning at the Suratgarh branch of IGNP stage I.

**Stage II** comprises construction of a 256 km long main canal and 5,606 km of a lined distribution system, and will serve 1,410 kha of CCA (873577 ha area in flow and 537018 ha under lift), utilizing 4,930 Mm<sup>3</sup>/yr of water. The main canal in the entire length was completed in the year 1986.



### The Green revolution in Rajasthan

After the construction of the Indira Gandhi Canal, irrigation facilities were available over an area of 6770 km<sup>2</sup> in Jaisalmer district and 37 km<sup>2</sup> in Barmer district. Irrigation had already been provided in an area of 3670 km<sup>2</sup> in Jaisalmer district. The canal has transformed the barren deserts of this district into rich and lush fields. Crops of mustard, cotton, and wheat now flourish in this semi-arid western region replacing the sand there previously.

### Improvement in living standards

Besides providing water for agriculture, the canal will supply drinking water to hundreds of people in far-flung areas. As the second stage of work on the canal progresses rapidly, there is hope that it will enhance the living standards of the people of the state.

### Sand dune stabilization

The Indira Gandhi Canal is a major step in reclaiming the Thar Desert and checking desertification of fertile areas. There is a planting programme for greening the desert in areas near the Indira Gandhi Canal which was started in 1965. This consists of the planting of shelter belts along roads and canals, blocks of plantations and sand dune stabilization. The tree species being used for planting are *Dalbergia sissoo*, *Eucalyptus tereticornis*, *Eucalyptus camaldulensis*, *Morus alba*, *Tecomella undulata*, *Acacia tortilis*,

*Azadirachta indica*, *Albizia lebbeck*, *Cassia fistula*, *Populus ciliata*, *Melia azedarch*, and *Acacia nilotica*.

### **Environmental problems**

The excessive irrigation and intensification of agriculture over the years has caused environmental degradation and creation of new wastelands. There have been problems with water-logging caused by excessive irrigation, seepage from canals and poor drainage. These factors produced a rise in the water table, increased salinity and finally submergence of the land. These problems have been exacerbated by the cultivation of water intensive cash crops such as wheat and rice.