

# Local Forest User Groups and Rehabilitation of Degraded Forest Lands

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## 1. INTRODUCTION

There has been a major concern about the impact of natural processes and human activities on degradation of the fragile mountain ecosystems in the Hindu Kush-Himalayan Region. Deforestation is one of the key issues in the region because of its impact on biodiversity and on poor farmers whose livelihood depends on this resource. Within Nepal, the relationship between the forest and the livelihood of mountain farmers is well documented (Mahat, 1987; Yadav, 1992; Eckholm, 1976). Degraded forest lands exist throughout the heavily populated middle mountains of Nepal.

As a result of global perceptions in the 1970s and 1980s, efforts to rehabilitate degraded lands in Nepal tended to concentrate on creating green vegetation cover. Such efforts have been relatively successful in increasing forest cover in some areas such as the Jhikhu-Khola Watershed. Forest cover in this watershed increased by 10% between 1972 and 1990 after an overall loss of 24% between 1947 and 1981 (Tamrakar, 1991). The establishment of pine plantations by the Nepal Australia Forestry Program was the main impetus for this change. However, a more detailed analysis has shown that the forest cover increase has been mainly on the intermediate slopes rather than on steeper slopes, and that the utility of pines for farmers is lower than mixed broad-leaved forests (Shah, 1994; Schreier, 1994). This illustrates a need to move from a "greening first" approach to a "community first" approach, in which the needs of the communities are emphasized and the community is involved in forest management.

The National Forestry Plan (Kayastha, 1991) has promoted the return of control of accessible forests to local Forest User Groups (FUG) under the assumption that local communities can better manage their forest resources. The Kavrepalanchok and neighbouring Sindhupalchok districts were pioneer districts in the evolution and implementation of community forestry programmes. Government legislation has been partially effective in handing over the control of the forest. However, there appears to be much less emphasis on active rehabilitation after the communities took control. For example, an ICIMOD team reported that in the Kavrepalanchok District (1993) only 21% of forest area handed over to the communities was subject to enriched planting. Between 1980 and 1988 less than half of the targeted community forests was replanted. The study also points out that most forests that have been handed over to the communities are degraded forests.

It has also been observed that conservative silviculture, which emphasizes resource conservation rather than optimal use, appears to be dominant in community management of forests. This conservative approach is appropriate under favourable conditions where native regeneration of degraded forests is possible. However, in severely degraded lands, the challenges are firstly to get the communities involved in protection, and secondly, to promote active rehabilitation work.

ICIMOD's rehabilitation programme is examining the issues of resource degradation in the Hindu Kush-Himalayan Region through participatory action-oriented research. The research programme, which is funded by IDRC (Canada), focuses on community level rehabilitation. It is being carried out in test areas in China, India, Nepal and Pakistan.

The Nepal site was established in 1993 and is located in the Kavrepalanchok District. Two forest user groups (FUG) from "Bajrapare ko ban" and "Dhaireni Pakha ko ban" are participating in the project with ICIMOD and the District Forest Office (Kavrepalanchok). This paper discusses the experience and findings of the rehabilitation work between 1993 and 1995.

## 2. PROJECT SITES AND ACTIVITIES

Both Dhaireni and Bajrapare sites are situated in the Jhikhu Khola Watershed, where the "Mountain Resource Management Project" (ICIMOD/ UBC/ IDRC) has been studying the resource dynamics over a considerable period of time. The two sites are located on red soils in similar agro-ecological zones, but differ in size, accessibility and composition of the Forest User Groups. These areas were identified by the District Forest Office as very degraded and in urgent need of rehabilitation. Some of the important biophysical characteristics of the two sites are summarised in Table 1.

Table 1. Selected biophysical characteristics.

	Site I	Site II
o Name	<u>Bajra Pareko Danda</u>	<u>Dhaireni Pakha</u>
o Area	6.76 ha	15.93 ha
o Altitude	925-1150 m.a.s.l.	900-1000 m.a.s.l.
o Climate	Sub-tropical (sub-humid)	sub-tropical (sub-humid)
o Rainfall	1000-1200 mm	1000-1200 mm
o Temperature	Min. 0°C; Max 35.5°C	Min. 0°C; Max 35.5°C
o Slope	15°-25°	10°-25°
o Aspect	South facing	South facing
o Soil	Red; clay loam. Poor in organic matters and low infiltration; gully erosion prominent	Red; clay loam. Poor in organic matters and low infiltration, gully erosion prominent
o Existing Vegetation	- Chirpine ( <i>P. roxburghii</i> ) Plantation in 1986  - amla ( <i>Emblica officinalis</i> ), pithouli ( <i>Rhus parviflora</i> Roxb.) bushes, sal ( <i>Shorea robusta</i> ), khar ( <i>Cymbopogan microtheca</i> )	- Chirpine Plantation in 1973  - pithouli, khar

The project is carrying out various planting activities in collaboration with the FUGs, and these activities are summarized in Table 2. Strengthening of these FUGs is a major goal of the project. This action-research project aims to improve the production of biomass and produce a range of other useful products from the degraded forests by integrating traditional and new technologies in the activities of the FUG's. The project also

aims to demonstrate the usefulness of planting nitrogen fixing plants, hedgerows and grass strips as a way to conserve soil moisture and improve the productivity of the forest. Demonstration of water harvesting techniques, research on soil erosion, species performance and natural regeneration are some of the main activities of the project. Since the implementation of the Rehabilitation Project, plant seedling production was initiated in the FUG nurseries, and various indigenous and exotic species were planted in the forests. In 1993 and 1994, a total of 2.5 ha was planted at Bajrapare and 5.05 ha at Dhaireni, which includes 1908 m of hedgerows at Bajrapare and 3318 m of hedgerows at Dhaireni.

Table 2. An overview of project activities.

Challenges	Options followed by the project	Research Components
a) Human activities i) Free grazing: increasing biomass depletion, decreased regeneration, increased soil erosion through ground cover losses and trampling ii) Uncontrolled resource extraction: low regeneration, biomass degradation	i) stop free grazing ii) Controlled extraction, encourage private production of such resources	i) Monitoring of impacts on natural regeneration and biomass production
b) Management constraints i) New settlements, therefore no consensus on protection ii) Lack of options/ information	i) Consensus building through regular meetings. Meeting space provided at Dhaireni. ii) Training/ Visits	i) Monitoring of participation and other socioeconomic variables
c) Natural constraints i) Soil: poor nutrient levels, highly erodible, crusts easily, low infiltration ii) Climate: high rainfall during monsoon, hot and dry other times thus high water losses iii) South aspect: Warmer/less rain iv) Deep gullies	i) Nitrogen fixing species, erosion controlling hedgerows ii) mulching in dry seasons, drought tolerant species iii) water conservation through hedgerows/ mulching iv) Check dams constructed	i) Species performance: biomass production etc.  Rainfall/ soil erosion monitoring

Table 3 shows that the Dhaireni location is ethnically more diverse than Bajrapare, which has implications on the social organization, especially on the collective social action to protect the forests. The population/forest area ratio is higher in Bajrapare (19.2:1) than in Dhaireni (16.3:1) and this could affect the feed supply for animals.

Table 3. Household (HH), population and ethnic composition of project sites, 1994.

	Bajrapare	Dhaireni
Total Household (HH)	18	259
Total Population	130	1667
Average Persons/HH	7.2	6.4
Ethnic Composition	Brahmin and Chettries	Brahmin and Chettries 34% HH, Newars 29% HH, Danuwars 21% HH, Sarki, Kamis and Damai 11% HH, Tamang 4% HH, Magar 1% HH

The comparisons in Table 4 suggest that, on average, most farming households own between 0.5 to 1.5 hectares of land. If we assume that land holding is the primary determinant of wealth, then comparatively more households are poor in Dhaireni than in Bajrapare.

Table 4. Comparison of land holdings at Bajrapare and Dhaireni with district averages.

Land Holding Categories (LHC)	Kavrepalanchok District Average (%HH)	Bajrapare (%HH)	Dhaireni (%HH)
Landless	0.4	0	2
<0.5 ha	37.7	39	59.2
>0.5-1.5 ha	55	61	30
>1.5ha	6.4	0	8.8

### 3. COMMUNITY INVOLVEMENT IN REHABILITATION

In 1993, the District Forest Office (DFO) in Kavrepalanchok 'handed over' the forest lands to the local User Groups in Bajrapare and Dhaireni. This was preceded by extensive discussions with the local communities and the DFO and followed the norms and regulations of the DFO. The project started in April 1993, following the signing of a tripartite agreement between the FUGs, DFO and ICIMOD. Formal clearance from the respective village development committees (VDC) was also obtained. Highlighted below are some of the issues that have emerged and approaches that were followed by the project during field implementation. These are considered relevant for participation of local communities in rehabilitation of degraded forest lands.

#### 3.1. Obtaining Consensus

Agreement among the FUG, VDC, DFO and ICIMOD to carry out rehabilitation work was very important in the project implementation. One of the major challenges was at Dhaireni where the FUG households live in ten different settlements. Initially, the main Forest User Group Committee members came largely from one settlement. Meetings were organized in each settlement to clarify the aims and objectives of the project and to start a process of continuous discussions within the communities. Members were chosen by each community to represent them in the FUG committee, which has ensured a continuous dialogue among local communities.

At both project sites, the participation of the local communities in project activities has been very encouraging. An indication of the local community support is that, despite a lack of fencing, the plantations have been very

well protected from grazing by domestic animals. The plantations at both sites probably represent the first plantation in the district without any fencing (Mr A. R. Sharma, District Forest Officer, personal communication).

Assisting local communities with other identified needs such as drinking water supply has promoted greater participation. Water supply in the village of Bajrapare has made it possible for the FUGs to produce their own seedlings in nurseries, and it has encouraged production of vegetables in the bari land (non-irrigated fields) near their houses.

### **3.2. Investment in Rehabilitation Activities**

The investment by the project has been an important factor. Contributions by the local communities have been mostly in terms of 'participatory' wages (charging less than market wages for work done on forest land) and also in supplying planting materials (seeds or plant cuttings). Our experiences suggest that communities are unlikely to make direct investments into rehabilitation of degraded forests due to a variety of reasons, the first being that investment in rehabilitation work in very degraded sites represents a risk. In comparison, natural regeneration is encouraged simply through community control over grazing and incurs little direct cost. In contrast, afforestation work requires investment. Very degraded and unproductive sites do not offer a means of income generation. Even with the FUG investment in rehabilitation, drought, very heavy rainfall or a single incursion by a stray domestic animal can destroy the efforts. There is a large element of risk involved in such an investment, and the benefits take a long time to realize. Community forests, being common property resources, have inherent problems with free riders (many non-contributors to rehabilitation enjoy the benefits) which also discourages investment.

### **3.3. Tenure Security**

Since ownership of the forest still resides with the government, many FUG members privately expressed reservations in participating. They feared that the government would annex control following their efforts to rehabilitate. If communities are not convinced that their tenure is secure, they are unlikely to invest in rehabilitation even if they have resources. Although tenure security can only be changed by a new law, significant progress has been made through a continuous dialogue between the DFO and the FUGs. Regular meetings have reassured the local communities that their rights and interests will be looked after.

### **3.4. Initiative by the District Forest Office**

There is no doubt that with favourable policies that promote the handover of forests to local FUGs, the DFO has been able to achieve participation of local communities in the project. Initiative by the DFO to identify a suitable area and in handover has been critical for project implementation.

### **3.5. Continuous Consultation**

Regular contacts with the District Forest Office, such as tripartite planning/ review meetings in which DFO, ICIMOD and FUG members participate, have helped to build confidence between the FUGs and DFO. For example, FUGs are now more likely to seek help from DFO in seed acquisition than they were a year earlier. A newly established field office has also made it possible for project staff and the FUGs to hold continuous dialogue and discussions. This, again, has been crucial in promoting trust and cooperation between the project and the FUGs. This has been particularly important in promoting the participation of women in project activities. For example, because the field staff have established a very good rapport in the village, the women were confident enough to ask for organization of a 'women only' field trip to Godavari.

## 4. IDENTIFYING APPROPRIATE TECHNOLOGIES

For community involvement in rehabilitation work, understanding the perceptions of the local FUG is essential. A severely degraded area with gullies and a thin layer of top-soil is very difficult to rehabilitate, especially if the soil characteristics and climate are also unfavourable. For example, at both project sites, which are on red soils, even natural regeneration has been difficult in some areas due to crusting of the soil. There was scepticism on the part of many FUG members that anything could grow in such area given the long dry and hot period.

### 4.1. Field Visits, Training and Demonstrations

The project first demonstrated that technologies were available to assist rehabilitation. Various field visits to successful rehabilitation sites were organized (Terani, Dang), to convince leaders that rehabilitation efforts are worthwhile and possible. The examples of successful plant growth and natural regeneration at project sites have also convinced people that rehabilitation is possible.

### 4.2. Selection of Species

Selection of species was mostly done by the FUGs, but some exotic species were included for trial purposes (e.g. *Tephrosia candida*, from China). In the forestry sector, emphasis is placed on planting tree species on degraded lands. However, as seen at Bajrapare for example, the priority of the villagers is on fodder production. Thus planting of fodder species, including grasses, provides an alternative to tree-only plantations. The FUGs have been very impressed by the performances of certain species such as NB21 grass, *Tephrosia*, sissoo (*Dalbergia sissoo*), lapsi (*Choerospondias axillaria*), bakaino (*Melia azadiracta*) and badahar (*Artocarpus lakoocha*). In fact, the FUGs were so impressed by these results that they were reluctant to cut and use NB21 grass but wanted to keep it to show others. Introduction of such species shows visible changes over a short period and is very important to sustain the interest of the FUGs.

### 4.3. Introduction of Innovative Technologies

After many discussions the project personnel managed to convince the FUGs that a modified Sloping Agricultural Land Technology (SALT) could be an appropriate method of rehabilitation (Partap, 1994). Selected FUG members were trained in hedgerow establishment and the concepts of SALT. The use of hedgerow technology in forestry has been tried in many countries with great success (eg. Vetiver in Thailand, Board on Science and Technology for International Development, 1993). However, in Nepal, the project sites in Kavrepalanchok probably represent the first case of the technology being tested on forest land.

### 4.4. Encouraging the Use of Indigenous Knowledge

Along with the introduction of innovative technologies the use of indigenous knowledge and local innovation must be fostered and encouraged. Emphasis on indigenous knowledge, through the incorporation of indigenous species and practices, can increase the participation and commitment of local communities by providing an opportunity to contribute. This is encouraged by the project at both sites. The collection and planting of local materials could also reduce costs and thus investment risks.

## 5. REPLICABILITY OF THE PROJECT EXPERIENCES AND ACTIVITIES

Many of the experiences are very site specific and the choice of species is largely determined by soil and climatic conditions. However, even within the Jhikhu Khola Watershed, large degraded areas on similar soils with similar climates exist, thus providing scope for replication. Red soil areas in other regions of Nepal have also been identified as being of special concern, with estimated erosion rates of up to 200 tons per hectare per year (Biot, 1990). Other countries in the region such as China have also identified areas (Zhang, 1991). Thus

there is potential for replication of the project experiences under similar biophysical conditions in many different places.

The hedgerows and species trials are only two years old, and data analyses are still underway. However, the initial results have shown encouraging signs. The establishment of plantations with hedgerows requires more material and labour than the standard afforestation carried out by the District Forest Office. For example, at Dhaireni, 3.55 hectares planted in 1994 required approximately 40,000 seedlings (Chalise, 1994), whereas the DFO would normally plant 5680 plants (at 1600/ha). Therefore, a large scale replication of this technology is neither feasible nor desirable. However, there is considerable scope for targeting specific problem areas for replication of this technology.

We believe, however, that the approaches taken by the project, which involve the local FUGs in active rehabilitation, provide some useful examples. It has been shown that communities are able to organize themselves if some outside agents play the role of catalyst. It also shows that communities are able and willing to learn new technologies and approaches and can, with initial encouragement, benefit by participating in a national programme such as the community forestry programmes. It has also been shown that with proper investment and encouragement, local communities can work on rehabilitation of very degraded lands.

## 6. CONCLUSIONS

The experience gained from ICIMOD's "Rehabilitation of Degraded Lands in Mountain Ecosystems" project suggests that rehabilitation of forest land through Forest User Groups is possible. To be successful it needs favourable policies, combined with initiatives, appropriate technological innovations, and active participation of local people. Extensive plantations without fences and hedgerows, which include fodder trees, are first attempts towards a successful rehabilitation program.

The project has also shown that initiatives by the DFO have facilitated the 'hand over' of the forest. They helped clarify to the local people their rights and obligations. Collaboration with other facilitators such as NGOs can also help in the process of 'take over' by local communities, even if the land is very degraded. Further research is needed on innovative approaches to be carried out to strengthen the FUGs as viable and capable institutions. Long term support and involvement in such work will be necessary to guarantee that these issues can be dealt with effectively. For active rehabilitation work, initial investment is essential. The need to invest in management of common property resources has also been highlighted by a number of other researchers (Jodha, 1990). Through commitment to support the activities of the FUG financially and visible collaboration with FUGs, the VDC and DFO have generated positive participation by the local communities.

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