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Conservation-Newsletter

RURAL RECONSTRUCTION NEPAL - RRN
Arun Valley Sustainable Resource Use and Management Pilot Demonstration Project

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A Scene of Deforestation in Sukepatal Community Forest in Num, Sankhuwasabha District of Arun Valley, Nepal

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— EDITORIAL —

Conservation and Management of Biodiversity Resources for Sustainable Livelihoods

Biodiversity refers to all varieties of life forms, from genes to species to ecosystems on planet Earth. The myriad diversity of life forms that exist and have existed in the planet Earth evolved over a million years of evolutionary process. Humankind itself is the creation of this process and has assumed the highest position in the biological world because of its capacity for conscious intellect and rationality. It is this rational capacity that creates new frontier of advancement adding new dimensions to human civilization.

If we carefully examine the question “what is the basic foundation of human civilization?”, we logically come to the conclusion that the myriad form of biological resources (collectively called biodiversity) that provided basic life support services - food, clothes, shelter, medicine, energy, etc. - to human beings is the fundamental basis for human civilization. It is evident from how human beings have been deriving their food, clothes, abode, energy source, medicines and other necessities from bio-resources. Agriculture, forestry, pharmaceuticals and food industries are all dependent on bioresources. The sustainability of the production systems of these industries is basically a function of the sustainability of the ecological systems that sustain and maintain the myriad forms of bio-resources (biodiversity) in nature. More specifically, the maintenance of wide genetic base, preservation of the species of life forms (fauna and flora), the resilience and the productive capacity of the ecosystems provide the basis for life support services.

However, sources of biodiversity are fast disappearing at an unprecedented rate. Each gene, species, or ecosystem lost reduces our options for adapting to new changes. This loss is compounded by the even more rapid disappearance of knowledge of biodiversity, especially among people who have a close relationship to complex natural ecosystems.

The Arun Valley Sustainable Resource Use and Management Pilot Demonstration Project (AVASRUM) aims to enhance the capacity of local and indigenous people to protect, access and sustainably use biodiversity and

knowledge of biodiversity uses, specifically focusing on the following imperatives:

- Assisting community forest users groups (CFUGs) in community forest resource management and ensuring equitable sharing of the benefits of biodiversity conservation and sustainable use of forest resources.
- Promoting indigenous and local knowledge of biodiversity and the institutions needed to protect and use this knowledge;
- Involving communities in the development and conservation of forest, agricultural and aquatic biodiversity and supporting the development of incentives, methods and policy options for in situ or on-farm conservation;
- Supporting income-generating strategies and incentives for sustainable use of the products of biodiversity, especially medicinal and aromatic plants and non-timber forest products (NTFPs).
- Supporting the development of appropriate and equitable policies governing biodiversity conservation and its sustainable uses.
- Promoting new methodologies for enhancing, monitoring, and evaluating the sustainable use of biodiversity;
- Enhancing communication among the local caretakers, the beneficiaries of biodiversity conservation and the policy makers at various levels.

The Rural Reconstruction Nepal (RRN), the implementing national NGO, firmly believes that unless biodiversity conservation is integrated with local community’s livelihood options and local community is convinced that its own survival has a direct bearing upon conservation and sustainable uses of these resources, community participation becomes virtually impossible in the sustainable management of bioresources and, consequently, the conservation of biodiversity becomes a futile endeavor. It is envisioned that RRN’s effort to integrate and expand community’s livelihood options with biodiversity conservation may contribute towards community approach to biodiversity conservation. The newsletter aims to share the approaches, lessons and the experiences learned in this effort with other national and international organizations involved in the noble cause of biodiversity conservation and sustainable management.

Gopi Upreti, Project Director

INTRODUCTION

This is a GEF/UNEP funded biodiversity conservation project being implemented by Rural Reconstruction Nepal in Sankhuwasabha district of Arun Valley since February 2001. The project comprises of three major components namely, *forest biodiversity conservation* through community forestry, *micro-hydro schemes* and *livelihood and income generating programmes*.

It is conceived that conservation of biodiversity becomes possible only when community participate in the management and conservation of such resources. For the community to be motivated to participate in conservation and management initiatives, it is necessary that community realize the importance and the implication of sustainable use and conservation of resources for their livelihood needs and requirement. It is necessary that the community undertake the full management responsibility, protection, conservation and sustainable use of the forest resources.



Sukepatal Community Forest, East of Arun River

The HMG/N has identified Arun Valley as the center of immense biological diversity with few pristine forests and eco-complexes left in Himalayas. The integrated activities of this project envisage not only nature conservation and sustainable natural resource use in the local community, but also the promotion of the wider application of the sustainable management and development imperatives, indigenous knowledge system and the equitable sharing of the benefits both at local (Arun Valley) and regional (upstream and downstream watershed area of Arun river) levels.

Currently, the natural resources in the eastern part of



Bhatbhuteni danda (hill), part of Sukepatal Forest Complex

the Arun River Watershed (outside Makalu Barun Conservation Project Area) are fast depleting without any provision for future conservation. The project area embodies remarkably high level of biodiversity and has come increasingly under the direct threat of anthropogenic activities and pressure. The area is known for providing habitat to at least eleven globally endangered or threatened known bird species in the area (*Cacomantis passerinus*, *Zoothera marginata*, *Megalaima australis*, *Gecinilus grantia*, etc. among others), at least eleven globally endangered mammal species (such as *Ailurus fulgens* (Red Panda), *Bos grunniens* (Yak), *Naefelis nebulosa* (Clouded leopard)), etc., and a large number of endangered flora and herb species (such as *Dioscorea deltoidea*, *Picrorhiza scrophulariflora*, *Cycas pectinata*, *Meconopsis regia*, *Taxus baccata*, etc.



Landslides and erosion prone areas in Pawakhola area

Project Goal

The project aims to mitigate the major threats to natural resources, especially the forest and the water bodies from anthropogenic activities, and design and evolve a management system with locally tested and proven solutions for integrating local community participation in the management of natural resources (forest, soil and water), which will integrate indigenous knowledge, skills and the ecological principles.

The findings are expected to be integrated into the national forest management policy for undertaking people's participatory process involving government, local communities and the related NGOs/private sectors with the intent of disseminating this approach to similar areas in the sub-region.

The project is also expected to yield results that would help to recommend the processes and the mechanisms for equitable sharing of the benefits in similar types of projects, that are of local as well as of global significance, and in particular to replicate it at a sub-regional level (upstream and downstream) of Arun river connecting Tibet and India. In summary, the findings of this project will be disseminated to any other applicable national, regional and international levels.

The primary objectives of this project is to organize and analyze the traditional knowledge of local communities and apply in the conservation and sustainable use of bio-diversity in one of the world's unique

mountain ecosystems with globally significant bio-diversity. The project has been designed to accomplish the following general and specific objectives.



Himsikhar Community Forest in Namase (Hatiya)

GENERAL OBJECTIVES

- To conserve the biodiversity and the forest ecosystems of selected sites in the eastern watershed area of Arun river outside the MBCP areas (Sukhepatal -Bhatbhuteni Dando - Mangsingma and Pawakhola (Ward 4)–Hatiya (Ward 8 & 9).
- To develop community based sustainable natural resource use model based on indigenous knowledge system, biological, ecological understanding of the resource base and the action research.
- To develop alternative renewable energy sources through the promotion of locally adapted fast growing energy plants and the micro-hydro schemes, which ultimately contribute to biodiversity conservation.
- To improve the living conditions of the inhabitants of the project sites through a number of livelihood and income generating schemes that can subsequently contribute to biodiversity conservation.



Part of a Selsele Community Forest in Pawakhola

SPECIFIC OBJECTIVES

- To generate baseline information on the existing natural resources use pattern, the demographic situation, existing development efforts and their impacts on people, the resources and the biodiversity.
- To provide the necessary enabling environment in order to promote sustainable community based resource management and livelihood approaches and develop effective sustainable management system for protecting the biodiversity in the proposed study sites.
- To analyze how indigenous / traditional wisdom of local communities can be used for the benefit of biodiversity conservation, respecting the rights of the local communities based on the findings of this pilot study.
- To analyze how local communities working in consultation with government agencies can agree on possible alternative options for equitable sharing of benefits that could be of use to other communities and countries while ensuring the sustainable use of biodiversity.
- To identify, develop and conserve the food and other resources of the communities to ensure their sustainable livelihood and food security.
- To promote cleaner alternative energy uses (e.g., micro-hydro system) those minimize deforestation and loss of bio-diversity and encourage agro-based income generating small-scale industries.
- To identify economic and policy incentives that would promote traditional knowledge of local communities for the benefit of bio-diversity conservation and the use of such incentives at national and regional levels.
- To disseminate and extend the findings of the project to local, national and regional levels for greater benefit of biodiversity conservation.

BIODIVERSITY CONSERVATION APPROACH

It is a **PILOT DEMONSTRATION PROJECT** which offers a new dimension to the government's protected area programs through the support of community based management on a small scale. The project basically serves as a case or pilot study designed to learn from small-scale, tested methodologies for integrating and promoting on larger scale, the use of traditional knowledge, skills and the institutions for the benefit of sustainable use and the conservation of bio-diversity.

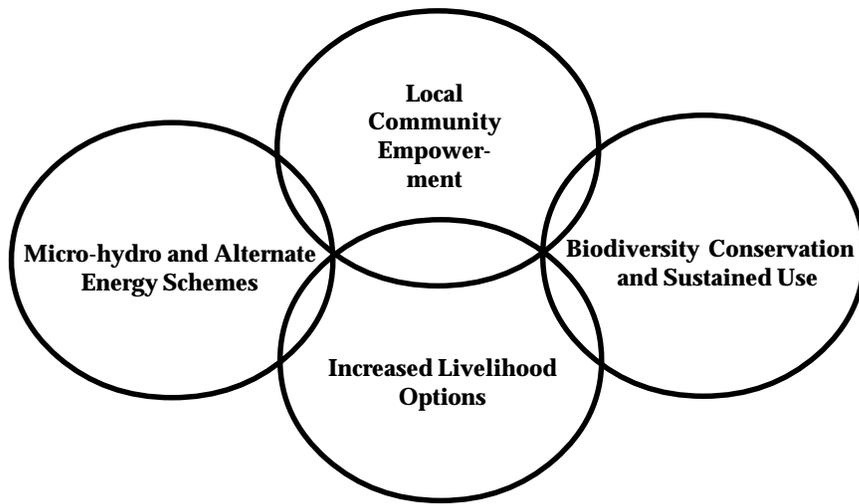
The forest and the biodiversity, the common resources, are the main resources available to the communities. If these resources are properly managed, these can form the major sources of income for the community especially when income-generating activities (agro-forestry, NTFP management and the processing of these products) are included in the user group management activities. The income can constitute a viable fund for financing local development activities and programs such as rural -infrastructure development and establishment of a revolving fund/source for supporting individual income-generating activities.

A major precondition for biodiversity conservation in the proposed sites is the development of the sustainable resource use and management of the forests and forest ecosystems. Community user groups based management approach is advocated as the most successful approach to the sustainable resource management in Nepalese context. The underlying assumption is that the biodiversity embodied in a particular forest ecosystem can only be conserved if the management of that forest ecosystem as a whole is conceived and developed with the direct participation of the community.



RRN staff explaining project goals and objectives in a rapport building exercise with the community in Num

INTERLINKAGES OF THE PROJECT COMPONENTS



Positive interaction of the components results into increased community empowerment



Agro-forestry system in Sipurung (Hatiya)

PROJECT ACTIVITIES

Orientation program

A four-day staff orientation workshop was organized at Khandbari office in the month of March 2001. The orientation program included sharing of the experiences of the project staffs and their backgrounds, general introduction of the project, issues of sustainable development, Agenda 21, community based biodiversity conservation approach, role of community forest user groups in biodiversity conservation, livelihood and sustainable use of non-timber forest products (NTFP), micro-hydro schemes and watershed management, characteristics of mountain ecosystem of Arun Valley etc.



Objectives Based Preliminary Operational Planning Workshop

A three-day workshop was organized immediately following the induction workshop for the staff in March 2001.



RRN Staff in Induction and Planning Workshop

The workshop centered on the analysis of the project objectives and the preparation of preliminary operational plan. The objectives and outcomes envisaged by the project were thoroughly discussed. Based on the analysis and the discussion, a preliminary operational plan was prepared which provided project staffs in the field the necessary guidelines to initiate project activities. A detailed operational plan is in the process and will be completed after the completion of baseline information.

RRN staff in Operational Planning Workshop

Finalization of Project Sites

A ten day field visits was undertaken to the remote village development committee of Pawakhola and



RRN Staff on their Way to Project

Hatiya in March 2001 in order to finalize the project sites. Based on the strategic location and the high species richness (biodiversity hotspots), Pawakhola 7 and the Hatiya 8 and 9 (Siprung and Namase) were selected as the additional project sites. The project site, Sitalpati, as conceived in the beginning, has been dropped as this site is basically a *Shorea robusta* dominated forest and does not offer much from the perspective of biodiversity conservation whereas the Pawakhola and

Hatiya sites have high level of biodiversity and the NTFP in these forests constitute the important livelihood source of the local community. The conservation and sustainable use of these resources have far reaching implications in the adjacent villages of Tibet as well. All together four sites have been finalized. These are namely Num, Pawakhola and Hatiya. Three project site offices have been established namely in Num, Pawakhola and Hatiya to carry out the regular project activities.



Mr. Bal Bir Tamang, the field coordinator explaining the project goals and the objectives to the community in Num

Staffs were posted in three project sites, namely Num, Pawakhola and Hatiya. Four staffs including the field coordinator are posted in Num site. A team of four and three staffs has been posted to Pawakhola and Hatiya sites respectively. The specific sites and their location are as follows:

| Num Village Development Committee (VDC) | VDC Ward No. |
|--|---------------------|
| 1. Sukepatal Community Forest, Num | 4 |
| 2. Langling Community Forest | 4 |
| 3. Gunyung Community Forest, Mangsima | 2 |
| 4. Gunyung Kalayan Community Forest, Mangsima | 2 |
| Hatiya Village Development Committee | |
| 1. Namase Himsikar Community Forest | 8 and 9 |
| Pawakhola village Development Committee | |
| 1. Pawakhola Community Forest | 7 |

general understanding of the project site that helped them to carry out the situation analysis with respect to the implementation of project activities.

Scientific Assessment of Biodiversity Resources

1. Forest biodiversity

Assessment of the forest conditions and forest biodiversity, mapping, indexing and inventory taking constitute the most important

scientific study for establishing the framework for sustainable management and uses of forest biodiversity resources. Following specific activities have been planned with respect to forest resource assessment.

Generation of baseline information on forest conditions including stocktaking

Biodiversity inventory, mapping and indexing of the community forestry

Establishing pilot management demonstration plots in all sites

Developing biodiversity management plan in the community forest area

Building Rapport with CFUGs

A rapport building process was initiated before implementing project activities. The project staffs introduced themselves with the local elected bodies, the VDC chairpersons, and the chairpersons of the community forest users groups and the chairperson of the respective wards. The project objectives were introduced and discussed with the local community leadership. With the assistance of the local community leadership, particularly the forest users groups committee, village council meetings were organized to discuss the project objectives with the community as a whole. The problems, constraints, and the expectations of the forest users groups were discussed. The staffs developed a

Incorporating biodiversity management plan in CFUGs' Operational Plan

Developing and implementing biodiversity monitoring system

The project office has started the forest resource assessment work in some community forests. Forest resource assessment of the Sukhepatal community forest in Num has been recently completed and in other project sites, the assessment work has been planned to carry out as soon as possible in the near future. The forest biodiversity assessment work in the community forests of the project sites will be carried out by the technical staffs of the project under the guidance of the hired consultants/scientists. The assessment work has been planned to commence from August 2001 because during monsoon rainy summer of June-July, no work can be done due to torrential rainfall and difficult mountain terrain.

2. Agricultural biodiversity

Inventory, indexing and mapping of agricultural biodiversity in and around the project sites is also equally important to maintain the broad biological base for livelihood and food security in the area. The *in-situ* and *ex-situ* conservation of agricultural biodiversity has become important aspect of food security and livelihood of local community. The activities pertaining to the study of agricultural biodiversity will commence from August-September for the same reason as above (rainy monsoon and difficult mountain terrain).



Collocaesia (taro), important food in Arun Valley

3. Biological and ecological study

Biological and ecological studies of the economically viable NTFPs and herbal medicinal plants constitute the scientific basis for their management, conservation, sustainable uses and the development of cultivation practices. The study on the floral biology, reproductive behavior, propagation, ecology and habitat provides the basis for developing farming practices of these resources. The following specific activities are planned to carry out from August-September 2001.



**Herbal meadow in high altitude (alpine ecosystem)
Selsele Community Forest in Pawakhola**

Ecology and habitat study of economically viable NTFPs (Lokta, Allo, herbal medicinal and Aromatic plants)

Developing domestication, propagation and nursery techniques

Establishing participatory action research in CFUGs' forest and farm lands

Establishing trial on cultivation practices of selected herbal plants

Social Assessment of Community Based Resources

Community forests and the community forest users groups (CFUGs) are the fundamental working units of the project especially in evolving the sustainable

management and uses of forest biodiversity and the conservation of forest ecosystem. The project activities have the major focus on the conservation of biodiversity and its sustainable uses in all community forests through capacity building of the community forest users groups (CFUGs), preparation of operational plan (OP) and its implementation and participatory monitoring mechanism. A number of innovative resource management and economically viable income generating schemes identified and prioritized by the community have been initiated in project areas to realize the broad objective of the project (the conservation of biodiversity and its sustainable uses). The activities that are being implemented have been described below:

1. Sustainable management of community forest

The following post support activities that lead to the sustainable management of the community forest in the project sites were identified:

1. Support to CFUG for planning and implementing operational plan (OP)
2. Development of forest management training for CFUGs of the project sites
3. Establishment of forest management demonstration plots in each site

Participatory planning and monitoring of community forestry activities with CFUGs

Establishment of linkages among CFUGs and between CFUGs and other organizations

Some of these activities are ongoing and some are being planned in the future. These activities will continue throughout project duration.

2. Participation of women and disadvantaged groups in CFUGs

Participation of women and socio-economically marginalized groups, who depend on forest products for their livelihood more than any other, in the decision

making capacity of CFUGs is highly imperative not only to ensure the equitable sharing of the benefits among stakeholders but also to ensure the sustainable management of the community forests. Realizing the weak participation of these groups in the decision making capacity of the CFUGs of the project sites, following provisions have been recommended to be incorporated in the by-laws and OP of CFUGs:

Encourage and ensure women's participation in CFUGs through the provision in by-laws

Make provision in the by-laws and OP for the representation of specific marginalized users group in CFUG with their own activities

These provisions are being incorporated into the by-laws of CFUGs. These provisions will also be incorporated into the operational plan (OP). Monitoring mechanism will be developed to ensure that these provisions are strictly implemented.

3. Community forest management as a livelihood source to local community

The existing by-laws and the operational forest management plan that follows from the by-laws do not apparently integrate NTFPs in the over all management of the forest. Due to the confusion created by the existing forest law and the by-laws, the CFUGs are often ignored and overlooked by the government's line agency (district forest office) in regard to their management and sustainable uses of NTFPs. Since NTFPs have become the important source of livelihood for local community, unless CFUGs are entitled and entrusted for the sustainable management and the uses of NTFPs and integration of NTFPs becomes the part of the overall management plan of the forest, sustainable forest management becomes untenable. Therefore, following activities have been identified for implementation and recommendation for policy change.

Integration of NTFPs and herbal medicinal plants into the OP of forest management

Training on the management of NTFPs, agro-forestry and processing

Development and implementation of CFUG pilot action research on management and processing of NTFPs

seedlings/saplings of important plant species.

Nursery Establishment

The community forest users groups (CFUG) in all project sites have placed a high priority for multipurpose agro-forestry nursery and participated in the establishment of such nurseries in all project sites (Num, Siprung-Hatiya, Namase-Hatiya and Pawakhola). The multipurpose agro-forestry nursery primarily consists of the forest, fodder, herbal medicinal plants, tea, vegetables, non-timber forest products (NTFPs) and some economically important timber species as identified by the local community. The community was involved in the collection of seeds and saplings from the forest and transplanting in the nursery. The RRN field staffs have technically assisted the community to establish the community nursery with the following objectives:

To facilitate and develop the nursery techniques of various economically important NTFPs and herbal medicinal/aromatic plants found in the forest ecosystems

To learn and develop the nursery techniques of important fruits and vegetables that can be successfully grown in the area

To learn and develop the nursery techniques of the important fodder species that could be used by the community

To propagate and prepare the saplings of the important forest species for the plantation activity in the community

To learn the reproductive biology of the plant species planted in the nursery

To use the nursery as a field laboratory to educate village children and youths about biodiversity conservation and environmental education

To facilitate community forest users group's (CFUGs) activities through the supply of the

The communities in the project sites provided the land for nursery establishment. Project staffs and the local community people have selected the appropriate sites especially taking into consideration of the sunlight and the drainage condition in the field.

Following the primary tillage operations, land was thoroughly prepared, leveled, and seedbeds were raised at least up to 15 cm to facilitate the drainage of the excessive moisture.



RRN staff and villagers establishing nursery in Namase

Field staffs and the community members have fully participated in the establishment of following nurseries:

Vegetable nursery

Vegetable seedbeds were prepared with the help of women and school children. Vegetable seeds were shown to raise the seedlings. A number of nutritionally important vegetables such as leafy vegetables, proteinous and the vegetables rich in vitamin A and minerals were sown. A community nutrition kitchen garden has been established in all project sites to disseminate the nutritional values of the vegetables and also the technique of growing vegetables in the community.

The community kitchen garden has grown vegetable seedlings and distributed to the community members.



Vegetable Nursery in Num

Project office has selected 10 to 15 vegetable growers in each project site. These growers have the special interest in vegetable growing. RRN staffs regularly monitor the vegetable growing activity of these growers and provide the necessary technical and material assistance needed by them.

NTFP Nursery

Nursery for potential NTFP such as Lokta (*Daphne bholua*) and Allo (*Diospyros malabarica*) have also been included in the multipurpose nursery scheme. The reason behind this is to learn the basic techniques of propagation of the potential NTFP and, if possible, to multiply the seedlings for possible farming in and around the communities' private and public lands. Lokta, Argeli and Sikhre, whose bark is used for making paper, are the most potential NTFP besides Allo.



NTEP nursery in Siprung

The development of nursery technique and the cultivation practices of these NTFPs especially in the *slash-burn* or *shifting cultivation* area would not only contribute to the livelihood base of the community but also immensely contribute to the conservation of these resources and the ecological stability of the fragile landscape that are being used for slash and burn cultivation practices. Project office has collected the seeds of these plants from the forests and will be sown in the nursery for their multiplication and planting in the community lands. Pawakhola, Siprung and Namase in Hatiya sites are the potential areas for NTFPs.

Herbal Medicinal Nursery

A nursery of herbal medicinal plants found in high mountain forest ecosystems has been established in Pawakhola and Namase sites. Pawakhola and the Namase forest areas are known to be the rich sources of high Himalayan herbal plants.



Project director observing herbal nursery in Pawakhola

The local herbal collectors from the forest ecosystem harvest in a large quantity of these plants every year. A substantial amount of these harvested herbal plants are transported to and sold in Tibet. The Bhotia community that lives in the region is knowledgeable about the herbal trade and other communities living in the lower elevation do not have the access to either the herbal trade or the knowledge about the herbal plants.

Even in the Bhotia community, only few old herbal practioners possess such knowledge and the new generation shows no interest in such thing. It has become

extremely important to preserve and conserve the traditional ethno-botanical knowledge base of the community by systematic methods of growing and developing nursery technique for some of these valuable Himalayan herbal plants. The objective of establishing herbal nursery in Pawakhola and Namase is twofold: *preserve the community's ethno-botanical knowledge base; develop nursery techniques for some of these plants for their possible cultivation in the ex-situ areas.*



Zatomansi herbal plant in Pawakhola

The seedlings of the potential herbal plants have been collected from the forest ecosystem in Pawakhola and Namase and planted in the nursery with the support of CFUG members who could identify the plants in the natural habitats. The important herbal plants include *Chiraito*, *Kutki*, *Panchaunle*, *Padamchal*, *Thulo Okhati*, *Zatomansi*, *Bikhma* and *Texas baccuta* etc. These are the popular herbal plants in the high Himalyan region and have good trade potential. All these plants are maintained in the nurseries of Pawakhola and Namase sites. RRN staffs regularly take observations on their germination, growth, reproductive behavior and the overall performance. Some of these herbal plants have been planted in a small scale in and around the nursery to investigate their overall performance.

Fodder and Grass Nursery

Fodder and grass constitute important source of animal feed. Most of the livestock feed are derived from the nearby forest area in the form of grass and fodder. This has caused tremendous pressure on the forest especially in the area where livestock population is high

and livestock based livelihood has become a viable option.



Project director observing nursery in Siprung

In view of providing livestock with ample amount of green grass and fodder and reducing the corresponding pressure of livestock on the community forest, fodder and grass nurseries were established in those sites where livestock raising constituted an important livelihood option. Num, Mansima and Siprung (Hatiya) are the sites with high animal population. Cattle, buffalo, goats and sheep are the principle livestock raised in these sites. The seeds and the cuttings were taken from fast growing, locally well adapted nutritious fodder and grass plants and were shown and planted in the nurseries. The community members were trained on how to grow and take the cuttings from the fodder trees.

Chiraito Nursery

Chiraito (*Swertia chiraita*) is economically the most lucrative and viable herbal plant throughout Sankhuwasava. Excessively high amount of the herb is being extracted from the forest and the community land every year. The rapid depletion of the natural stock of this herb from its forest habitat has caused a great concern about its possible extinction. There is considerable interest among community members to develop farming practices for this herbs and grow it just like any other agricultural crops. A nursery has been established with the objective of learning and developing propagation and the farming techniques for this herb in all project sites. Seeds were sown with different treatments along with planting of the seedlings collected from the forest.



Chiraito nursery in Namase (Hatiya)

Proper roofing and thatching is essential especially during rainy summer to protect nursery beds (soil) and the plants from excessive rainwater and sun injury. Roofing and thatching were provided with locally available materials. Chiraito conservation and cultivation concerned groups have been formed in all project sites to systematically carry out the conservation and cultivation activities. Cultivation performance trials have been established in all project sites. Observations on germination, growth, reproductive and flowering behavior and the overall biomass production have been taken in a systematic manner in order to generate the basic information about the herb.

One of the major objectives of *Swertia chiraito* cultivation trail is to develop the cultivation techniques and expand its cultivation in the *slash* and *burn* landscape so that a continuous source of income for the households can be ensured along with the ecological benefits the community can derive from such practice.

Timber and Fuel wood Nursery

Economically important timber species in the community forest become the center of attraction as they can substantially increase the revenue for the CFUG and the government. Proper management practices must be adopted to maximize the production and the benefits of these species.

CFUG members in all community forests seem to pay special attention to the viable timber and fast growing fuel wood species. As community's needs for these

resources increase every year rapidly, the limited supply of these resources from the community forests cannot meet the demand and the requirement of the communities. Therefore, the development of the farm forestry with timber and fast growing fuel wood and fodder trees in the communal and private lands has become the fundamental strategy of the community forest management of the project.



Timber and fuelwood nursery

In view of the growing demand and the requirement of the communities for timber, fuel-wood and fodder, forest timber and fuel wood nurseries were established in all project sites. Seeds and the cuttings from the locally adapted fast growing fuel wood, fodder and important timber species were collected, sown and planted in the nurseries. The multiplication of these species has assumed in a mass scale and the seedlings have been distributed to the CFUG members for plantation in their private and communal lands. The nursery activities in Num site has been dominated by the multiplication of timber, fuel wood and fodder species.

Tea Nursery

Tea plantation has become one of the important economic activities in the sloppy marginal land in the hills and the mountains of eastern Nepal. The Diding, Matsyapokhari and Num areas of the project site have been recognized as agro-climatically-suitable areas for tea plantation in Sankhuwasava district.

Given the climatic requirements for the production of high quality *orthodox* tea, the areas covered by above VDCs have tremendous scope and potential for improving the socio-economic conditions of the people through tea plantation.



Tea nursery preparation in Matsyapokhari

The VDCs and the local communities have identified tea as one of the most potential income generating activities and have requested development agencies and HMG for technical support. Recognizing the potential of teas as a high value cash commodity and the strong interest of the local community in tea plantation and its added ecological benefits (tea plantation converts naked desert like landscape into a productive greenery), a community tea propagation nursery has been established in Matsyapokhari VDC with following specific objectives:

- To disseminate the technical know-how on tea growing in the area
- To develop and demonstrate nursery and propagation techniques of tea growing
- To use nursery as the field laboratory to teach nursery techniques
- To provide tea seedlings to the community and assist in raising tea plant
- To assist community in the establishment of tea garden
- To provide technical assistance for care and maintenance of tea garden.

Project office and Matsyapokhari VDC signed memorandum of understanding (MOU) that the VDC would provide the land for nursery establishment and the project office would provide all technical and material support. Following activities were carried out in regard to the establishment of tea nursery:



Village youths taking cuttings from tea motherstock stems

- Project office and the community started all nursery activities including tillage, land preparation, nursery bed preparation, thatch, roofing and fencing of the nursery area.
- Project hired and trained a local person as *nursery man* to carry out regular nursery activities.
- Seedlings and the cuttings of tea from the adjoining tea growing district of Dhankuta purchased and transported to the nursery site
- Seedlings and the cuttings were transplanted in the nursery
- The project staffs, interested community members and the nurseryman were given training on the nursery technique and the raising of tea seedling 2000 tea seedlings were transported to the nursery site and planted in the nursery. The mature tea stems for cuttings were also transported to the nursery site. About 8000 cuttings were taken from the stems and established in the nursery.

This is basically a teaching / learning demonstration nursery where in project staffs carry out the necessary nursery technique and propagation activities. The tea seedlings and the cuttings will be distributed to the community members. The basic nursery and propagation training will also be provided to the community members or the groups interested in tea cultivation in the area.

A small demonstration tea garden has been established

Study and Installation of Micro-Hydro Schemes

Micro-hydro scheme is an important component of the project. A number of micro-hydro schemes that could be materialized from the community forest watershed area of the project sites were conceived. The idea behind the integration of micro-hydro scheme into biodiversity conservation is that the community participates in the protection and management of the watershed area that embodies the micro-hydro scheme consequently leading to the effective conservation and sustainable use of biodiversity. Micro-hydro scheme includes the implementation of following activities.



MH-feasibility study team measuring the flow of water

Feasibility study of identified schemes with detail design and cost estimates

Social mobilization (formation of users group committee or cooperative) for micro-hydro schemes

Micro-hydro equipment purchase, construction and installation of the schemes

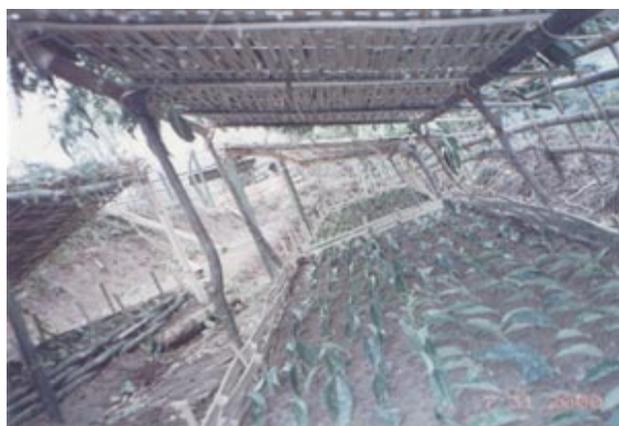
Human resource development and institutional mechanism for operation, management and the sustainability of micro-hydro scheme



VDC Chair Planting Tea cuttings

in the school compound area in Chichila of Matsyapokhari VDC. About 1500 tea saplings were planted in the school area. The school children, teachers, community members and RRN staffs participated in the tea plantation activity. This tea garden has a great educational value. The tea plant is an exotic commodity in the area. The school children have read and tasted the tea product but they have not seen the tea plant. This has generated a strong interest among school children and has stimulated their curiosity to learn more about tea growing.

In addition to this, people in the community are making an organized effort to initiate tea plantation in the area and are trying to learn more about tea growing. This demonstration garden will provide them with the basic information on the growth and the development of the tea plant.



Tea nursery established in Matsyapokhari VDC

Feasibility Study of Micro-hydro Scheme

Feasibility studies of already identified micro-hydro schemes had been recently completed. The feasibility study indicated four micro-hydro schemes to be feasible in the project sites including two peltric sets. The company hired to conduct feasibility study has submitted the detailed engineering design and cost estimates for some of the viable schemes.

Consultants have been hired to study technical reports. In view of the technical comments received from the consultants, it appears that some schemes need to be revisited for more technical study in order to finalize the construction of these schemes. The project office has planned to send technical team to the field in November 2001 to gather more technical information and finalize the construction of the selected schemes.

Environmental Education for Nature Conservation

Environmental education is considered as one of the most fundamental program activities of the project. The scope and dimension of the activities that can come under environmental education are numerous and varied encompassing a whole range of cognitive and human behavioral spheres.



Dr. Upreti addressing the eco-club members in Namase

Environmental education activities are geared to organize and impart information, knowledge and the basic

ecological understanding of the interdependence and the interactions of biotic and abiotic components of the planetary ecosystem and learn to live in harmony with ecological laws by bringing appropriate human behavioral and attitudinal changes. A number of activities have been carried out in all project sites under the theme of environmental education.

The major areas identified for environmental activities include, inter alia, formation of village eco-clubs, adult literacy classes, awareness raising campaign, forest visit and camping, interaction and quiz context, sports, games, tree plantation and preparation of environmental education materials. Following activities have been identified to carry out under various themes:



Ecoclub members and RRN staff establishing S. chiraito nursery in Namase

Campaign and awareness raising activities for resource conservation

Development of conservation education curricula / materials

Documentation of indigenous knowledge system (IKS)

Mobilization of social capital (formation eco-clubs)

Human resource development (adult literacy classes)



Eco-club members and villagers in Siphung



Dr. Upreti welcome the participants and highlighting on the objectives of herbal training

TRAINING-WORKSHOP

Herbal Medicinal Plants Cultivation and Processing Training

A three-day training on herbal medicinal plants cultivation and processing was jointly organized by RRN, Arun Valley Sustainable Resource Use and Management Pilot Demonstration Project and the Sankhuwasba District Development Committee (DDC) at Khandbari from June 29 through July 1, 2001. 33 participants from 19 Village Development Committee (VDC) of the remote mountain area of Sankhuwasaba district participated in the training.

Dr. Gopi Upreti, the project director of Arun Valley Sustainable Resource Use and Management Pilot Demonstration Project, welcomed the participants and briefly summarized the objectives of the training.

Objectives

To raise the awareness of the *community over the need of conservation and sustainable use of herbal medicinal plants found in the mountain environment of Arun Valley*

To be able to identify and recognize the commonly found herbal medicinal plants in the mountain environment

To impart technical know-how on cultivation practice of economically important herbal medicinal plants

To impart technical know-how on post-harvest processing and quality of the herbal medicinal plants

To explore and develop marketing channel and linkages.



DDC president addressing herbal training workshop

The participants identified 46 different herbal plants of economic and medicinal importance. Out of 46 herbal plants, 10 herbal medicinal plants were rated as economically the most potential plants in the region based on the volume of the trade and the total transaction value. The training workshop primarily

concentrated on the cultivation and processing of these potential herbs.

The training proved extremely fruitful because this was the first training of its kind jointly organized in partnership spirit with district development committee (DDC).

The participants complained that the training was short and such training should have been longer and intensive concentrating on the cultivation and processing of few important medicinal plants. They demanded that the project organize a field practical training on the cultivation practices and processing of important herbal medicinal plants in the future.



Participants in the herbal medicinal cultivation and processing training

Herbal medicinal plants included in the cultivation and processing training

| S.N. | Nepali Name | Scientific Name | Remark |
|-------------|--------------------|-----------------------------|--|
| 1 | Chiraito | Swertia chiraito | <i>Chiraito</i> is economically the most outstanding herbal medicinal plant being exported from Arun valley. It alone contributes about 40 % of the cash income of the people of Sankhuwasaba. Development of the cultivation practices of <i>Chiraito</i> has been considered as the lead income generating activity in the Project <i>Bikhma</i> , <i>Kutki</i> , <i>Padamchal</i> <i>Pakhanved</i> , and <i>Panchaunle</i> are the most important Himalayan herbal medicinal plants whose cultivation can significantly contribute to the income of local people. |
| 2 | Bikhma | Aconitum bisma | |
| 3 | Timbur | Zanthoxylum armatum | |
| 4 | Kutki | Picrorhiza scrophulariflora | |
| 5 | Padamchal | Rheum australe | |
| 6 | Yarsa Gumba | Cordyceps sinensis | |
| 7 | Pakhanved | Berginia Ligulata | |
| 8 | Majito | Rubia manjith | |
| 9 | Panchaunle | Dactylorhiza hatagirea | |
| 10 | Bojho | Acorus calamus | |

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| S.N. | Name/Designation | Address |
|------|---|---|
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| 13 | Representatives from district based NGOs -2 | |
| 14 | Representative from project promoted CBO | |
| 15 | Member Secretary, Dr. Gopi Upreti, Project Director | Aruan Valley Sustainable Resource Use and Management Pilot Demonstration Project, Rural Reconstruction Nepal, Tel: 977 1 415418, Fax: 977 1 418296, E-mail: rrn@rrn.org.np |

Rural Reconstruction Nepal

Rural Reconstruction Nepal (RRN) has been implementing integrated rural development programmes ranging from environmental management to poverty reduction through the proper management

environment, participated by representatives from Bhutan, Bangladesh, India, Nepal, Pakistan, Sri Lanka and observed by guest observers from Indonesia, Japan and Thailand, and had contributed to the formu-

lation of national policy on environmental management. RRN has three 'regional' offices located in the eastern, western and mid-western parts of the country and eleven project/field offices. In addition to its projects on integrated rural development encompassing natural resources management to promote sustainable agriculture, social forestry, irrigation, livelihoods and micro-credit support work for communities whose livelihoods have been affected/threatened, RRN has carried out integrated health and biodiversity resources management programmes as well. RRN also runs two livelihoods learning and training centres, one in Chitwan and the other in Morang districts each of which include training facilities in



Project Director, Gopi Upreti with participants of the Herbal Training

and use of natural and human resources since 1989 when it was established as an NGO. RRN has a mission to improve the lives of the poorest rural people, particularly rural women, peasants, forest users groups (CFUGs) and the most disadvantaged and socially oppressed strata of Nepali society through providing opportunities and facilitating them through the human rights perspective for their own socio-economic empowerment. Currently, RRN has over 500 staff and volunteers engaged in development activities in various remote parts of the country. RRN is accredited to both ECOSOC of UN and the GEF. Some of RRN's funding partners are IPEC/ILO, UNICEF, Horizont3000- Austria, European Commission, Austrian Government, University of Calgary, CIDA, GTZ and IDRC.

It is a network member of International Institute of Rural Reconstruction (IIRR), International River Network (IRN) and Ecological Society. RRN had organized South Asian Convention on River Water and En-

vironmental management. RRN is an active partner in networks such as Asian NGO Coalition for Agrarian Reform and Rural Development (ANGOC), Asian Regional Exchange for New Alternatives (ARENA), Globalisation Concern Group- Nepal, among others.

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