Appendix 1

ICIMOD Methodology Workshop on Rehabilitation of Degraded Lands in Mountain Ecosystems of the Hindu Kush-Himalayan Region
May 29 - June 3, 1993
Kathmandu, Nepal

PROGRAMME SCHEDULE

MAY 29, 1993: Participants arrival at Summit Hotel which is about 3km away from the ICIMOD office

MAY 30, 1993

09:30-10:30 a.m. Registration at ICIMOD Conference Hall

10:30-11:15 a.m. **Session I** **Opening Session** Chair: Dr. E.F. Tacke

- Opening remarks from Dr. E.F. Tacke, Director General, ICIMOD
- Brief Report on ICIMOD Project on Rehabilitation of Degraded Lands in Mountain Ecosystems of the HKH Region by Prof. Pei Shengji

11:15-11:30 a.m. Tea Break

11:30-12:45p.m. **Session II: Country Reports: 20 minutes for each report and 10 minutes for discussion**

Chair: Prof. Pei Shengji
Rapporteur: Ms. J. D. Gurung

- Country Report from China by Mr. Xu Jian-Chu, Kunming Institute of Botany, CAS, China
- Country Report from India by Dr. B.P. Kothyari, Institute of Himalayan Environment & Development, India

12:45-1:45p.m. Lunch Break

2:00-3:30 p.m. **Session III: Country Reports (continues)**

- Country Report from Nepal Site I (Godavari) by Mr. B.R. Bhatta, ICIMOD
- Country Report from Nepal Site II (Kavre) by Prof. S.R. Chalise, ICIMOD

3:30-3:45 p.m. Tea Break

3:45 - 5:00 p.m. Country Report from Pakistan

- General Discussion and Comments on Country Reports
- Concluding Remarks by Chairperson

6:30 p.m. Reception and Dinner at Summit Hotel

MAY 31, 1993 **Field Trip** Organiser: Prof. S.R. Chalise & Mr. B.R. Bhatta

09:30 a.m. Participants leave for Kavre site by bus from ICIMOD office

10:30-11:00a.m.	Visit District Forest Office, Kavre. Mr. B.R. Paudyal gave a presentation on Community Forest Management in the Kavre Palanchowk District.
11:00-12:30a.m.	Visit to Kavre site and Nepal Mountain Resource Management Project Site in the same area. Professor S.R. Chalise and Mr. P.B. Shah briefed participants respectively on site activities.
12:30-1:30p.m.	Lunch at Dhulikhel Mountain Resort
1:30p.m.	Leave for Godavari Site from Dhulikhel by bus
3:00-4:00p.m.	Visit Godavari site; during the visit Prof. Lu Rongsen briefed participants on site activities
4:00p.m.	Leave for ICIMOD office from Godavari site.

JUNE 1, 1993 **Session III: Approaches and Technologies**

Chair: Prof. Pei Shengji
Rapporteur: Ms. J. D. Gurung/Ms. Charla Britt

9:30-11:00a.m. Presentation on Technologies and Approaches that are used for Rehabilitation of Degraded Lands in different Mountain Ecosystems.
20 minutes for each presentation and 10 minutes for discussion

- Mr. P.B. Shah: Nepal Mountain Resources' Management Project and Methodologies Adopted for Monitoring Soil & Water Erosion in the Project area
- Dr. B.S. Majila: Water Storage & Harvesting Technology for Rural Development in the Indian Himalayas
- Prof. Qiu Xue-Zhong: Biological Technology for Rehabilitation of Degraded Mountain Lands Caused by Soil Erosion and Debris Flow in Yunnan of China

11:00-11:20a.m. Tea Break

11:20-12:45a.m. **Session III: Approaches and Technologies (contd.)**

- Ms. J. D. Gurung: Social Aspects of Rural Resources' Management
- Mr. W.J. Jackson: Methodologies for Forest Users' Groups in Nepal
- Mr. B.R. Bhatta: Sloping Agricultural Land Technology (SALT)
- General Discussion on methodologies that are being used at different sites in the Project Areas

12:45-1:45p.m. Lunch Break

Session IV: Working Groups

Working Group I Methods for Baseline Studies and Methodologies for Monitoring

Convener: Dr. B.P. Kothyari
Rapporteur: Mr. P.B. Shah

- Mapping the Project Area
- Soil & Water Status
- Inventory of Existing Bio-Species and Biomass production

Working Group II: Socioeconomic Aspects of Rural Resources' Management

Convener: Mr. Xu Jian Chu
Rapporteur: Ms. Jeannette D. Gurung

- Local Organisation
- People's Participation
- Community Forest Management
- Food Production
- Cash Generation and Marketing Linkages
- Cultural Aspects of Resource Management

Working Group III: Technologies for Land Rehabilitation of Degraded Mountain Ecosystems

Convener: Mr. B.R. Poudyal
Rapporteur: Ms. Charla Britt

- Biological-control Technology on Degraded Land
- Agronomic Technology on Critical lands
- Engineering Rehabilitation Technology on Degraded Lands
- Water-harvesting Technology
- Agro-forestry Technology
- SALT

1:45-5:00p.m. Working Group Session in three meeting rooms (Tea Break at 3:30 p.m.)

7:00-9:00p.m. Video film show at ICIMOD Conference Hall
Organiser: Prof. Lu Rongsen

1. Seabuckthorn
2. Biological Control of Debris Flow & Soil Erosion

JUNE 2, 1993: Working Group Session (Continued)

9:30-11:00a.m. Group Discussion and Consolidation

11:00-11:20a.m. Tea Break

11:20-12:45p.m. Group Discussion and Consolidation

12:45-1:45p.m. Lunch Break

2:00-3:30p.m. **Session IV: Reports from Working Groups**
Chair Person: Prof. Pei Shengji

1. Working Group I: Report by Mr. B.P. Kothyari (25 minutes)
   Comments and Consolidation (25 minutes)
2. Working Group II: Report by Ms. Jeannette D. Gurung (25 minutes)
   Comments and Consolidation (25 minutes)

3:30-3:50p.m. Tea Break

3:50-5:00p.m. Session IV Continues

3. Working Group III: Report by Prof. Chalise (in 25 minutes)
   Comments and Consolidation (25 minutes)
4. Conclusion of the Session: Chairperson

JUNE 3, 1993	Workshop Closure Chairperson: Dr. E.F. Tacke
9:30-11:00a.m.	1. Proposed Workplan for the Project in 1993-94, by Project Coordinator, and Comments on Proposed Project Work Plan 2. Remarks from Director of Programmes, ICIMOD 3. Concluding Remarks from the Chair
11:00-11:30a.m.	Tea Break
11:30-12:45p.m.	Individual activities with ICIMOD staff members
12:45-2:00p.m.	Lunch at ICIMOD Guest House
2:00-3:30p.m.	Participants visit the ICIMOD MENRIS facilities and receive GIS Briefing
3:30-4.00p.m.	Tea Break
4:00 p.m.	Participants' Departure

Workshop participants

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- Mr. B.R. Bhatta
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- Mr. P.B. Shah
- Ms. Jeannette Denholm

INVITEES

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LIST OF WORKSHOP PAPERS

China: Country Reports

- Participatory Rural Appraisal for Project on Rehabilitation of Degraded Lands in Mountain Ecosystems - A Report from Damai Village, Baoshan, P.R. China. Prepared by Kunming Institute of Botany, CAS, China.
- Rehabilitation of Degraded Lands in Mountain Ecosystems: Project Progress Update Report of Baoshan Site in China. Prepared by Kunming Institute of Ecology, Chengdu Institute of Biology, CAS.

India: Country Report

- Status Report on Mountain Ecosystem Rehabilitation/ Restoration in the Himalayas. Prepared by Kothyari, B.P. et al., G.B. Pant Institute of Himalayan Environment and Development, Kosi-Katarmal, Almora, India.

Nepal: Country Report Site I

- Site I, ICIMOD Complex site, Godavari, by Mr. B.R. Bhatta

Nepal: Country Report Site II

- Rehabilitation of Degraded Lands in Mountain Ecosystems, Country Report: Nepal Site II, by Prof. S.R. Chalise

Pakistan: Country Report

- Project Proposal for Rehabilitation of Degraded Lands in Mountain Ecosystems of the Pakistan Himalayas

Approaches and Technologies

- Methodology Adopted for Monitoring Soil and Water Erosion, by P.B. Shah
- Action Research for Community Forestry - The Case of the Nepal Australia Community Forestry Project, by W.J. Jackson
- Sloping Agricultural Land Technology (SALT): A Suitable, Sustainable Technology for the Environmental and Economic Development of Poor and Degraded Mountain Ecosystems, by Bal Ram Bhatta.
- The Biological Control of Mountain Torrents and Mud-Rock Flow in Nanjian County, Yunnan Province of China, by Qiu Xuezhong.

COMPOSITION OF DISCUSSION GROUPS

Group I: Methods of Base-line Studies and Monitoring Methodologies

Venue : Conference Room

Group Members

- Dr. B. P. Kothyari (Convener)
- Mr. P. B. Shah (Rapporteur)
- Mr. B. R. Bhatta
- Prof. Yang Qi Xiu
- Prof. Pei Shengji
- Prof. S. Chalise (Part-time)

Group II: socioeconomic Aspects of Rural Resources' Management

Venue : MENRIS Meeting Room

Group Members

- Mr. Xu Jian Chu (Convener)
- Ms. Jeannette Denholm (Rapporteur)
- Mr. W. J. Jackson
- Dr. B. S. Majila (Part-time)
- Prof. Pei Shengji (Part-time)
- Dr. S. Z. Arifeen

Group III: Technologies for Land Rehabilitation of Degraded Mountain Ecosystems

Venue : MFS Meeting Room

Group Members

- Mr. B. R. Paudyal (Convener)
- Ms. Charla Britt (Rapporteur)
- Dr. B. S. Majila
- Prof. Tong Shaoquan
- Prof. Lu Rongsen
- Prof. S. Chalise
- Dr. M. Hanif
- Mr. R. Shrestha
- Prof. Qiu Xue Zhong

ABSTRACTS OF METHODOLOGY PAPERS

Participatory Rural Appraisal for the Project on Rehabilitation of Degraded lands in Mountain Ecosystems - A Report from Damai Village, Baoshan, P.R. China - Kunming Institute of Botany

The author of this paper provides the reader with background information on the biophysical and socioeconomic details of the site selected for this rehabilitation project in the west of Yunnan Province. The information was gathered by using Participatory Rural Appraisal methods. The PRA methods were used to gain an understanding of the problems and opportunities presented by these degraded lands and to formulate action plans for their rehabilitation in order to relieve poverty.

Over 90 per cent of Yunnan Province, China, consists of mountainous and sloping terrain with slopes of more than eight degrees. An area of approximately 18.7 million hectares is classified as marginal land, caused by over-logging, over-grazing, inappropriate farming practices, and natural disasters.

Forest cover was significantly altered by three major events in China's history. The war against Japan, resulting in military invasion in the 1940s; the national mass movement for steel refining in 1958; and the massive cutting of forests for timber and fuelwood during the cultural revolution decimated this area's forests. In addition to these factors, the increasing demands of the growing population for food, fuel, timber, and even cash income placed additional strain on the forest resources. Crop residues replaced fuelwood, fodder shortages led to overgrazing of pasturelands, and mismanagement of uplands led to further deterioration.

The biggest problem identified by the community was that of water supplies. Only one-third of paddy rice land is irrigated, and from a distant source; this causes continual conflicts amongst farmers. Small ponds and reservoirs often dry up, and a serious drought in 1992 caused a drop in food production by 40 per cent.

Fuelwood shortages are faced by two-thirds of the population. Unable to access fuelwood from government reforested lands, farmers spend a lot of time collecting small pieces of wood and digging up stumps. One half of the households buy fuelwood from the market. The need for fuelwood for tobacco curing intensifies the problem.

Most uplands have been abandoned due to grazing pressures and the unproductivity of soils there. This has brought about a decrease in the number of livestock held by households interviewed.

Soil erosion and mud-rock flows commonly cause damage to paddy fields and houses in Damai village. Severe gullies and landslides can be seen in the upland areas.

Cash incomes are derived from the sale of sugarcane and livestock. However, sugarcane market prices are not high, and livestock is often affected by diseases. Off-farm work is also an important source of cash.

Ecological Environment and Mud-Rock Flow in Nanjian County of Yunnan Province - Kunming Institute of Ecology

Researchers at the Kunming Institute of Ecology surveyed degraded sites in seven counties within Yunnan Province to select one for detailed investigations and the application of ecological engineering methods for rehabilitation work. They selected Nanjian County and have presented here a description of that site.

Nanjian County is situated in northwest Yunnan, in the southern part of the Dali Bai nationality Autonomous Prefecture. People of the *Yi*, *Han*, *Bai*, and *Miao* nationalities inhabit this region.

Nanjian town is located at the base of two mountains, on a plain of ten square kilometres, with Nanjian river threading its way through the centre. Due to mud-rock flows, the riverbed is elevated above the surrounding farmland, which is rich and fertile due to alluvial soils. Previously, the area was forested with evergreen broad-leaved trees. Historical factors and population pressures have brought about forest degradation and soil erosion, resulting in the formation of mud columns with scattered pine trees on mountain tops. Despite the barren conditions, farmers continue to cut grass and trees here, dig plant roots, and graze their livestock.

Huge gullies have formed, bringing down torrents of rock, mud, and water during monsoon rains. In 1986, this debris

inundated the first floor of a department store in the town and damaged roads, fields, houses, and bridges in the valley. The safety of town dwellers is threatened whenever a rainstorm occurs.

The severe degree of mud and rock flow here causes the development of different types of land formations - steep walls, deep gullies, clay poles, etc.

The Kunming Institute of Ecology team has already begun to collect specimens, establish nurseries, and identify biological-cum-engineering methods of controlling mud-rock flow damage and restoring the land to be recovered with plants and eventually restoring productivity.

Action Research for Community Forestry: The Case of the Nepal Australia Community Forestry Project - W.J. Jackson

In this paper, the author defines action research and describes it in the context of rural development by presenting a case study from a community forestry project that seeks to involve people in their own development.

While there are numerous definitions of action research, the common feature is the intertwining of research with action through a conscious and deliberate cyclical process of observing, reflecting, planning, and acting. It involves social systems in which the researcher is a part, seeking out practical solutions to problems with the participation of villagers, and allowing the researcher to learn of different world views and opinions. The author describes various models of action research, providing figures and diagrams to supplement his characterisations.

A key step in the process is the reflection on the situation which can challenge assumptions on which project planning is based. The author describes a key shift in the focus of NACFP that came about during the process of deliberate reflection, bringing about the formulation of new concepts and their testing. Early phases of NACFP held a predominant concern with the creation of resources (plantations), first through a technocratic, top-down approach then through a participatory, bottom-up approach. Once the project team realised, through action research, that the objective of community forestry to improve the management of local forests was not being met, the shift was made to focus on the management of existing and new forests rather than the establishment of plantations. This new concept was then tested and refined.

Further enquiries led to an understanding that local administrative units of the Government were inappropriate institutions for effective management of local forests and, sometimes, produced conflicts and inequities at the village level. The concept of 'users groups', based on usufruct rights to forest resources, emerged from the subsequent reflections of the staff. This finding led to the focus on forest user groups as the new entity responsible for management. Both the Master Plan for the Forestry Sector, Nepal (1989), and the recently approved Forest Act of 1993 acknowledge the user group as the focus for community forestry in Nepal.

Many of the issues of community forestry development are social rather than technical, making the problems unclear to forestry staff. Because action research can embrace both the hard and soft social sciences, it is a valuable approach when dealing with problems between people and the natural environment as, for example, in rehabilitation projects.

Sloping Agricultural Land Technology (SALT): A Suitable, Sustainable Technology for the Environmental and Economic Development of Poor and Degraded Mountain Ecosystems - B.R. Bhatta

SALT is a soil-conservation oriented farming system developed in the Philippines in the late 1970s. It is described by the author through definitions, diagrams, and species' lists in this paper. Its suitability to mountain characteristics and their implications are presented in tabular format; universal elements of SALT systems and elements present in SALT systems of the HKH Region are described in the document.

SALT is a relatively simple, practical, low-cost and environmentally appropriate method of diversified farming on hilly lands for the sustained production of biomass at different altitudes and with minimal soil erosion. Under the SALT system, degraded slopes are divided into strips of land for cultivation and separated by double hedgerows of leguminous trees or shrubs planted along contour lines. These hedgerows act as erosion barriers to stabilise slopes, increase soil fertility, and provide fodder, fuelwood, and biomass. Numerous combinations of annual and perennial species are possible, with or without livestock and forestry components. Three basic types of SALT systems can be distinguished: SALT I is a crop-based system, SALT II is a livestock-based system with emphasis on fodder crops, and SALT III is forestry-based, often practised on steeper and higher slopes.

SALT systems can contribute to increased productivity through higher yields, resulting fro[illegible]n nitrogen fixation and hu[illegible]n availability due to mulchi[illegible]aus second contributing fa[illegible]ng. A higher level of diver[illegible]co[illegible] is a farming system, [illegible]sity in the and harvestin[illegible]g of diversified crops are st[illegible]aggered throughout the year, complemented by livestock and forestry enter-

prises. This results in better utilisation and efficiency of both land and labour; it also ensures income generation throughout the year.

SALT systems have the potential for improving farming systems in the HKH Region, but they require trials and demonstrations on steeply sloped terraced lands before being widely promoted. This system can provide many advantages over conventional farming systems typical of the HKH Region, for example:

- steep-slope farming without need for terracing
- multiple benefits through diverse species, regular incomes
- nutrient recycling and soil protection
- versatile, multi-storey planting
- relief of dependence on common property for livestock feed.

ICIMOD has initiated an action-cum-research project to test SALT on degraded lands in Sichuan Province, China, as an initial site. It is hoped that, if successful, SALT systems can be introduced to farmers throughout the HKH mountains.

Methodology Adopted for Monitoring Soil and Water Erosion - P.B. Shah

The author describes a research project that was undertaken to examine soil erosion, hydrological/sedimentation and soil fertility processes in relation to land-use changes in the Jhikhu Khola watershed, east of Kathmandu. Intensive mapping and monitoring were carried out from the beginning; the initial work involved basic resource mapping (topography, geology, land use, geomorphology, soils, active erosion) and setting up a climatic, hydrological, sediment, and erosion monitoring programme using Rapid Rural Appraisal methods and a Geographic Information System to evaluate the data.

Water flow, erosion, and sedimentation are key processes in the study of resource sustainability in Nepal. Removal of topsoil is a fundamental problem in soil management, and sedimentation downstream causes siltation problems in irrigation channels and hydropower generating reservoirs, leading to increased flooding of fertile lowlands. Although the role of natural forces in the Himalayas is not to be ignored, human-induced erosion is also a major cause of the degradation. Irrigation, road construction, slope modification, fodder and litter collection, and grazing are just some of the causes of soil movement and sedimentation.

There are no standard techniques for conducting quantitative studies of erosion rates in the Himalayas, because of the unusual physiographic setting, the enormous magnitude of these processes, extensive terracing of slopes, and extreme variations in microclimatic conditions. Therefore, the methodology of this research necessitated the establishment of separate monitoring systems for the watershed, sub-watershed, and erosion plot components of the system. Water flow, erosion, and sedimentation were evaluated for each of these components. Data so far analysed show that most of the erosion results from a few intensive storms, primarily occurring in the early and late monsoon season.