

## CHAPTER 13

# SUCCESSFUL WATERSHED MANAGEMENT: A NEPALESE VILLAGE CASE STUDY

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### INTRODUCTION

About two-thirds of the world's degraded land is in Asia and Africa, where most of the world's poor live. Of this, about 9 million ha are so badly damaged that they have lost nearly all their biological functions and are unlikely to be restored to productivity. Some 300 million ha need restoring; something that is beyond the capacity of most developing nations.

Land degradation is a serious threat in the Himalayan ecosystem. Of India's 226 million ha of land with biological potential, 90 million ha are very badly degraded and are no longer productive owing to denudation, waterlogging, salinization and other factors. There is growing awareness of the need to ensure the ecological security of the Himalayas in order to protect the livelihood security of local people and the millions who live downstream. India and Pakistan's main grain growing area – the Indo-Gangetic plains – is irrigated with water from the Himalayas.

It is crucial for the sustainable development of the Himalayan region that the economy of hill farmers is improved. Cropping and farming systems need to be made more economically viable, in balance with local environments. Growing demands for food and fodder have led to agricultural cultivation extending to marginal lands. The soils in these areas are often shallow and nutrient-deficient. The lack of irrigation facilities also leads to low productivity. This has led to increasing soil erosion and low productivity on the numerous small hill farms. Poor socio-economic conditions and small and scattered holdings make it difficult to practise commercial agriculture.

### INTEGRATED WATERSHED DEVELOPMENT PROJECT

#### Objectives

The Integrated Watershed Development Project (Hills-II) started in April 1999 and is due to end in March 2005. It has a budget of US\$24.4 million and is being run by experts from different line departments. It is World Bank-funded and operates in Haryana, Jammu and Kashmir, Punjab, Himachal Pradesh and Uttaranchal.

One of its working areas lies in northeast Haryana in the most degraded watersheds of the Siwalik hills and their adjoining piedmont plains. The Indo-Gangetic plains lie to the south. The project area has been identified as one of India's eight most degraded rainfed agro-ecosystems. The project

area extends to 70 472 ha, covering 219 villages in the districts of Panchkula, Ambala and Yamuna Nagar.

The geology of this area is mostly unconsolidated sedimentary clays, sandstones and conglomerates. These are very fragile and form steep slopes. The project area has an annual average rainfall of about 1 200 mm, with 80 percent falling during the monsoon. The area experiences extreme climatic conditions with temperatures ranging from  $-5^{\circ}\text{C}$  in the winter to over  $40^{\circ}\text{C}$  in the summer.

Much of the project area covers *kandi* lands. *Kandi* is the local term for the strip of undulating land that lies between the Siwalik hills and the alluvial plains. These areas are severely dissected by creeks (*choes*). They have high rainfall, high levels of runoff and deep water tables. They are covered in scrub forest that provides low-grade grazing for cattle. These areas suffer from drought for much of the year, and the people who live there are economically very poor.

The project is working to improve the productive potential of these areas using watershed treatment technologies and participatory community action. It aims to decrease soil erosion, increase water availability and alleviate poverty in the contiguous areas of the Siwalik hills. Its main strategy for promoting project sustainability is local people's participation.

In the project area, decreasing vegetative cover and severe soil erosion cause severe water, fodder and fuelwood shortages. Reversing natural resource degradation is the key to promoting rural development in these areas. The project aims to benefit the more marginalized and vulnerable groups who rely on natural resources for their subsistence. It involves all stakeholders in project planning and implementation and aims to build up the capacity of communities to take responsibility for maintaining the assets created under the project. The strategy is to link community-based organizations to the panchayati raj local government institutions to take joint responsibility for these assets.

### **Project components**

The project is being implemented through stakeholder participation and by promoting a number of mechanical and vegetative measures for watershed development and protection, improved livestock management, rural road rehabilitation and institutional strengthening. The two major components of the project are institutional strengthening and watershed development and protection.

The institutional strengthening component supports stakeholders in planning, implementing and maintaining measures that improve their watersheds. It is also working to strengthen the research, extension and training functions of project implementing agencies. The watershed development and protection component encourages local people to adopt vegetative technologies and to build mechanical structures. These are chiefly:

- on arable land: building contour vegetative barriers; repairing terraces; planting vegetative field boundaries; promoting silvipasture, farm forestry and on-farm fodder production; and setting up rainfed horticulture cropping system demonstrations; and
- on private non-arable land: building vegetative and shrub barriers in contour trenches on common and forest land; developing pastureland; promoting silvipasture, afforestation,

- drainage line treatment and gully stabilization; protecting stream banks; building water harvesting structures and village ponds; controlling roadside erosion; and treating landslides;
- other activities: livestock and animal husbandry improvement, and rural infrastructure development.

## **CASE STUDY OF THATHAR VILLAGE**

The contributions of IWDP (Hills-II) can be seen by looking at how the project helped to transform the socio-economically poor village of Thathar. This village is in Dangri sub-watershed, which is one of the five sub-watersheds where the project works. It lies 60 km from the state capital of Chandigarh.

### **Situation of Thathar**

When the case study was carried out the village of Thathar had:

- a population of 277 in 69 households, with 53 Gujjars (graziers) and 16 scheduled caste (so-called low caste) households;
- 14 of the scheduled caste households owned less than 1 ha of land, while 33 of the Gujjar households owned more than 1 ha;
- 468 livestock, including 229 cows, 86 buffaloes and 95 goats;
- 259.6 ha of village land, of which 39.6 ha was cultivable and only 1.5 ha was irrigated cropping land; and
- 220 ha of uncultivable land, of which 180 ha was forest land, 20 ha in stream beds, 2 ha common grazing land, 2 ha under habitation and 16 ha barren land.

The local people relied for their livelihoods on agriculture, livestock rearing and seasonal day labouring in the reserved forests or for public works departments far from the village. The only public amenity in the village was a middle school. There was no road, health centre, bank or market. The nearest health care centre is 6 km away and the nearest veterinary care centre 15 km away. The village's water supply came from a neighbouring village. It was erratic during the dry season, and during monsoon time flash floods and landslides often cut the supply off.

In Thathar, 51 percent of males and 23 percent of females were educated. This relatively high figure is due to there being a middle school in the village. However, children attended school irregularly, as most sons were taken to assist their fathers in herding the cattle far away while daughters had to help their mothers collect fuel and water when the men were away.

### **Participatory rural appraisal**

Phase 2 of IWDP (Hills) started in April 1999. After an initial training camp on participatory rural appraisal techniques for field staff, a team of forestry, horticulture, agriculture and animal husbandry technicians and institutional development experts carried out a participatory rural appraisal of the village.

Resource mapping found that villagers brought 60 percent of their fuel from the local forests, with the 40 percent balance coming from cow dung and crop residues. Ninety percent of livestock fodder came from the forest and 10 percent from farmland. It was also found that the average yield of a cow was only 1 to 1.5 litres of milk, and 2 to 3 litres for a buffalo. For five to six months of each year, the village men took their cattle to graze the wet areas of Satluj in the Punjab owing to local shortages of water and fodder.

The team helped local people to draw up their annual agricultural calendar of activities (Table 1). They also mapped out the hour-wise daily engagement of men and women and the monthly and source-wise availability of fodder. It was recorded that *Syzygium cumini*, *Toona ciliata* and *Emblica officinalis* were the most useful forest trees, while *Emblica officinalis*, *Mangifera indica*, *Citrus* sp. and *Carissa opeca* were the villagers’ preferred fruit trees.

It was found that the first provision of any kind of important facility to this remote village had been the setting up of a primary school in 1986. It was upgraded to a middle school in 1995. The only two other developments were the 1989 fitting of a drinking-water supply system and the 1996 fitting of solar lighting.

The PRA exercise found that the preferred income-generating activities for women were “stitching”, carpet weaving, rope-making and plant nursery work.

**TABLE 1**  
**Village agricultural calendar**

January	Labouring work, collecting fodder from forests and fields
February	Migrating with cattle and labouring work
March	Harvesting grain and collecting hay and wheat straw
April	Harvesting and threshing wheat and gram
May	Labouring work
June	Tilling fields and repairing bunds
July	Maize and sorghum sowing
August	Weeding
September	Harvesting kharif crop
October	Thrashing harvest, labouring and arranging fodder
November	Sowing wheat and other crops, labouring
December	Fodder and fuel collection

The villagers reported that their main problems were:

- lack of accessibility to the outside;
- lack of irrigation water;
- soil erosion;

- scarcity of fodder and fuel;
- unemployment;
- lack of health facilities.

The other problems were poor crop and milk yields, livestock health problems, low-quality fruit plants, lack of higher education facilities, lantana and parthenium weed infestation, and lack of drinking-water for livestock.

The participatory appraisal made every effort to understand local people's problems and encourage them to identify solutions. The information was compiled into a village development plan and reviewed by the villagers before being finalized.

A village development committee (VDC) was formed with membership of one male and one female from every household, on payment of a 10 rupees fee for each. An executive committee was elected, and the VDC was registered with the Registrar of Societies. A scheduled caste person was elected as pradhan (president). There already existed a local forest management group called the Hill Resource Management Society (HRMS). However, the project had to form a new group, as HRMS included people from other villages.

The VDC signed a Memorandum of Understanding with the project to address the Thathar villagers' main two priorities of connectivity and water for irrigation. This laid out how work would be carried out by the VDC, and the details of cost-sharing and how the new structures would be maintained.

### **Project works**

Shortly after the work started, benefits began to emerge. A water source was located and a sub-surface dam built. The villagers carried galvanized piping from the nearest road-head to build the new irrigation system. The resulting supply of irrigation water brought major changes to local people's economic conditions and lifestyles.

The VDC set about building a 1.5-km long bridle path by widening the existing footpath. The village is now accessible by jeep almost all year round. This widened the scope for development, as farmers can sell their surplus grain and vegetables, while households with less land have easier access to labouring jobs.

Local people also established 23 ha of tree plantations and installed structures to stabilize gullies, including crate wire and dry stone masonry structures reinforced by vegetation. Water was piped from another natural spring and is now irrigating about 16 ha of land belonging to 16 households. These households have formed a water users group.

All farmers grew vegetables during 2001/2002. The main crops grown during the monsoon (*kharif*) are maize, paddy and sorghum and during the winter rabi season, wheat mustard, vegetables and *berseem*. Off-season vegetables tomato and chilli are also now being grown. Other vegetables grown are onion, turmeric, ginger, arbi, *bhindi*, *brinjal* and cauliflower. In 2002/2003 about 3 tonnes of vegetables were sold. All of these vegetables were introduced by

the project. Farmers have also planted 475 fruit trees, mainly mango, guava and lemon. Livestock care is being provided by regular visits from project technicians.

Unlike previous similar initiatives, the project's tailoring programmes focused on teaching local people how to make clothes by hand. Other initiatives had given out sewing machines. These had been very popular, but people had been attracted to the scheme in order to obtain the machines rather than to learn about making clothes.

## CASE STUDY LESSONS

Prior to the project starting work, the village suffered a from severe water scarcity, reducing green cover and increasing soil erosion. Shortages of water and fodder meant that during the dry season the men had to graze their cattle in faraway areas.

The project's interventions were welcomed by local people, who took ownership of them through the participatory approach. They donated their labour and held monthly meetings, contributed to a village fund, worked on resolving conflicts and set up women's self-help groups. This resurgence of the village led to people's proper representation in the executive body of the VDC and the appointment of a scheduled caste person as village president. This project has reached the poorest of the poor in a very remote village.

The main environmental benefits of the project have been:

- the rehabilitation of large areas of land;
- improved stream water availability in drier periods;
- more farmyard manure available owing to adoption of stall-feeding; and
- improved availability of fuelwood and water means that old men, women and girls have to spend less time carrying out arduous collection tasks.

The socio-economic status of the village has dramatically improved in many ways, with women's household work reduced by their easier access to water, fuel and fodder; increased employment at home; and improved diets. There have also been many significant indirect benefits with:

- women's increased skills and earning capacity improving their status in the eyes of men – as a result they now participate more in village decision-making;
- families finding it easier to find good marriage partners for their children;
- improved incomes increasing local people's credit-worthiness;
- the status of the VDC pradhan has increased, and government officials now take more notice of him;
- villagers improving their ability to plan, design and implement;
- increased confidence of villagers and increased spirit of competition within the village and with neighbouring villages;
- improved technical and local knowledge about low-cost soil conservation, drainage and water harvesting techniques; and
- transparency, accountability and participatory monitoring and learning have taken root in villager's attitudes.

Outsiders have also benefited. For example, the improved availability of fodder and water has meant that villagers no longer take their cattle to the Punjab each year – therefore reducing grazing pressure on the area in the Punjab.

Some of the project works have however had disadvantageous effects. An increased indiscriminate use of pesticides accompanied the move to growing more vegetables, and the move to growing more paddy rice has meant less fodder, as paddy straw does not make good fodder.

Of all the lessons from the project's experiences in Thathar village, probably the major one is the importance of good leadership. The election of a member from the low-status scheduled caste part of the community encouraged scheduled caste people to become involved. This has been found elsewhere where such a leader causes other members of his/her caste group to participate as, for example, in Singhwala village, Markanda watershed.

The following are other lessons learned:

- Participatory rural appraisal is a good tool to identify community needs and get people's commitment to share costs in the form of labour. Planning and working together in this way means that assets created under the project are more likely to be well maintained.
- It is better to have one institution per village. For better maintenance, user groups should be promoted.
- Skill development is more important than distributing machines or goods.