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ENVIRONMENTAL EDUCATION IN NEPAL

— A REVIEW —



NATIONAL CONSERVATION STRATEGY IMPLEMENTATION PROGRAMME
NATIONAL PLANNING COMMISSION, HMG NEPAL, IN COLLABORATION WITH
IUCN, THE WORLD CONSERVATION UNION

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NPC/IUCN NCS Implementation Programme

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LIST OF SELECTED ACRONYMS

AA/N	Action Aid/Nepal
ACAP	Annapurna Conservation Area Project
ADB	Agricultural Development Bank
AGFUND	Arab Gulf Fund for United Nations Development
AHW	Animal Health Workers
APROSC	Agricultural Project Services Centre
B.Sc.	Bachelor of Science
BS	Bikram Samvat
BTTC	Balaju Technical Training Centre
CDC	Curriculum Development Centre
CECI	Canadian Centre for International Studies and Cooperation
CEDA	Centre for Economic Development and Administration
CERID	Centre for Educational Research, Innovation and Development
CFA	Community Forest Assistant
CFF	Community Forest Foreman
CFW	Community Forest Watcher
CRT	Centre for Rural Technology
CTC	Cooperative Training Centre
CTSDC	Curriculum, Textbooks and Supervision Development Centre
DLS	Department of Livestock Services
ECCA	Environmental Camps for Conservation Awareness
GTZ	Deutsche Gesellschaft Fur Technische Zusammenarbeit
HAN	Hotel Association of Nepal
HMG	His Majesty's Government
HMTTC	Hotel Management and Tourism Training Centre
IAAS	Institute of Agricultural and Animal Sciences
IHDP	Integrated Hill Development Project
INSAN	Institute of Sustainable Agriculture
IOF	Institute of Forestry
IUCN	The World Conservation Union
JT	Junior Technician
JTA	Junior Technical Assistants

KMTNC	King Mahendra Trust for Nature Conservation
LWS	Lutheran World Service
MLD	Ministry of Local Development
MOEC	Ministry of Education and Culture
NAFP	Nepal Australia Forestry Project
NASC	Nepal Administrative Staff College
NCRTC	Nepal Conservation Research Training Centre
NCWCA	Nepal Centre for Women and Children's Affairs
NESC	Non-Formal Education Services Centre
NESP	New Education System Plan
NFEJ	Nepal Forum for Environmental Journalists
NPC	National Planning Commission
NPI	Nepal Press Institute
ODA	Overseas Development Administration (UK Government)
PCRW	Production Credit for Rural Women
PEP	Post Earthquake Programme
PEP	Primary Education Project
PIN	Plan International Nepal
PSTC	Postal Service Training Centre
RATC	Revenue Administration Training Centre
RECAST	Research Centre for Applied Science and Technology
RLDTC	Regional Local Development Training Centre
SCA	Soil Conservation Assistant
SCF/UK	Save the Children Fund/UK
SCFUS	Save the Children Federation (USA)
SEDEC	Science Education Development Centre
SFDP	Small Farmer Development Programme
SLC	School Leaving Certificate
SPACE	Society for Participatory and Cultural Education
TRUGA	Training Project for Rural Gainful Activities
UK	United Kingdom
UMN	United Mission to Nepal
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNICEF	United Nations Children's Fund
USA	United States of America
USAID	United States Agency for International Development
USC	Unitarian Service Committee of Canada
WTC	Women's Training Centre

NATIONAL CONSERVATION STRATEGY IMPLEMENTATION PROGRAMME

The National Conservation Strategy (NCS) for Nepal was completed in 1987 and endorsed as policy in 1988. Nepal's NCS is being implemented through a series of programmes in the key areas of environmental planning and assessment, education and public information. Coordinated by the National Planning Commission (NPC), the implementation programme involves representatives of all the major ministries and government departments concerned with environmental issues, as well as an increasing number of local non-governmental organisations (NGOs).

The NCS was prepared and is being implemented with technical assistance from IUCN - The World Conservation Union. Nepal is one of over 700 members of IUCN, and is among more than 40 governments that have been assisted by IUCN in developing National Conservation Strategies.

Founded in 1948, IUCN is the largest professional world body working to conserve the earth's soil, land, water, air and life systems. IUCN is active in over 120 countries, and is a unique international agency whose membership includes both governments and non-governmental organisations, providing them equal opportunity to work together to achieve effective conservation action. IUCN's aim is to establish a tangible link between development and the environment that will result in a lasting improvement in the quality of life of people all over the world.

PLANNING AND ASSESSMENT

An Environment Core Group has a key role in developing new environmental policies and procedures best suited to Nepal. The Group comprises of some forty senior government officials from the fifteen ministries and departments and all NPC divisions. Over several years, this Core Group is participating in a series of practical, field-oriented professional interactions, as well as in intensive policy development workshops and secondments to the NPC and relevant ministries.

While the Environment Core Group programme for developing environmental planning policies is continuing at the national level, the NPC/IUCN NCS Implementation Programme has initiated local environmental planning activities through local NGOs. Communities are being assisted in the preparation of model

environmental plans in eight villages and two districts, Lamjung and Arghakhanchi, to test field planning methods, including community involvement processes. This local planning effort will be used by the Core Group as a practical model for the formulation of national environmental planning guidelines and procedures.

The Environment Core Group is also engaged in preparing national and sectoral guidelines for environmental impact assessment (EIA) of development projects. Linkages, through the Core Group, with the NCS Environmental Planning Programme, will ensure that the procedures and methods defined for the appraisal of projects will be appropriate to the land use planning framework and field methods tested and developed under that Programme.

HERITAGE CONSERVATION

Another component of the NCS Implementation Programme is concerned with conserving cultural and natural heritage of national significance. Under the NPC's leadership, the NPC/IUCN NCS Implementation Programme is working closely with the Nepal Heritage Society, other local NGOs and relevant government ministries to compile a register of national heritage sites, their condition and current management. The programme will involve establishing criteria for national significance, critical review of existing inventories and comprehensive field survey, particularly for natural sites of importance outside existing protected areas. The preparation and implementation of management plans for selected demonstration sites that combine natural and cultural attributes of outstanding value is also a key element of the programme.

POLLUTION CONTROL

The first stage of the Pollution Control programme was completed in December 1990 and resulted in a comprehensive inventory of industrial sources of air, water, soil and noise pollution in the country. This national survey, undertaken in collaboration with the Nepal Environmental Conservation Group (NECG), identified industrial pollution problems requiring immediate attention.

The second stage of the pollution control programme is a demonstration project for industrial pollution assessment and control in the Balaju Industrial District, Kathmandu. The project commenced in January 1991 and will result in a pollution control management plan for the district. This stage also includes a comprehensive survey of laboratory facilities in Nepal.

Stage three of this programme will extend the implementation of management plans to industrial complexes which were identified in the national survey as requiring urgent pollution control attention. Management plans will be implemented in collaboration with relevant ministries and related public and private sectors. Draft standards will be prepared to cover all pollution-prone categories of industries operating in Nepal.

The wider ranging objective of this project is a detailed and comprehensive understanding of Nepal's pollution situation, with enough quantified data to establish practical pollution standards and technical capability to apply them.

As a preliminary exercise, the programme undertook a review of pollution studies conducted to date in Nepal, examining levels of water, air, land and noise pollution at sample sites in selected districts. This review provided the necessary background information for the design and implementation of the national survey of industrial pollution sources.

PUBLIC INFORMATION

The NCS Public Information Programme focusses on two main elements: publications support to other components of Strategy implementation and public environmental awareness activities. An NCS Newsletter provides information and updates on the status of the NCS implementation programme and on agencies and programmes working in environment-related fields. Public awareness activities are implemented through local NGOs and include a strong training element aimed at orienting members of the media and professionals of various disciplines towards consideration and coverage of environmental issues.

Information is being disseminated at the community level through a wall newspaper, with the objective of expanding the currently limited information on conservation issues available to rural communities. Two weekly radio programmes, investigative reports and an interdisciplinary seminar series also form part of the Public Information Programme.

EDUCATION

Under the NCS for Nepal, a series of education and training projects are being designed and implemented within the NCS Environmental Education Programme. These projects aim to enhance the coverage of existing environmental management and resource conservation subjects in formal and non-formal education programmes in Nepal. A National Environmental Education Conference will provide a forum at which consensus can be reached on Nepal's environmental education needs.

Primary school curriculum is a priority concern of the programme. The Environmental Education in Primary Schools pilot project includes the preparation of model environmental curricula, revision and expansion of current textbooks and the development of associated resource materials. Teachers and students are being involved in a series of trial and evaluation workshops to refine the lessons and teacher's guides. This package will be comprehensively tested in selected schools, accompanied by teacher training and evaluation. Ultimately, the project aims to have the tested environmental education materials integrated into the national level primary school curriculum.

The Environmental Education Programme further emphasises pre-service and in-service training of extension workers and government officers. Environment courses have already been introduced on a trial basis within three governmental training centres, and this work will continue to be expanded to produce and test training packages for a number of sectors.

These activities were based on the Environmental Education Review presented in the pages which follow. The Review of Education courses and projects in Nepal was undertaken as a first step in the environmental education programme to give it relevance and direction.

Recently the United Nations directed its family of organisations to give greater emphasis to integrating environmental concerns and activities within their programmes. Bilateral donors have been given a similar mission by their respective governments. This stress on environment by assistance agencies, and the significant contribution by NGOs in the field, is leading to a wider range of new environmental education activities and, where applicable, modification to existing programmes to accommodate environmental education components. This process of change was gaining momentum during this Review preparation. If any organisations working in environmental education have not been covered, or if others have not received due credit for recent initiatives, the NPC/IUCN Programme would welcome update information which could be incorporated into a future edition of this Review.

INTRODUCTION

The National Conservation Strategy for Nepal sets out an agenda for conservation action. This includes an Environment Education Programme covering the formal and non-formal sectors. As a first step in the Programme, this review was conducted to document the status of environment education and training in Nepal, and to identify desirable additions and changes to courses available.

Environmental Issues and Problems in Nepal

Nepal has a tradition of natural resource conservation practices in the rural areas. These natural resource management systems have developed over the years as a result of rural people's experiences and interaction with the local environment to meet their daily needs. However, these are not static and continue to respond and develop according to the social, economic and political circumstances people are living in. National policies and changes in population pressure on available resources are two factors that have played a role in these changes.

Although villagers may not understand the scientific principles behind the systems they manage, they have long-term exposure to the way the environment reacts to their activities. They do not necessarily have altruistic motivations in preserving their natural and cultural heritage; rather, it is a practical matter of survival. People's ability to act in an "environmentally friendly" way, in rural areas of Nepal, is usually more related to the foremost priority of meeting their livelihoods than to their awareness of environmental issues or levels of education. Poverty and population pressure are central and not side issues to environmental degradation. Many rural environmental problems stem from the socio-economic position of villagers and the political and economic environment they operate in, rather than from a technical problem of villagers being ignorant of their environment.

In Western countries, where rural populations are small and the percentage of the population directly involved in agriculture is low, nature conservation is a different issue. In Nepal, rural localities targeted for conservation also provide a livelihood for local inhabitants. The only solution which will reverse environmental degradation is

one which involves these people in both the planning and the implementation of conservation policies.

Rural sites are not the only areas suffering from environmental degradation in Nepal. Growing urban centres and development of small industries have raised pollution problems for both water and air quality. Environmental abuses are also common when society is not interacting closely with and relying on the immediate surroundings for daily needs. Short-term economic interest in an area may encourage lack of environmental concern as it becomes of no personal consequence whether a resource is conserved or not. Once again, effective systems of planning and development which involve all affected interests are required if the quality of urban life in Nepal is to improve.

Need and Concept of Environmental Education

What are the aims of environment education?

The ultimate aim of environment education is to ensure that effective actions are taken to conserve and enhance the environment. These actions would not always be protectionist policies setting aside nature from people. People, whether living in rural or urban settings, must use the environment as a resource. Urban populations, who do not rely on direct interaction with their natural environment for their livelihoods, experience special environmental problems. They will need a different action agenda to that of villagers. However, all communities require environment education if they are to adequately define their action agenda, and then to act on it with commitment and understanding.

The need to change attitudes is often cited as the key to changing actions. Yet environment education calls for a deeper analysis of the reasons why people act the way they do, seeming to destroy the very environment which guarantees their future. Although attitudes do shape people's behaviour, their livelihood needs are a stronger pressure on the way they behave, especially for poor, low-income families. Urgency to meet immediate needs often overcomes the ability to take into account long-term environmental considerations. Destructive actions leading, for example, to deforestation and soil erosion, may stem from the "poverty-trap". Rural people are often aware of the problems and have ideas about what to do, but do not have the power or resources to act.

Creating awareness of the technical and biological aspects of environmental problems can only go part way to slowing environmental degradation. What are often perceived as negative or uninformed attitudes towards the environment are in fact actions resulting from the socio-economic climate in which people live. Basic

changes in development policies are often required. Change cannot be promoted through environment education alone. This is acknowledged in the National Conservation Strategy which includes development of new environmental policies and procedures based on local environment planning activities. Preparation of national and sectoral guidelines for environmental planning and impact assessment of projects is currently underway.

Environment education must include these political, economic and social issues as a central feature to understanding the causes and process of environmental degradation. It is essential, for sustainable development, that pathways are sought to maintain the ecological balance and sustain yields from renewable resources. The people themselves need to be involved in the planning process. These concepts and ideas, rather than a purely technical approach, have to be clearly raised and explored in environment education if it is to lead to successful action. Integration of conservation education into the formal education curricula can contribute significantly to tackling environmental problems only if appropriate concepts and issues are covered.

To whom and how should environment education be taught?

To many, the word "education" implies a transfer of information in a top down manner and in a formal setting; the knowledgeable teacher passing on facts to ignorant students. Yet modern concepts of education are about enabling individuals to identify and analyse problems and develop solutions to them. This study takes the broader definition of education, considering non-formal and in-service training opportunities in addition to formal courses. The study assesses course content and materials in the belief that children and trainees have their own first-hand knowledge and experience of the environment, and that this needs to be tapped as a starting point to build on.

Teaching methods and the levels of student participation are key to the success of environment education, in addition to the content of courses. Causes and solutions to environmental problems are usually case or location specific, and cannot be taught as a generalisation. Ideas and possibilities can be suggested and discussed, and the process for problem identification and action planning can be taught. However, students need practical experience. Action planning and implementation has to be worked through on a case by case basis involving the individuals who live or work in the area. Therefore environment education includes interaction with people and their environments, problem analysis and ways in which to plan corrective action.

This aspect of environment education is especially important for trainees who will be conducting extension work or further training courses themselves. Environment education must include theory and practice of the processes of participatory appraisal and planning.

In school level education it is preferable to integrate environmental issues into existing subjects in the curricula, rather than attempting to introduce environment as a separate subject. This approach emphasises the importance of the issues and their relationship to all subjects. Introducing a separate subject may result in the environment being treated as a separate issue rather than integral to all aspects of our daily lives.

Objectives of the Study

The objective of this study is to review and make a critical evaluation of the existing curricula, textbooks and resource materials on environmental subjects in Nepal. This review covered three areas of education and training:

- national primary and secondary school education: science and social studies subjects;
- proficiency certificate and bachelor's level training: science, forestry, engineering, health and sanitation, education, nursing education and agriculture;
- non-formal training programmes: selected training and in-service programmes run by government and non-governmental organisations.

The review identifies issues and materials presently included in course content, and associated deficiencies. Based on the review, the study makes recommendations on appropriate curriculum development to integrate environmental issues more efficiently into the education system.

Methodology

A comprehensive review was made of the existing school curricula and textbooks in science and social sciences. This involved detailed study of the courses prescribed for students of formal and non-formal (adult) education. Units and chapters relevant to the study of the environment, conservation of natural resources and cultural heritage were identified. Course content, presentation of facts and quality of illustrations and exercises given in the textbooks were assessed. A group interview was conducted with selected, experienced school science teachers on the effectiveness of these materials and activities.

In post-school education, a review was undertaken of curricula for Proficiency Certificate and Bachelor Degree courses in science, social studies, geography, nursing, and auxiliary health work. The prevailing gaps in the syllabi, along with

some suggestions regarding how these could be addressed, have also been pointed out.

Environmentally related courses prescribed by HMG training institutes in science and social studies subjects were also reviewed, including courses offered in cottage and village industries and to forest rangers, women workers and civil servants.

Limitations of the Study

Evaluation of content in environmental and conservation subjects at the tertiary level and in-service training courses was based on literature made available to the team of researchers, such as the prospectus and syllabi. Detailed evaluation of teaching methods and the effectiveness of including these subjects was not made in the courses. The present work could also be enhanced by an evaluation of the levels of environmental understanding among school students.

REVIEW OF ENVIRONMENTAL SUBJECTS IN SCHOOL LEVEL CURRICULA

The Formal School Education Programme for primary and secondary levels is being implemented in over 19,000 schools in Nepal. The total school-going population in the 5 to 16 year age group amounts to 2.7 million children. The majority of Nepal's school children come from poor and low income families in rural areas. The schools are staffed by over 78,000 teachers, of whom nearly 8,000 are women, drawn primarily from among Proficiency Certificate and Bachelor's Degree holders for placement in the secondary schools.

People with up to primary school education are mostly employed by HMG or private employers in basic clerical jobs, or return to their family farms or businesses. Secondary school graduates find employment at lower non-gazetted officer and equivalent levels. Discussion and understanding of the nature and cause of environmental problems during early school years could lead to more effective action, whether the students return to the village and farm or are employed by HMG.

The school education system in Nepal is of a ten-year duration and is organised in 3 consecutive tiers: 5 years' primary level, 2 years' lower secondary level and 3 years' secondary level. The expansion of primary education has been very rapid over the past two decades, and today most children in the primary school age group have access to education. Access to primary education is twice as high as to lower secondary and three times as high as to secondary school. Adult education and other non-formal educational programmes have also been introduced. Technical trade schools provide 3 years of instruction and one year of on-the-job training following completion of the course.

The most important landmark in the evaluation of school level curricula was the implementation of the New Education System Plan (NESP) in 1973. Under this plan, the secondary level science curriculum was redesigned to develop scientific skills, attitudes and the ability to relate scientific phenomena to experiences in daily life.

Prior to the introduction of NESP, little emphasis was placed on environment education. Curricula did contain topics relating to the natural environment, natural

resources, and the relationship between people and the environment, particularly in science and geography textbooks for grades 9 to 10. However, the choice of material was relatively unsystematic and ungraded and therefore difficult to absorb. It was also designed to impart factual details on the environment as an external and neutral agent, rather than being activity and application oriented. The school curricula thus failed to emphasise the root causes of environmental degradation, its relationship to society and how action can be taken to reverse the trends. In addition, the materials demanded rote learning and memorisation of factual information.

NESP incorporated further material in the natural environment and its protection. It offered a wide variety of subjects and a broad based curriculum at school level. Science and social studies were prescribed as main subjects at lower secondary level (grades 4 to 7). Geography and history at the secondary level (grades 8 to 10) were augmented by other main subjects including science, health and physical education.

School level curricula were again revised and updated in 1982 (2038 BS). Provision was made for subjects such as science, geography and history as electives for grades 9 to 10. These curricula for science and geography appear somewhat more slanted towards activity and application, especially in the case of materials concerning the natural environment and its conservation. Although predominantly theoretical, science textbooks contain some application-based activities in a chapter on the protection of wildlife in Nepal. However, conservation is not only a protection issue, or an activity abstract from villagers' daily lives. Materials on the ecosystem have been rendered more realistic and relevant with the inclusion of topics such as the impact of population growth on land and the water ecosystem. Coverage of these important socio-economic issues needs further expansion.

CONTENT OF SOCIAL STUDIES CURRICULA (GRADES 1-10)

A summary is given below of units relevant to environmental and conservation issues, taught under social studies in primary and secondary schools.

Primary Level (Grades 1, 2 and 3)

Studies in Nepali language and literature provide a preliminary introduction to students' immediate physical cultural and biological environment, and its importance to people. Units covering this include 'The Basic Needs of Man', 'Homes', 'Our Family', 'Our Festivals', 'Our Neighbours', 'Our Schools', 'Our Town and Market', 'Food', 'Man and Domestic Animals', 'The Earth'. A few items on common environmental hazards such as diseases are also included.

Lower Secondary and Secondary Level (Grades 5 to 10)

Environmental units are included in geography and economics.

Grades 4 to 6: Social studies is currently being taught as a single subject. Topics are included under three separate units:

- The first unit, 'Our History and Ourselves', provides a general introduction to Nepal's civilisation, culture and national traditions, especially the cultural aspects of the Kirat, Lichhavi and medieval periods of Nepalese history.
- In the second unit, 'Our Geography and Ourselves', concepts are included on 'Physical Divisions of Nepal', 'Rivers of Nepal and Their Importance', 'Climate of Nepal', 'Natural Vegetation' and 'People of Nepal'. A preliminary topic on 'Our Natural Environment and its Relationship with People' has also been included.
- The third unit, 'Our Economic Life and Ourselves' (grades 4 and 5), includes introduction of agriculture and other occupations such as trade and service.

Grade 7: No materials on environment are offered to students of grade 7 in social studies. A separate unit entitled 'The Earth and Us' gives an introductory account of 'Earth', 'Climate', 'Atmosphere', 'Hydrosphere' and 'Lithosphere'.

Grades 8 to 10: A few units in geography are relevant to environment and conservation in Nepal. These include:

- Unit 23 'Natural Resources of Nepal'
- Unit 24 'Agriculture'
- Unit 25 'Industries'
- Unit 28 'Population'
- Unit 37 'World's Natural Resources'
- Unit 38 'Agriculture and its Economic Values'

Similarly, some units in physical geography and economic geography such as 'Humankind and Economic Geography', 'Climate and its Types', 'Surface of the Earth', 'Change of Seasons', 'Types of Lakes', 'Land Forms', 'Winds' and 'Evaporation and its Factors' are included to provide students with a general understanding of physical environment and life supporting systems as well as human use of natural resources for economic growth.

GAPS IN STUDY CONTENT FOR SOCIAL STUDIES (GRADES 1 TO 10)

The study of nature and culture has been integrated with teaching of language skills through short stories, essays and poems. The main gaps which are evident in the courses relate to Nepal's mountains, rivers, ponds, lakes, pastures, gardens and parks and their immediate environment and conservation. The geography of Nepal has been incorporated in the courses to help students appreciate the natural wealth of Nepal and its role in the economy and well-being of the Nepalese people. These economic relationships are fundamental to the students' understanding of environmental degradation. Introduction of further course content related to people and the environment would be beneficial, to explore the types of damage inflicted by people upon Nepal's rivers, mountains, pastures, forests and cities, and more importantly the reasons behind these damaging actions.

In the unit on the 'History of Nepal' further material could be introduced to promote the students' respect for various socio-cultural and religious monuments and to develop the habit of protecting and preserving them.

Grade 3: The unit 'Humankind and Economic Geography' offers an opportunity for students to understand the types of environment and the potential and constraints for economic growth. It provides an introduction to the effects of human activities such as agriculture and forestry on environment. The consequence of population growth on the quality of environment is not covered. Strategies for minimising negative environmental impacts are also missing. The units 'Man and Economic Geography' and 'Geography of Nepal' call for inclusion of some understanding of the present status of vegetation, water bodies and the land ecosystem, and the reasons they have degraded.

Grades 4 to 7: Areas not covered in the curricula are:

- the interrelationships between population, economic growth and resource depletion;
- agricultural practices and depletion of soil and forests;
- conservation and socio-cultural practice of Nepal;
- natural and cultural heritage and its conservation in Nepal;
- local development committees and their role in conservation of natural and cultural heritage;
- transportation and urbanisation and their role in depletion of natural resources;
- population growth and the quality of the environment.

These additions to curricular content would enable students to understand the close link between human activities for economic growth, or even subsistence, and destabilisation of the equilibrium between people and nature.

Grades 9 and 10: The unit 'Humankind and Economic Geography' examines natural resources of the world and their distribution. However, little information is given on the present status of natural resources worldwide and on global environmental problems.

The unit 'Geography of Nepal' covers forest, soil and water resources, but the need to understand the effects of agricultural, industrial and other economic activities on the quality of soil, water and air have not been emphasised. The same observation holds true for the material on population. Issues relating to the protection of minorities and vanishing ethnic groups of the world and their cultural heritage have not been incorporated in the unit entitled 'Main Ethnic Groups and Their Life Styles'.

CONTENT OF SCIENCE CURRICULA (GRADES 1 TO 10)

The science curricula for school students has three specific sets of objectives, relating to subject knowledge; laboratory skills; and to attitudinal development. Some objectives, such as developing an ability to apply knowledge towards solving day-to-day problems and enabling students to discover a cause-effect relationship in natural processes are particularly relevant to the basic purposes of environment and conservation education.

The following objectives for environment education have been identified in the current secondary school science curriculum:

1. To develop fundamental knowledge of scientific terms, facts, concepts and generalisations
2. To develop certain basic working scientific skills
3. To develop scientific approaches to work
4. To develop an awareness and appreciation of natural phenomena occurring in the environment
5. To develop a curiosity and quest for information on society and the world.

The existing science curriculum provides for the study of general science, health education and physical education from grade 4 onwards. A study of general science courses reveals that several units related to environment and conservation education have been included for students of various grades.

Lower Secondary Level

Grades 4 to 7: Topics on science, health education and physical education have been incorporated within a single and compulsory subject of study. Many topics related to biology and ecology have been included under teaching units of 'Living

Things', 'Plants Around Us', 'Animals Around Us', 'Living Things and Environment'. These units aim to develop a preliminary understanding of facts and concepts concerning the interrelationships between plants and animals and other natural phenomena.

Grades 5 and 6: Some important aspects of the physical environment, such as earth and soil, land, water and air are included, providing students with a preliminary understanding of the life support systems in nature.

Beyond grade 6, topics on the physical environment have been incorporated in courses on physics and chemistry.

Secondary Level

The curriculum at the secondary school level is designed for developing students' understanding of the relationship between man and plants and animals. One unit each on 'Conservation of Natural Resources', 'Plants and Animals and their Relation to Environment', and on 'Air', 'Water' and 'Soil' has been included in the curriculum.

Grades 8 to 10: In grade 8, only general science and health education have been jointly treated as a single and compulsory subject of study. A single unit is included on 'Living Beings and Environment.' This unit contains some important concepts of ecology such as the 'Ecosystem', 'Nitrogen Cycle', and 'Food Chain and Adaptation'.

Grades 9 and 10: For the last two years of schooling, general science is offered as an optional subject and includes courses on human physiology. The unit 'Some Useful Plants and Animals of Nepal' deals with forests, forest products and wildlife conservation practices in Nepal.

The present courses on biology have thus attempted to provide students with a preliminary understanding of the physical environment and life-support mechanisms, the structure and function of living things, as well as the interaction between the physical environment and the living world, including people.

Some units of the general science course under the physical sciences (physics, chemistry and earth science) are also related to environment and conservation education. These units include 'Atmosphere', 'Atmospheric Pressure', 'Air and Water', and 'Soil'. A separate unit has been incorporated on sources of energy and the energy crisis. Students are taught preliminary concepts concerning the roles of important physical factors such as heat and light as well as gases such as hydrogen, nitrogen, oxygen and carbon dioxide in the environment. A unit entitled 'Earth' gives

a general overview of natural resources, with an emphasis on rocks and minerals and some environmental concerns such as land erosion and earthquakes.

In summary, chemistry subjects at the school level cover topics relevant to environment and conservation education, including different states of matter and their properties, chemical reactions, chemical properties of acids, bases and salts, non-metallic gases and other compounds, metals and their compounds and organic chemicals. These units introduce concepts on chemical properties, the structure of the atom, preparation and use of important chemicals and laws covering chemical use.

The courses in biological sciences include units that deal with basic components of living systems, diversity of plants and animals, biological resources and their use, plant and animal behaviour, physiology of plants and animals, and ecology. In the area of ecology, several concepts related to the ecosystem and its types, animal adaptation, plant communities, food and food chain and some biochemical cycles are taught to the students.

GAPS IN STUDY CONTENT FOR SCIENCE (GRADES 1 TO 10)

An emphasis has been laid in the school science curriculum on the broad concepts relating to the environment. Little effort is made to provide the students with an understanding of the ways in which science can be harnessed for the conservation of natural resources and cultural heritage, and how economic and social factors have to be incorporated into planning for sustainable resource use.

Environment has been given little emphasis in the science course for lower secondary schools in Nepal. No supplementary activities, such as field trips, are undertaken. The curriculum is based on a conventional teaching approach; people and their role in maintaining environmental quality do not receive attention as in many other Asian countries such as India, Korea, Thailand and the Philippines.

The science curriculum at the secondary school level in Nepal places some emphasis on environmental studies, but ecology is not taught as a separate discipline. Concepts of ecology have been introduced under different subjects of studies in science and the humanities, such as biology, chemistry, physics, geology, and geography.

Students are given few opportunities to develop and practice scientific skills and attitudes that can contribute to the conservation of natural resources and cultural heritage. More importantly, there is no provision for developing awareness of the

reasons behind the detrimental impact of human activities on natural resource quality and cultural heritage preservation.

The following broad conclusions can be drawn:

- i. Some areas of science study which are directly related to the maintenance of environmental quality are still ignored in the courses of study. These areas include:
 - human ecology, including the impact of population on the quality of the environment, and the social, economic and political causes of environmental degradation;
 - environmental pollution and its control.
- ii. Little attention has been paid to creating an awareness among students of the global ecological crisis and to further develop their skills and attitudes with regard to conservation principles and practices.
- iii. Study of the biosphere, as a component of the earth's environment, is not included in the curriculum.
- iv. In chemistry, topics such as organometallic compounds, toxic and hazardous, chemicals carcinogenic chemicals and their effects on human health, and environmental quality are excluded from the course of study. An understanding of the major sources of the chemicals and chemical processes which contribute to environmental damage, as well as methods for their avoidance, would help students in cultivating an attitude towards prevention and treatment of environmental damage. Units on the chemistry of air, water and soil pollution are essential for providing students with some knowledge of the chemical aspects of environmental pollution.
- v. There is a lack of specific content in biological sciences related to the biology of water, soil and air, and the impact of soil, air and water pollution on animals including humans. Students are not taught to appreciate the significant role of environment quality in the maintenance of human health and sustainable living. Similarly, formal education has done little to develop an understanding of how domesticated plants and animals can have a negative impact on the quality of the environment.

EFFECTIVENESS OF TEACHING METHODS RELATED TO ENVIRONMENT EDUCATION

A lack of instructional materials and proper teacher training has had a deleterious effect on the effectiveness of social studies teaching in schools. Textbooks are still the only teaching aid made available to students and teachers. The lecture method is the most prevalent teaching method in schools. Additionally, the whole teaching-learning programme is examination-centred, focusing on scoring high marks rather than bringing about changes in students' analytical ability and behaviour.

Lesson plans are prepared on the basis of curricular objectives. In most rural schools, however, while field visits and collection of specimens are possible, these are infrequently undertaken as lecture supplements. Classroom demonstrations are rarely performed. Teachers have raised issues relating to the availability of funds and motivation.

Activities should be undertaken to give students adequate opportunities to learn through experience in order to increase the effectiveness of courses on the environment. Problem solving is helpful for effective learning in this field. Few activities relating to the personal experiences of students and their immediate environment are being undertaken at present.

Student performance in units on environment and conservation tends to be satisfactory. Responses to classroom lectures meet set standards. Many teachers feel that their teaching of courses on the environment has proven to be more effective than for other science courses because of the practical implications. Senior students are able to apply their knowledge of the environment directly by improving personal hygiene, for example; however, broader application of this knowledge to community problems is unusual. This is mainly because students are given very few opportunities to participate in field studies and conservation activities. It is evident that schools are not encouraged and are poorly equipped to organise conservation activities in the community. However, in a few rural schools, there are examples of community activities being undertaken with good participation by students.

OVERVIEW OF SCHOOL TEXTBOOKS AND RESOURCE MATERIALS

Science textbooks contain many examples and experiments presented in a lucid and easily comprehensible manner. The exercises given in the textbooks are of a review nature, satisfactorily serving to recapitulate what has been previously learnt. However, they contribute little to promoting students' cognitive abilities such as

independent thinking, interpreting, deducing and classifying information and drawing their own conclusions.

Diagrams and the few photographs in textbooks are poorly illustrated and reproduced. Illustrations in the textbooks prepared for the lower grades are particularly inadequate and poorly drawn and thus do not foster the growth of student interest in, and curiosity about, the environment and its features.

Field experiences are almost entirely ignored. As a result, students rarely practice skills in the protection and conservation of nature. Little emphasis is placed at the lower levels on oral exercises, workbook drills and practicals. Many questions in text exercises simply test memory and are not often used for the purpose of evaluating the syntheses of ideas by the student and the depth of understanding. Given the lack of teacher guides, the textbooks fail to help teachers to identify the specific objectives of the lesson. The contents are mainly based on the curriculum prescribed for the classes concerned, and teaching units are arranged in the same sequence as given in the curriculum. Teachers are given no advice on use of suitable materials for teaching the unit and administering proper test methods for measuring student achievement and performance. In the higher classes there is an adequate correlation between the course objectives, contents and the textbooks. Yet no supplementary teaching materials are used for teaching the environmental aspects of science studies in schools.

History textbooks do not contain any material regarding activities undertaken for preserving the cultural environment.

TEACHER TRAINING

The Faculty of Education of Tribhuvan University is responsible for pre-service training of teachers, and offers two degree level courses. A two-year Proficiency Certificate level is offered to SLC graduates, and this course qualifies students for employment as lower secondary teachers. Alternatively, they can continue on to the Bachelor in Education course designed for secondary school teachers. The subsequent two-year Masters in Education course prepares teacher educators and specialists in various professional areas. These courses are, however, degree-oriented academic courses and not professional training programmes. Consequently, courses tend to be more concerned with maintaining academic standards rather than developing practical teaching skills in students. Moreover, academic degrees allow students to opt for jobs in fields other than teaching, and as a result few students actually use their B.Ed. or M.Ed. degrees in pursuit of a career in teaching. Teacher training is not a prerequisite for employment of permanent

teachers. This combination of factors is reflected in the low percentage of trained teachers at the primary, lower secondary and secondary levels, at 35, 36 and 48 percent respectively (MOEC, 1988).

The only professional pre-service teacher training currently available is a ten-month female teachers' training programme, offered at only a few campuses, for SLC graduates from rural and remote areas. This course places considerable focus on environment education.

The Ministry of Education and Culture has moved consistently towards providing in-service training for teachers. A Basic Teacher Training Programme initiated by the Ministry aims to reach all untrained primary school teachers with a 150-hour training package by the year 2000. Specific need-oriented courses continue to be developed by the Ministry's Primary Education Project and the Education for Rural Development Project in Seti Zone. Primary school teachers are also trained through the Radio Education Teacher Training Project.

At the secondary level, the Science Education Project has established a network of 25 training centres for the in-service training of science teachers.

Overall, opportunities for teachers to attend training programmes are infrequent and irregular. Most programmes make only casual reference to conservation issues, and efforts are yet to be made on a systematic basis for the inclusion of environment education components in teacher training courses.

REVIEW OF PROFICIENCY CERTIFICATE AND BACHELOR'S LEVEL CURRICULA

Proficiency Certificate level programmes in Humanities and Social Sciences, Management, Education and the technical disciplines of Engineering, Agriculture, Science, Medicine and Forestry are offered by Tribhuvan University and its affiliated campuses. School Leaving Certificate (SLC) graduates receive further education for two years to fulfill the middle-level personnel needs of the country in various sectors. In 1984, enrolment at Proficiency Certificate level at the Institutes of Medicine, Engineering, Agriculture, and Forestry was 1,455, 2,762, 1,834, and 760 respectively. Proficiency Certificate holders are employed by HMG, public and private agencies in various middle-level administrative and technical jobs. Master's degree holders in related subjects are eligible for teaching posts at university level.

Science

The curriculum for the Proficiency Certificate in Science includes several environment related units within physics, chemistry and biology subjects. Physics courses include topics such as energy and power, hydrostatics and pneumatics, hygrometry, heat, light, sound and electricity. Such knowledge helps the students gain an understanding of the physical properties of the environment. Other units are more directly relevant to environmental studies. These include information on the transfer of heat, transmission of sound, effects of electricity and absorption of radiation. However, physical elements of the environment that are harmful to human health and well-being are barely dealt with. Furthermore, the current practice of learning each topic as a separate entity, unrelated to the overall environmental picture, does not meet the desired objectives of environment education. For example, a student taking an energy course learns about kinetic and potential energy in various forms and basic principles. The course work does not relate to energy issues such as conservation and deforestation.

The chemistry curriculum also includes basic environmental information on elements and their properties, chemical reactions, acids, bases and salts, non-metallic gases

and other compounds, metals and their compounds and organic chemicals. These units introduce the properties, preparation and use of important chemicals, and the structure of the atom. However, as in school level education, consideration of the performance, use and implications of chemicals for environmental quality is entirely neglected.

Biological sciences include units that deal with the basic components of living systems, diversity of plants and animals, physiology of plants and animals, and ecology. This unit on ecology covers types of ecosystems, animal adaptation, plant communities, food and food chains, and natural cycles. Specific content on the biology of water, soil and air as well as the environmental impacts of pollution and other human activities is lacking.

Lectures are the most common form of teaching supplemented by discussions, laboratory experiments, studies of museum specimens, slides and field collection in ecological studies. Some experiments are also conducted on the adaptation of plants and animals to their environments.

Civil Engineering

The Institute of Engineering, Tribhuvan University, offers a three-year course for technicians. Physics and chemistry of relevance to civil engineering are taught in the first year. The contents deal with basic concepts and principles of physics and chemistry which are a prerequisite for an understanding of units taught at the higher level. Preliminary concepts are lacking in engineering physics, such as on the water-cycle, pollution due to heat and noise, and hazards due to radiation.

Second and third year courses deal with topics related to engineering materials, engineering mechanics, basic hydraulics, construction technology, soil mechanics, water supply engineering, highway engineering, sanitary engineering, irrigation engineering, surveying and cost estimation and management of construction works. Engineering works in both rural and urban areas can have profound effects on the environment, either beneficial or detrimental. It is essential that students acquire an adequate understanding of the principles of soil erosion, the phenomena of water pollution, health hazards and waterlogging. Units related to engineering works do not include studies of their possible long-term effects on the environment, the aims and methods of environmental impact assessment, environmental planning and associated tools of monitoring, impact mitigation and the consideration of alternate technologies.

Engineering courses are taught primarily through lectures, often supplemented by practical work and field visits. Models, charts, audio-visuals and documentaries are

also used in teaching. The textbooks are mostly of standards equivalent to those used in other engineering institutions in Asia.

Health and Sanitation Education

The Proficiency Certificate in health education and sanitation covers basic epidemiological concepts. These include disease cycles and level of prevention, water, sanitation, excreta disposal, refuse and waste-water disposal, insecticides and human health and problems of sanitation at the institutional level.

The courses of study in basic sciences for first-year medical students deal with the principles of physics, chemistry, botany and zoology essential for the study of courses at higher level. Units on chemistry include a definition and explanation of matter, its structure and properties, while those on physics give students a basic understanding of energy, its types and its interrelationship with nature. The courses in botany provide students with a basic knowledge of the plant kingdom, structure and life functions of plants. A separate unit on environmental biology has been introduced in the courses with some fundamental concepts on abiotic and biotic factors affecting plant, water and air pollution. Similarly, zoology content related to animal life includes its diversity and its life processes.

The course is adequate in its coverage of specific environmental aspects of sanitation; however, it does not provide an understanding of the global crisis, the variation in sanitary conditions, inequities and relevant social and economic considerations.

These course are supported by field experience in communities and project areas. Instruction methods include field work, group planning and discussions, micro-projects and seminars.

Nursing

The programme for the training of nurses is primarily focused on preparing students to serve the needs of individuals, families and communities in achieving an optimal level of health. The training lasts three years, and only SLC graduates or equivalent are eligible for admission to the course. The overall objectives include development of the ability to utilise knowledge in the care of individuals, families and communities, to take preventive and therapeutic measures for promotion, maintenance and restoration of health, to teach and supervise health care workers, and to mobilise the community in this task.

The first year course includes the promotion of health and prevention of diseases. The second year focuses on maintenance of health through family care. In the final year, priority is given to concepts related to illness and care of patients. The unit entitled 'Environmental Sanitation' which comes under 'Fundamentals of Community Health Nursing' discusses basic concepts and principles of community health, including environmental sanitation and water. Some topics such as 'Uses, Sources and Purification of Water' as well as methods for solid waste and sewerage waste disposal are also dealt with.

In addition to classroom lectures, field work in community health nursing is organised to acquaint the students with field conditions regarding environmental aspects of human health. Materials used for the training include standard textbooks, reference books and audio-visuals.

Education

The curriculum for the Proficiency Certificate in Education has been designed to train science teachers to teach biology in lower secondary schools. It provides a background in biology, with emphasis on the applied biological sciences relating to agriculture, forestry and environmental conservation. It includes units on behaviour of living things, continuity of life, diversity of life, and the economic importance of plants and animals. A separate unit on 'Environmental Biology' is included in the course to give students an understanding of environmental factors, succession, adaptation, ecosystems, conservation of natural resources and pollution. Practical work includes setting up an aquarium and experiments on life processes. Field trips provide students direct experience in collection, observation, and field study of ecosystems.

Teaching materials consist mainly of standard textbooks and reference books.

Again, the course takes a physical science perspective and fails to incorporate necessary social science aspects. Future teachers must especially be made aware of the "people" side of environmental well-being, and recognise it as an important area to investigate with their students.

Forestry

The Institute of Forestry (IOF) is the only educational institution in the country to qualify professional forest and natural resource managers. Established under HMG's Department of Forests in 1947, IOF became part of the national university in 1972. The institute offers a two-year technical certificate in forestry, and a three-year Bachelor of Science degree with specialisation in general forestry, soil and water conservation and wildlife management. Both programmes are offered at the

Institute's main campus in Pokhara, while its branch campus at Hetauda offers only the Certificate course.

Most Proficiency Certificate level and B.Sc. graduates are employed by the government in the Departments of Forests, Soil Conservation and Watershed Management, and Wildlife and National Parks, or by the Nepal Timber Corporation. Certificate holders join as Rangers or Community Forestry Assistants, and are posted in all 75 districts of the country. B.Sc. graduates are employed as Forest Officers for district level forest offices, or by central division offices in fields including research, training and community forestry. Some join donor agencies, NGOs, the private sector, or work as naturalists in the tourism sector.

The Proficiency Certificate degree is a two-year programme with approximately 225 students located at each campus. It is mainly oriented towards training junior level technical staff for the forestry sector, with additional course work in agriculture, and soil, water and wildlife conservation. Six months are spent gaining supervised field experience. The course is open to students with an SLC or equivalent qualification.

Some areas relevant to environmental studies and conservation of natural resources are identified in the first year of the Certificate level course. These include basic silviculture, introduction to biology and plant identification, basic forestry and forest conservation, soil and water conservation, and conservation of renewable natural resources. Course work covers a review of the communication and organisational skills necessary for effective extension work.

The second year of the Certificate level includes study on the protection of forest resources, wildlife conservation, agriculture and rural sociology. The unit on general characteristics of Nepal deals with meteorological aspects, ecosystems, the interaction between people and the impact of forestry practices on the environment and protection of wildlife. In biology classes, a separate unit introduces the plant community and ecological factors. The subject area of soil and water conservation deals with hydrology, soil erosion and its control and soil conservation practices. Under wildlife conservation, units are prescribed on selected wildlife species, wildlife conservation techniques and national parks and wildlife reserves of Nepal. Topics such as identification of species, survey techniques, habitat analysis and development are taught to students. Course work on agriculture and rural sociology covers the social structure, natural resource conservation and farming systems of rural areas in Nepal. No specific content on forest genetic resources of Nepal and their conservation is presently listed for study.

The three-year B.Sc. degree programme is only offered at Pokhara, and is currently attended by approximately 110 students, with 40 graduates per year. Students seeking enrolment are required to have completed a Certificate level degree

programme and at least one year of government service, or possess a B.Sc. degree in Basic Science. Most students major in forestry, while a few choose majors in wildlife or soil and water conservation. Third year students must prepare a thesis based on original research with faculty supervision.

The first year of the B.Sc. programme is designed for persons coming from government jobs. Students are provided a background in mathematics and an introduction to botany, zoology, chemistry and physics. All courses at this level are taught in English, which is also offered as a separate course.

Students with B.Sc. degrees in Basic Science are eligible for entry at the second year B.Sc. level. During the second year, students take courses in hydrology, geology, soil science, ecology, resource economics, surveying and mapping, statistics, and soil and water conservation. Additional course work is given in the areas of wildlife conservation, forestry, and soil and water conservation, according to the student's major.

In the third year, students are required to complete courses in silviculture, forest protection, remote sensing, wildlife, biology and statistics. Depending on their major, students choose between a variety of courses in forestry, soil and water conservation, watershed management, agriculture and range management, and wildlife conservation.

IOF's training and research activities are beginning to reflect a change towards community forestry research and training. Although traditional forestry remains the mainstay of the IOF mandate, there are now stronger links between the biophysical and social sciences, especially in social forestry, forest planning and management, human resource management, and ecology. New curricula are being designed to more fully emphasise community forestry training and research.

In the area of community forestry, however, a sectoral approach continues to be taken to forestry management, with a corresponding lack of emphasis on agroforestry and other subsistence farming systems. Coverage of fields such as soil and watershed conservation and wildlife conservation is still very weak.

The teaching method mainly includes lectures aided by audio-visual materials, notes, handouts, published materials and field observation. Supervised participation in projects offers additional opportunities for students to gain a wider knowledge of the subject and associated technical skills. Assessments are made through oral and written tests. The syllabi used for courses are often outdated, yet teachers must adhere to the set syllabi because these form the basis for examination papers. In the absence of a yearly revision of syllabi, teachers are unable to introduce new and more pertinent material and to test students on such material. The library is unable to

provide recent reference material and is currently confined to offering outdated textbooks.

Agriculture and Animal Science

The Institute of Agriculture and Animal Science (IAAS) has developed a five-year B.Sc. (Agriculture and Animal Science) degree programme. The Certificate in Agriculture course is no longer taught at IAAS, although the first two years of the five-year course are equivalent to the certificate level in other institutes. A two-year Junior Technician (JT) training programme is conducted by the Department of Agriculture, HMG.

Basic environmental concepts are included in the first year within the Agricultural Zoology course. Basic Ecology biogeographic distribution and adaption of animals, water and air pollution, conservation of resources, wildlife, agriculture, forestry and aquaculture are among the topics included in this course. The second-year course in Agronomy includes tillage and its effect on crop production and soil properties, soil productivity maintenance, cropping systems, climate and its effects on crops, crop rotation plant ecology, and methods of weed control.

Apart from the degree programme, IAAS also conducts a one-year non-academic Animal Science training programme for Junior Technical Assistants (JTAs) at the SLC graduate level. The course includes environment-related topics such as waste management, fodder production, soil erosion, agronomic practices and breeding and selection of farm animals.

All the topics in both courses are dealt with from the perspective of agriculture production rather than within the wider context of environmental management and sustainable farming. Debate and discussion on values and long-term environmental issues are not covered by the course. These should include economic pressures on farmers to disregard conservation farming practices, socio-economic influences on agriculture and genetic conservation of wild plants, crops and farm animals. Coverage of participatory extension methods would help technicians improve problem diagnosis and planning with farmers.

The main teaching method is lectures, supplemented by audio-visual demonstration and field observation.

REVIEW OF IN-SERVICE TRAINING PROGRAMMES

IN-SERVICE TRAINING PROGRAMMES RUN BY GOVERNMENT DEPARTMENTS

PUBLIC HEALTH

Human Resources Development Centre: Water Supply and Sanitation Department

The Centre organises in-service training courses of varying lengths for engineers, overseers and technicians of the department. The Centre does not have its own trainers on staff but invites trainers from other institutions to run these courses.

The engineers' courses last two to three weeks and cover topics including planning, managerial skills, communication, supervision, general administration, financial management, evaluation and specific engineering issues.

The overseers' course focuses on technical aspects of rural water supply engineering. Communication, work supervision, financial management, report writing and community participation are also included in the training curriculum. Emphasis has been given mainly to the technical aspects of rural water supply due to the lack of a clearcut government policy on sanitation. This course lasts three weeks. Lectures, discussion and audio-visual presentations are the main teaching methods used.

The lower level technician training courses improve technical skills to upgrade existing skills. These short two-week courses include plumbing, tool maintenance, masonry and water pump operation. Workshop practice is the main training method employed. A simple working manual has also been developed by the Centre. In addition, special on-the-spot courses on plumbing, masonry and maintenance of rural water supply structures are also conducted for local tradesmen through the district branches of the department.

All these courses prioritise technical skills training and do not attempt to incorporate environmental aspects.

Public Health Division

The Training Wing of the Public Health Division conducts in-service training courses for village health workers, officers in charge of health posts, nurses, health inspectors and public health officers.

The village health workers visit door-to-door, working three weeks a month in the field. They use extension pamphlets and posters to create awareness among villagers about basic health care. A seven-week course is run for village health workers, covering all aspects of primary health care such as population education, family planning, nutrition, immunisation and minor clinical procedures. Causes and consequences of environmental disasters are studied under population education with case studies, examples and illustrations. A special five-hour course on 'environmental health' is also included in the curriculum. This deals with water supply, water pollution and purification, sanitation, waste disposal and latrine construction.

Mini-lectures, group discussions, self-instruction modules, charts and audio-visual presentations are the teaching methods employed. A 'Village Health Workers Training and Working Manual' has been published and extensively used in the courses.

Three-week courses are separately organised for those in charge of health posts and nurses. These cover all aspects of primary health care, health post management and extension methodology. A special topic on environmental health is also included in the training. Health post officers themselves conduct special week-long training courses on basic health for the primary school teachers and women volunteers in their areas.

Health inspectors and public health officers are given a month's pre-service training on general administration, government health policies, personnel management, planning, monitoring and evaluation, and extension methodology.

Solid Waste Management and Resource Mobilisation Centre

This Centre is the only organisation in Nepal whose sole responsibility is solid waste management. One of the Centre's important tasks is the cleaning up of cultural and historical sites. It is involved in programmes such as city street cleaning, sanitary landfill, collection and safe disposal of solid waste (household and industrial), waste

recycling, compost-making and latrine construction. The Centre is also actively involved in extension work and campaigning to promote sanitation and cultural resource conservation.

Publicity programmes are being launched under a 'Mass Communication Working Policy' using mass media such as radio, TV and the print media. A biannual journal *Phoharmaila Byabasthapan* (Solid Waste Management) is also published. Cooperation from volunteer groups and social organisations is sought in order to create awareness of the need for sanitation and for the conservation of culturally important sites.

A four-day training course is also conducted for municipality staff, local motivators and local social clubs in the field of health education, sanitation, waste management, motivation and extension techniques. Resource materials for school children on sanitation and solid waste management also have been produced under the programme.

NON-FORMAL ADULT EDUCATION

Non-Formal Adult Education Programme, Ministry of Education and Culture

The Non-Formal Adult Education Programme is run by the Adult Education Section of the Ministry of Education and Culture with the following objectives:

- to enable school drop-outs and illiterate adults to read, write and compute in fields relevant to daily life;
- to increase self-reliance through awareness;
- to enable them to participate in development activity;
- to improve their standard of living through increasing productivity by providing them with knowledge, skills and information about agriculture, cottage and rural industries;
- to help them lead a healthy life by providing them with knowledge, skills, and information on health;
- to increase their sources of income by developing skills needed for solving day-to-day problems;

- to promote their living standard through family planning;
- to acquaint them with political, social, economic and cultural aspects of the country.

The Non-Formal Adult Education Programme is specifically designed to develop practical skills in adults. This programme is directed towards the education of illiterate adults and youth primarily from rural areas, and activities are carried out at venues convenient to the participants. The trainers are mostly school teachers. The programme also seeks the support of extension workers employed by HMG in health, agriculture and forest services. Products of this non-formal programme are mostly self-employed, but some are engaged in various development projects.

The non-formal system of education and training provides three different types of education to the adult population. These are:

- (a) literacy education
- (b) *chetnakaran* (awareness) education
- (c) vocational education

This non-formal education programme is of a six-month duration.

Literacy education aims to provide adults with a basic knowledge of reading, writing and arithmetic in Nepali. On completion of this course the trainees achieve a literacy level equivalent to that of grade 3 students under the formal education system. The *chetnakaran* programme helps to provide rural communities an opportunity to discuss problems, identify their solutions and motivate themselves towards solving their problems in the areas of agriculture, public health, family planning, education, and local development. Under the non-formal vocational education programme, adults receive a variety of skills and knowledge required for agricultural production through locally available staff such as JTAs and Animal Health Workers (AHWs) who are trained in their respective fields of expertise. The course also includes techniques in improved agriculture, conservation of forests, afforestation, poultry farming, livestock, fisheries and horticulture.

The teaching materials used for the programme include pictures, letter-cards, textbooks (*Naya Goreto* - Vol. I, II and III) and teaching guides. Non-formal education has proved quite beneficial in equipping adults with skills and knowledge required for self-employment.

FORESTRY

Ministry of Forests and Environment

Orientation training for junior forest officers by the Ministry of Forests and Environment, till recently the Ministry of Forest and Soil Conservation, gives the trainees basic knowledge on the organisation, policy, rules and procedures of His Majesty's Government as they relate to their jobs. This programme provides some concepts about forestry extension and community forestry and is supplemented with field visits to soil conservation sites, tree-seed units and community forestry areas, as well as with documentary film shows. The junior forestry officers' orientation is followed by a week-long workshop which involves group discussion with the concept of people's participation as a central issue, in addition to soil conservation and watershed management, and national parks and wildlife conservation practices.

At the technical level, the forestry training courses (extension) are organised with a view to enabling the Community Forest Assistants (CFAs), Rangers and Assistant Rangers to plan, organise, implement and monitor community forest development schemes, as well as to conduct simple training sessions for villagers on technical aspects of forest management.

A separate training course on management of community forests is organised for CFAs, Rangers and Assistant Rangers to provide them with knowledge and techniques of preparing community forest management plans. These include inventory demarcation, survey and field work.

A three-week orientation training is provided to Community Forest Assistants and Assistant Rangers, mainly to inform them on organisation, rules and procedures relevant to their jobs. The courses include lectures on afforestation, forest nurseries, forest management and planning, concepts of extension education and the role of rangers in the planning of extension education, soil and watershed management practices and wildlife management practices. This programme is supplemented with visits to watershed project areas, nurseries and community forestry sites. A trainer's training course is organised for experienced Rangers, Assistant Rangers and CFAs to provide them with necessary skills in training forest guards and nursery foremen.

The forestry training programme for the village female extension workers is designed especially to provide female workers with sound knowledge and proper skills in forest conservation, production and use of forest resources. It also enables them to teach other village women basic forestry techniques. The course includes a separate unit on the destruction of forests and the consequent impact on human life, uses of minor forestry products, agro-forestry, village-level wildlife and soil conservation practices,

and use of improved stoves and their impact on village life. An introductory unit on conservation education is also included.

A two-week training course is given to CFWs (Community Forest Watchers) and CFFs (Community Forest Foremen) to enable them to better perform their jobs. Community Forest Foremen are taught how to establish, maintain and run the nurseries, and Community Forest Watchers learn how to protect and maintain the village forest under the technical supervision of a CFA. This course includes units on the selection and maintenance of nursery sites, control of weeds and pests, selection of species, land clearance, planting and transfer of seedlings, grass and fodder collection, thinning, grazing and clear cutting.

The in-service training programmes do not contain specific courses on natural and cultural resource conservation. The existing programmes should be supplemented with course content on conservation and supported by trained external resource persons. The extension training programmes are of short duration, focusing on a few specific topics related to conservation. Coverage of methods of erosion control, afforestation and protection of natural habitats needs to be strengthened.

Soil Conservation Assistant (SCA) orientation training is provided to newly appointed SCAs to acquaint them with the organisation of the Department of Soil Conservation and Watershed Management, and its rules and procedures relevant to their jobs. This programme provides trainees with information on soil conservation legislation, forest nursery operation, afforestation, soil conservation practices and a general understanding of watershed management. The training activity is supported by field work and visits.

The Department of National Parks and Wildlife Conservation conducts a two-week officers' pre-service training course. Topics covered include conservation of protected areas, wildlife management, wildlife census-taking, conservation education and extension methodology. The Department also conducts in-service training courses for park wardens and wildlife rangers. Special curricula have not been developed; the course content is usually chosen according to the knowledge and specific needs of the trainees. The usual topics covered by these courses are park management, park-people interaction, conflict resolution, wildlife biology and government policies. The Royal Chitwan National Park also organises short-term training programmes on wildlife management for game scouts and nature guides.

The Department publishes the 'Wildlife Bulletin', 'Wildlife Nepal', '*Samrakshan Samachar*' (conservation news) and brochures. These extension course materials cover different aspects of wildlife conservation. Wildlife wardens and staff of national parks have special extension duties in addition to their normal responsibility for park management.

Department of Forestry and Plant Research

The Department conducts demonstrations and short training courses on medicinal herb farming for local farmers through its herbal farms located in different parts of the country. These extension activities concentrate mainly on the technical aspects of commercial cultivation of specific medicinal herbs such as belladonna and citronella. Training methods include mini-lectures, demonstrations, discussions, flip charts and farm visits. In addition to this activity, the Department could demonstrate soil conservation techniques associated with terracing and tree and grass planting, so that farmers can practise these techniques on their own land.

AGRICULTURE AND LIVESTOCK

Junior Technicians (JTs) in Agriculture and Animal Sciences

The non-degree JT-level education programme in agriculture is offered to SLC graduates. The two-year course for training of JTs is presently conducted by the Department of Agriculture at its training units. The Proficiency Certificate in Agriculture has recently been merged into the B.Sc. (Agriculture) and B.Sc. (Animal Science) courses.

The course of study for the first year aims to prepare mid-level staff in the field of agriculture, and is divided into the following subject areas: extension education, farm management, animal husbandry, horticulture and agronomy. The physical and chemical properties of soil, minerals and their utility in crop cultivation, organic manures and chemical fertilisers, soil erosion and conservation practices in the crop-field are subjects covered in agronomy.

In the second year of the JT course, trainees are instructed in physics and chemistry, both inorganic and organic. The 'Agricultural Physics' unit includes the basic principles of energy such as heat, light and electricity as well as the mechanics of simple machines. Diversity of plant life and physiology of plants, ecosystems, ecological processes and adaptation are among the subjects included in the 'Agricultural Botany' unit. 'Introduction to Plant Science' covers climatic determinants of crop distribution and more advanced aspects of soil and its properties, manures and fertilisers, and soil erosion and its prevention. The principles of pasture management are included within a course on 'Animal Nutrition and Fodder Production'. Fodder production covers the geographical distribution of grasslands in Nepal, the conservation of fodder, and pasture and its management. A unit on ecology includes concepts such as the carbon and nitrogen cycles, pond and terrestrial ecosystems, and the food chain. A separate unit of fisheries, wildlife and

nature conservation is also included under 'Agricultural Zoology'. Habits and habitats of fish and wildlife of Nepal, deforestation and overgrazing, water and air pollution, and National Parks of Nepal are among the special units related to natural resource conservation in Nepal.

Theoretical lectures are usually supplemented with practical work. The textbooks prescribed for the training of JTs are of standard quality; other methods of teaching such as field visits and demonstrations are also used. Evaluation of students' performance is effected by internal assessments and written and practical examinations.

The courses for JTs include many basic applied and theoretical concepts. Efforts have been made to enable the students to develop a proper understanding of the need and ways to conserve soil, water and flora and fauna. However, these courses do not consider agricultural practices which can damage the environment, or the ways in which these practices can be implemented without causing unwanted environmental effects.

The principle of genetic conservation of domesticated and wild plants and animal species and the impact of animal husbandry practices on the quality of the environment is not adequately emphasised.

Miscellaneous Training in Agriculture

The Central Agricultural Training Centre, Department of Agriculture and its regional centres provide training courses of varying duration to chief leader farmers, leader farmers, agricultural assistants, technical assistants, and agricultural officers.

The chief leader farmer training course includes technical agricultural subjects. The trainees are given a grounding in agricultural practices such as nursery maintenance, vegetable seed production and potato cultivation.

Agricultural assistants are selected from among the local farmers and are trained for a period of one month at the training centre. These agricultural assistants are posted to their own villages. The courses for agricultural assistants include production and cultivation of paddy, maize, wheat, millet and legumes, use of fertilisers, fruit and vegetable production and management and care of nursery beds. A few extension components are also included in the course.

Technical assistants and leader farmers are given training in some specific crop-production techniques. The period of this training is less than a week. The contents are not fixed and are mostly decided by the instructor in line with local demands.

None of these courses give any understanding of the possible negative impacts of farming practices on the quality of the environment (air, water and soil) and trainees are thus not made aware of mitigation or conservation measures. The problems of soil erosion, flood and drought and their control are not included, and courses are therefore unable to develop in farmers a consciousness of the effects of their own activities and awareness of methods to prevent loss due to these hazards. Training materials used include charts, models, diagrams, slides and posters. Discussion and field visits are also arranged for the trainees.

Livestock

The Central Training and Extension Centre of the Department of Livestock Services (DLS) and its regional branches conduct training courses of varying duration for leader farmers, mid-level livestock technicians and livestock officers. The objective of the training programmes is to improve the capacity of DLS staff in the planning and implementation of livestock development activities.

The leader farmer training course, usually a week in duration, includes pasture development, fodder tree and forage grass planting, rotational and controlled grazing, forage conservation, and livestock management. Short lectures, discussions, audio-visuals and field and farm visits are used as the training medium.

Mid-level livestock technician training includes topics such as animal nutrition, livestock production management, animal breeding, pasture development, animal health, extension methodology, high altitude pasture and fodder tree management. These training courses vary in length from a few days to one month. Lectures, discussions, practical work and farm visits are the teaching methods usually employed in these courses.

The training courses for livestock officers include general and financial administration, planning, government policies, training and extension methodology, animal breeding and nutrition. These courses last from a few days to a couple of weeks. Teaching methods include lectures, group discussions and seminars, case studies and audio-visual presentation.

General review of the curriculum of livestock training courses indicates that the trainees are not given specific understanding of the possible impacts of livestock development on the environment. Concepts of soil erosion, overgrazing and proper use of fire for pasture development are excluded, inhibiting the ability of these courses to encourage awareness of the need and the ways to conserve natural resources such as soil, forests and water.

IN-SERVICE TRAINING PROGRAMMES RUN BY SPECIALISED TRAINING CENTRES OF THE GOVERNMENT

Agricultural Projects Services Centre (APROSC)

APROSC conducts in-service training courses on management skills, on project formulation, appraisal, monitoring and evaluation, and on communication in the field of agricultural and rural development. The programmes are geared primarily towards meeting the training needs of government department personnel, development banks and rural development institutions. These training courses usually span two to four weeks. The instruction materials used in the courses include books, audio-visual presentations and handouts. Lectures, discussion, case studies and brainstorming sessions are the teaching methods most often employed. In addition, occasional training seminars are conducted to address pertinent issues of national development in order to impart specific skills and to encourage dialogue and exchange of experiences between development planners and executives. Training is also conducted for prospective trainers from other institutes and projects in the agriculture sector. These two to five-week courses focus mainly on training methodology, decentralised planning, extension techniques, local participation, and specific aspects of agriculture, livestock and community development.

Training curricula do not contain themes such as impact of agricultural practices on the environment, environmental planning and resource conservation.

Balaju Technical Training Centre (BTTC)

The Balaju Technical Training Centre (BTTC) was established in 1962, originally as the Mechanical Training Centre, to produce skilled staff for industrial enterprises. As a senior technical school run jointly by HMG and the Swiss Government through the Technical Education and Vocational Training Council (Nepal) and Helvetas (Nepal), BTTC offers a well-oriented programme with an emphasis on practical work. BTTC has three departments: mechanics, electrical and sanitation, of which the mechanics department is the oldest.

Apart from conducting its regular training programmes, BTTC also organises various short-term trade courses. BTTC graduates achieve a level of competence that allows for their employment within both the private and public sector.

The curricula of BTTC include contents on 'General Science' and trade subjects related to mechanical, electrical and sanitary engineering. These courses are available for students who have completed their high school education. The courses

of study in the sanitation section are mainly concerned with the supply of clean and safe water as well as with the safe disposal of human wastes. As waterborne diseases are very common in Nepal, a high level of efficiency in the sanitary system is essential for the maintenance of community health. Skills in plumbing are provided to students, including substantial instruction on the installation of domestic drinking water and waste water systems. Practical experience is also provided in the installation of ground tanks and pumps for drinking water. Students develop skills for the installation of drinking water and sanitary systems in private homes, as well as those needed for installation and maintenance of community level sewerage systems and town water supplies. These skills have a significant bearing on protecting water and air from the hazards of pollution caused primarily by biogenic and chemical contamination.

However, in courses of other departments of the Centre, a lower emphasis is placed on promoting skills and knowledge related to safety and protection of the environment. Students in the electrical and mechanical technician courses are taught basic theory and skills in these fields and given opportunities to work on various types of machine tools and electrical appliances.

A few gaps still exist in course content relating to the potential hazards caused by possible defects in mechanical, electrical and sanitary systems and their installation, operation and maintenance.

Central Local Development Training Centre

The Central Local Development Training Centre conducts short-term seminars and training programmes for local development officers on development planning, policies, general administration and accounting. Special seminars are also organised for social workers and officers of government line agencies on community development issues. These seminars focus on the process of coordinating the activities of agencies involved in local development. So far emphasis has not been given to the need for environmentally sound development. However, the Centre now realises the need to include topics on resource conservation in its curriculum which is currently under revision.

The Ministry of Local Development (MLD) publishes the 'Local Development Magazine' in Nepali and English. The magazine contains mainly academic articles on local development issues. A periodic newsletter is also published. Posters and pamphlets (developed by MLD as well as other government agencies) are used as extension materials by village development committees and town municipalities. These include themes related to population education, tree planting, sanitation and health. Extension course materials are currently unavailable on the causes and

impact of human activities on the environment and the need for a coordinated and inter-sectoral response to associated problems.

Civil Aviation Training Centre

The Civil Aviation Training Centre organises pre- and in-service training courses for the staff of the Department of Civil Aviation. These courses cover air traffic control, airport management and other technical and managerial issues related to civil aviation. The duration of these courses varies from a couple of weeks to 18 months. A three-month course is held on fire fighting which includes theoretical as well as practical aspects of fire control in case of air accidents. Special short-term courses are also run from time to time.

The training curriculum does not contain environment-related topics. Topics which could be covered include environmental guidelines to be followed when building airports, noise pollution due to aircraft, noise abatement techniques, visibility problems due to atmospheric pollution and its control, and disaster management.

Cooperative Training Centre

The Cooperative Training Centre (CTC) is involved in cooperative education and training, motivation, curriculum development and publicity. The target group includes the staff of cooperative societies, leader farmers and government staff involved in cooperative development. The training course contains education on cooperatives, agricultural development and subjects related to overall village welfare. These training courses are mainly geared towards increasing awareness and efficiency in the people involved in cooperatives. Mobile training camps conduct courses for small farmers on subjects such as agriculture, livestock development and forestry.

Cottage and Rural Industry Training Centre

The Cottage and Rural Industry Training Centre, run under the Department of Cottage and Village Industry, conducts training programmes for promoting technical and vocational skills such as tailoring, carpet weaving, knitting, wood carving, carpentry, cane work, leather work, and electrical and metallurgical works. Training projects run by the Centre include the rural and cottage industry project for women, the readymade garments and handmade paper project, the training project for rural gainful activities (TRUGA), and the ceramic development project.

The Centre has undertaken extensive training activities in most districts of Nepal. Skill training courses are provided by the Department's technical training section and its regional offices. These are of three major types:

- ordinary level training (2 years)
- advanced level training (1 year)
- vocational training (2 to 3 months).

Ordinary and advanced level training is given in skills such as textiles, mechanics, sewing, carpentry, electrical work, carpet weaving, and hosiery. Trainers receive orientation to enable them to adopt modern teaching methods and to use varied teaching materials. Teaching manuals, especially prepared by the Department, are provided to the trainers during the training period. Daily assessment and annual tests are used for measuring the trainees' performance. Under the TRUGA project, this training programme will be strengthened and made more effective by developing suitable curricula in the near future.

Hotel Management and Tourism Training Centre (HMTTC)

The Hotel Management and Tourism Training Centre (HMTTC) was founded in 1972. It trains personnel for the hotel and travel industry for basic, supervisory and mid-management levels, with the aim of making the hotel and travel industry fully self-reliant. The Centre has acted as a catalyst for the qualitative improvement of hotel and tourism staff resources, thereby assisting the development of the tourism industry in Nepal. Training courses are organised in 15 different subjects.

The training courses for tourist guides, trekking guides and trekking cooks contain material relating to the natural and socio-cultural ecology of Nepal. The courses for tourist guides and trekking guides cover units including culture and architecture, history and geography, hygiene and sanitation, and the flora and fauna, arts and crafts, ethnic groups and religions of Nepal.

Trainees in the courses on food preparation and personal hygiene, food hygiene and kitchen hygiene are provided with an understanding of the maintenance of good health, clean food and a neat kitchen. Content on food, food-types and a balanced diet is also included to help trainees in making a proper choice of food items.

Like NASC and WTC, HMTTC is working with the NPC/IUCN National Conservation Strategy Implementation Programme to enhance the coverage of environmental courses relevant to all its courses.

Land Survey Training Centre

The Local Services Training Centre conducts pre- and in-service training courses for different ranks of surveyors on subjects related to land surveying such as photometry, cartography and mapping. These courses are technical in nature and do not contain environmental aspects. Special seminars could be organised during the courses to impart knowledge on the environment and conservation.

Legal Service Training Centre

The Legal Service Training Centre conducts pre- and in-service training courses for government officials working under the Legal Service. These short-term courses cover different aspects of Nepalese law and judiciary procedures. Teaching methods comprise of lectures and discussions. The Centre invites specialised resource persons to teach specific topics.

Local Development and Municipality Training Centre (Pokhara)

The Centre runs special short-term training courses on municipal administration, accounting procedures, tax policies, record keeping, development planning, law and judiciary for municipality officials. The training courses do not contain environmental information, and thus do not contribute to developing environmental awareness in participants.

Nepal Administrative Staff College (NASC)

The Nepal Administrative Staff College (NASC) was founded in 1982 as an autonomous, national level institution to promote efficiency in civil service and public enterprises. The College runs a series of training programmes and seminars for all levels of civil servants and public officials as well as for personnel providing consultancy and information services to government. The basic policy of NASC is geared towards making training an integral part of the personnel and administration programmes of HMG while integrating it with career development of the trainees. The courses offered by the College provide trainees with knowledge relevant to their jobs. The duration of training varies with the nature of the courses.

Presently, the National Administrative Staff College undertakes four main categories of training programmes:

- a. training programmes for particular civil service grades;

- b. training programmes for specific public servants;
- c. short-term courses for specific managers and administrators; and
- d. other training programmes often designed on request from specific organisations.

These programmes are directed at providing trainees with necessary skills in planning and management, accounting and auditing, development administration and management, project analysis and management, financial and personnel management and basic administration.

The course content for training programmes is tailored to the needs of the client groups. However, development planning and management are common denominators in the courses offered. The courses make no mention of the possible impact of planning and management decisions on the environment or of the methods of integrating environmental factors into decisions such as environmental impact assessment or integrated environmental planning systems.

Some aspects of environmental conservation, especially administration and management of conservation, are dealt with in administrative training programmes undertaken for forestry and agriculture officers. Currently NASC is actively participating in the National Planning Commission/IUCN National Conservation Strategy Implementation Programme to develop a package of environmental teaching materials and guides for use in each of its courses.

Postal Service Training Centre (PSTC)

PSTC conducts in-service training courses for different levels of staff working in the Postal Service. Course contents include general administration, financial management, royalties, and government procedures related to the Postal Service. These training courses usually last a month. The Centre believes that a few hours of environment-related topics could be included in its training programmes.

Regional Local Development Training Centres (RLDTC)

The RLDTCs at Jiri, Janakpur, Jhapa and Nepalgunj provide a three-month in-service training course for village development committee secretaries on a range of rural development issues. Topics such as tree planting, agriculture, sanitation, health, population education and soil conservation are included in these courses. Insufficient

emphasis is currently placed on the relationship between human activities and the environment. Teaching methods used include lectures, discussions, flip charts, slides and occasional field visits.

These Centres also conduct week-long on-the-spot training courses for rural populations on tree planting, health, sanitation, drinking water, population education and irrigation. These courses indirectly increase environmental awareness in trainees. Mini-lectures, discussions, practical work, demonstrations, flip charts are the standard teaching aids.

Skill development training, especially in carpentry, masonry and plumbing, is also run by the centres. These courses are purely technical in nature and do not emphasise the impact of the trades on the local environment, or the need for conservation of local resources including building materials.

Revenue Administration Training Centre (RATC)

RATC runs training courses on taxes, customs, excise duties, land taxes and accounting procedures for different levels of government officials at the request of individual government departments. These in-service and pre-service training courses are usually one or two weeks long. RATC realises the importance of environmental awareness and believes that special seminars on environmental problems and conservation could be conducted during its training courses as a fringe programme. In order to implement these, the Centre needs help from government and non-government agencies specialising in environmental concerns.

Telecommunication Training Centre

The Telecommunication Training Centre caters to staff working within the government's telecommunications service. The curricula of short and long-term training courses and refresher courses run by the centre are purely technical in content, with no emphasis on the environment. Trainees are not instructed in the environmental aspects of telecommunication facilities, such as how to place telecommunications lines and other structures so that they do not impose upon areas of scenic beauty and wildlife importance.

Women's Training Centre

Established in 1956, the Women's Training Centre (WTC) initially focused on introducing women's development programmes within the Kingdom. Accordingly, the

Centre organised programmes for training women workers and rural women in various areas of development.

Over time, WTC has assumed newer roles and responsibilities. Some of the important activities of the Centre include imparting training to workers of the Nepal Women's Organisation, and organising a series of training opportunities, seminars and workshops for groups of women development officers, supervisors, women workers, and trainers. A total of 354 women were targeted for training at the centre during the fiscal year 1989-1990 (Table 1).

TABLE 1

CATEGORIES AND NUMBERS OF PARTICIPANTS IN TRAINING PROGRAMMES ORGANISED BY THE WOMEN'S TRAINING CENTRE, JAWALAKHEL, KATHMANDU

Programmes	Participants	Number	Duration
1. Skill Oriented Women's Leadership Training	Women Workers	20	6 months
2. Programme Supervisor's Training	Women Supervisors	20	3 months
3. Pre-Service Training	a. Teachers, Supervisors and Volunteers (<i>Sevika</i>) b. Women Development Officers	30	1 month
4. Teachers' and Examiners' Training	Teachers and Examiners of Adult Literacy and Cheli Beti Programme	unspecified	9 days
5. Workshops	a. Female Teachers b. District Chairpersons, Nepal Women's Organisation	20 125 in 5 groups	1 month 7 days

The nature of the courses offered by WTC is determined by each group's needs and objectives and duration of the training. However, all courses include content which promotes the functional capability of the trainees in their respective fields. The multi-

disciplinary content in the courses offers a wider perspective of knowledge and skills to the trainees. 'Soil Erosion and Water Conservation' is one of the units offered. The courses cover other environment-related areas such as livestock, health and hygiene. The unit on 'Forest and the Law of Conservation' introduces general concepts, such as the relationship between people and their environment, and plants and animals. Some skills are also provided in planting and afforestation techniques. Similarly, some skills in soil conservation such as terracing, construction of dykes and dams are provided under the subject heading of agriculture. A unit on 'Population Education Planning' is also included in the course of study.

The teaching methods used for this training include lectures, discussions, demonstrations, role playing and field experience. These are augmented by aids such as flash cards, films, slides, charts and posters. WTC runs its own radio programme, aired by Radio Nepal, with a view to educating women and disseminating information relevant to their development.

Training personnel include the trainers at the Centre and other resource persons in related fields such as administration, agriculture, forest and land conservation, population education, community health, and mother and child care. On completion of the training programme, women workers are employed by various development projects and extension programmes.

WTC is participating in the NPC/IUCN Programme to prepare a comprehensive range of environmental resource materials and teacher's guides tailored to each of its main target group courses.

IN-SERVICE TRAINING PROGRAMMES RUN BY GOVERNMENT PROJECTS

Dhading Development Project

Under its non-formal education programme, the Dhading Development Project, supported by GTZ, conducts Cheli Beti classes and functional adult literacy courses. The Cheli Beti classes are designed for girls between 10 to 15 years of age who are unable to attend school. After completion of the six-month literacy, numeracy and awareness course, the girls are eligible for admission to grade 4 of the formal school system.

The functional adult literacy programme uses the *Naya Goretu* package which is based on the Freirian theory of adult learning and the keyword method. Keywords are

taken from familiar rural scenes. Discussion of keywords such as forest, water, sanitation and farmland provide functional knowledge on improved farming techniques, health and sanitation, tree planting, forest and soil conservation.

Primary school teachers are provided non-formal training in agriculture, livestock, kitchen gardening, forestry, soil conservation and sanitation. The project also supports activities of government agencies relating to forest conservation and environmental awareness.

Education for Rural Development Project in Seti Zone

The Seti Project is supported by UNICEF, UNDP, UNESCO and AGFUND. The main aim of the Seti Project is to promote education as a powerful tool for rural community development, particularly in remote areas such as those in the Seti Zone. The adult education programme uses *Saksharta Pustika* (literacy booklet), developed by the project. 'Adult Education - Practical Guidelines', also produced by the project, is used in developing awareness of various practical community development activities. This book contains chapters on practical activities that are directly related to the environment: tree planting, forest conservation, sanitation, soil conservation, nutrition, drinking water, medicinal herbs, basic health care, oral rehydration therapy, smokeless stoves, private tree nurseries, compost making and aesthetics. Each of these issues is explained in simple language with clear illustrations. These materials can help participants to appreciate the importance of environmental conservation.

Under the Cheli Beti programme developed by the project, local girls above six years of age who cannot go to school for economic and social reasons are given literacy, numeracy and awareness education. The teaching material used for the programme is *Saksharta Pustika*. The course also emphasises practical activities such as sanitation, nutrition, health, tree planting and kitchen gardening.

Village reading centres have been established for neo-literates, providing simple supplementary reading materials. This programme plays an important role in developing and strengthening awareness of environmental protection and related activities.

Short-term and long-term training courses are also provided for primary teachers and adult education/Cheli Beti teachers so they can develop the skills and knowledge necessary to run their respective education programmes. These courses emphasise the importance of building environmental awareness among local target groups.

The School Environment Improvement Programme within this project has built schools based on the design of houses within the local community, and thus in

harmony with their environs and constructed with local building materials. This approach provides a good example of development initiatives working in sympathy with the cultural and natural habitat.

Integrated Hill Development Project (IHDP)

IHDP, which was phased out in 1990, aimed to improve income generation within the populations of Dolakha and Sindhupalchowk Districts and, at the same time, create and preserve the balance between the human and natural environment. Towards this end, the project conducted adult and child literacy programmes and provided numerous non-formal training and extension services in various areas of rural community development. The adult literacy programme used the *Naya Goreto* package. *Saghan Paila* (integrated step) and *Saghan Barnamala* (integrated alphabets) were produced to complement the literacy package. Adult core clubs were also established to facilitate post-literacy awareness programmes.

Leader farmers were given non-formal training in improved farming systems, livestock management, pasture development, fodder tree management, tree planting and forest conservation. Training courses on health and sanitation, nutrition, family planning and child care were provided for women. The *Tuki* programme of IHDP was essentially an extension activity in which a motivated and trained villager (called *tuki*) trains the villagers of his/her village on various aspects of community development.

IOF/AID Project

Since the early 1980s, USAID has assisted in the professional development of the Institute of Forestry (IOF). The IOF/AID Project, initiated in 1989, provides technical assistance, training and other institutional support required to assist the Institute in more effective teaching, research and extension work. The project provides advanced training for IOF faculty and staff; strengthens the institute's administrative systems; works towards upgrading the library, laboratories and other academic support facilities; funds faculty research; facilitates networking with other institutions; and assists with the revision of the institute's curriculum to meet the standards defined in the new Master Plan for the Forestry Sector, which places an emphasis on social forestry.

The School of Forestry and Environmental Studies at Yale University is managing and implementing this five-year USAID funded project. Several networking activities have been initiated for education and information exchange. Specialists with the Peace Corps have been posted at the IOF to cover some of the teaching duties of IOF

faculty away on advanced training, as well as to conduct research in collaboration with IOF faculty and students.

Nepal-Australia Forestry Project

The Nepal-Australia Forestry Project (NAFP) runs several training activities in two districts of Bagmati Zone (Sindhupalchowk and Kabhrepalanchowk). Project activities comprise of education and training for community and extension workers, reforestation, silviculture, forest management and nurseries. The project offices are located at Chautara and Dhulikhel. Education and training focuses on widening the range of skills of men and women working in the forestry sector. The project is engaged in four main types of training activity: Forest Guard Training, *Ban Nayeeke* Training, *Bankuli* Training, and Field Training for students at the Proficiency Certificate and Bachelor's levels at the Institute of Forestry, Tribhuvan University. A five-week course is conducted in nursery techniques for about 25 trainees at Patalepani Nursery Training Centre, Chautara.

Forest Guards and Senior *Nayeekes* are provided short-term training for a period of two to three weeks. Refresher courses for *Bankuli*, Forest Guards and *Nayeekes* last one week. Training in the use of improved stoves is provided to school girls and adult village women.

Forest Rangers receive training through a twelve-day workshop on management and community development. The NAF Project is mainly engaged in the development of technically and socially acceptable methods for establishing and managing community forests in Nepal. If the programme proves appropriate for the two districts in which it is currently being implemented, activities will be extended to other districts in the country.

Table 2 shows the different training and educational programmes conducted by NAFP. The instructional materials include specially prepared videos, manuals and discounts papers on a range of issues of relevance to community forestry.

TABLE 2

CATEGORIES AND NUMBERS OF PARTICIPANTS OF TRAINING PROGRAMMES ORGANISED BY THE NEPAL-AUSTRALIA FORESTRY PROJECT AT ITS PATALEPANI TRAINING CENTRE NEAR CHAUTARA

Training Programmes	Target Groups	Duration
1. Forest Guard Training	Forest Guards, Senior <i>Nayeekes</i>	2-3 weeks
2. <i>Ban Nayeeke</i> Training	<i>Ban Nayeekes</i>	2-3 weeks
3. <i>Bankuli</i> Training	<i>Bankulis</i>	1 week
4. Field Training	Proficiency Certificate and Bachelor Level students of the Institute of Forestry, Tribhuvan University	
5. Nursery Techniques	Local Farmers	5 weeks
6. Training in the Use of Improved Stoves	School Girls Adult Village Women	short period
7. Workshop Training for Forest Rangers	Forest Rangers	12 days

Post Earthquake Programme (PEP)

CECI, South Asian Partnership and USC-Canada have jointly launched PEP in some earthquake-devastated districts. A six-month non-formal adult education programme using the *Naya Goreto* literacy package also forms part of the project. The literacy programme is supplemented with non-formal training courses on various activities related to rural development: agriculture, animal husbandry, terrace improvement, tree and grass planting, smokeless stoves, sanitation, water supply and income-generating skills. Soil erosion control measures are given top priority in devastated areas.

Primary Education Project (PEP)

The Primary Education Project, supported by a World Bank loan and grants from UNICEF and DANIDA, is run by the Ministry of Education and Culture in six districts in the Eastern, Western and Mid-Western regions. It conducts non-formal literacy classes for children not attending school. Two main courses offered are the nine-month A-level course which aims to develop literacy, numeracy and general awareness; and the B-level functional literacy course which also lasts nine months and covers topics such as civic awareness, agriculture, forest conservation, sanitation and cultural values. A nine-month literacy programme and a six-month advanced course have also been launched.

The teaching package contains lessons, teacher's guides and training manuals developed by PEP. Community libraries established under the project continue the literacy and awareness raising process begun in PEP's education programmes. Simple reading materials provided by these libraries cover many issues pertinent to rural environment.

In addition, a three-day training course has been designed for primary school teachers on environmental education. The objective of this programme is to create environmental awareness in school children and local communities. PEP has produced a special training manual *Vidyalaya Tatha Watawaran Sudhar Talim Nirdeshika* (training guidelines for school and environment improvement). Topics include environmental sanitation, kitchen gardening, tree planting, forest and soil conservation and horticulture. This new approach to primary education can be instrumental in developing environmental awareness in school children.

Production Credit for Rural Women (PCRW) Programme

The PCRW programme is run by the Women Development Division of the Ministry of Local Development. The programme, primarily funded by UNICEF, accesses women's groups to developmental activities and bank credit under the Priority Sector Credit Scheme. PCRW provides training programmes for rural women in various short and long-term rural development activities. Women are provided technical support and technical skills in areas such as animal husbandry, vegetable cultivation, nurseries, agroforestry, health and environmental sanitation.

Small Farmer Development Programme (SFDP)

SFDP is run by the Agricultural Development Bank (ADB) and funded by UNICEF. The overall aim of the project is to improve the living standard of small farmers. SFDP

runs training and extension programmes on various topics for this target group. Since early 1990, environmental protection has been incorporated into these programmes. The environment project aims to increase public awareness of the need for environmental protection by controlling detrimental activities, as well as by initiating protective measures. Activities such as tree planting, soil conservation, small scale riverbed protection, forest conservation, smokeless stove installation, latrine construction and construction of drinking water systems, all of which are important in addressing environmental degradation at household and community levels, have been included in the SFDP training programmes. Teaching aids such as posters, charts, slides and pamphlets developed by the Centre for Rural Technology are used in these courses. In some programmes, women trainees of the Production Credit for Rural Women (PCRW) programme of the Women Development Division, Ministry of Local Development, are also invited to participate.

The regional offices of ADB organise these training courses in cooperation with local government line agencies. The trained farmers act as trainers for other farmers and initiate activities in which they have been trained. Simultaneously, a literacy programme is run intensively in all SFDP sites, using the *Naya Goreto* package.

Children and women of poor families are the most adversely affected by environmental degradation, and SFDP expects to reach 50% of women in SFDP and PCRW programme sites. The programme also adopts as targets the reduction of household work by 40%, the establishment of community woodlots and the planting and maintenance of at least ten trees per family.

This programme, if implemented as planned, will contribute significantly to fostering an understanding among communities that environmental degradation reduces the quality of life and undermine the positive impacts of development programmes.

Women's Education Project/MOEC

This project aims to coordinate and strengthen existing efforts for increasing the participation of girls and women in education. The non-formal education programme of the project is integrated with the Cheli Beti programme of the Seti Project. The objective of this programme is to provide a basic level education for girls (6 to 14 years of age), who for a variety of reasons are not enrolled in school. The curriculum package includes literacy and numeracy, personal hygiene, kitchen gardening, basic health care, and tree planting. With the knowledge and skills acquired from this programme, the girls play a role in conveying the same messages to their parents and siblings who are usually illiterate. A small-scale women's literacy programme is also being launched in the Karnali Zone.

A ten-month long female primary teacher training programme is run by the project with the objective of increasing the number of female teachers in primary schools. They, in turn, are expected to motivate a large proportion of girls in the community to enroll in a local school. The training course contains components of basic teaching methodologies, and the ways and means by which they can operate as 'change agents' in communities. The training provided is accredited by Tribhuvan University's Faculty of Education as equivalent to the first-year Proficiency Certificate. Short-term refresher courses are also conducted by the project to help previously trained female teachers to review and update their knowledge and skills.

IN-SERVICE TRAINING PROGRAMMES RUN BY NGOs

A number of national and international non-governmental organisations are working in the area of environment education in Nepal. Currently, however, most programmes are specifically tailored to the needs of communities where these agencies are engaged in ongoing activities. While successful in themselves, more attention needs to be given to the replicability of such approaches and initiatives.

Besides the work being done by the agencies described below, the review team acknowledges the significant training opportunities offered by the **Overseas Development Administration (ODA)** through the Pakhribas and Lumle Agriculture centres on integrated agricultural practices, livestock breeding, new varieties of crops, fodder tree plantations and the management of soil. Further, the **Nepal Press Institute (NPI)** conducts regular, long-term journalism classes for aspiring youth, with a strong emphasis on environmental reporting. The **Hotel Association of Nepal (HAN)** has been successfully training lodge owners along major trek routes on issues of fuel use and sanitation in addition to food preparation techniques and general hospitality requirements.

The **Institute for Sustainable Agriculture (INSAN)** is providing training on permaculture as a possible alternative for meeting Nepal's growing food needs and also on better housing designs aimed at mitigating health hazards. The **Centre for Rural Technology (CRT)** provides specialised training on the use of appropriate technologies including improved stoves, water turbines and biogas plants. Meanwhile the mass media -- **Radio Nepal**, **Nepal Television** and the print media (newspapers, magazines and journals) -- contribute to supplement the environmental information needs of a wide range of the population.

Action Aid/Nepal (AA/N)

Action Aid's non-formal education programme follows a multi-message approach to make participants more aware of the wide range of the project's multi-sectoral activities and development possibilities. The adult literacy classes under this programme follow the Ministry of Education and Culture's *Naya Goreto* literacy package. A new 'post-literacy and awareness' course had been started as an advanced course designed for neo-literates who have completed six months of the adult literacy and awareness course. In addition, home reading circle programmes have also been initiated which provide simple reading materials for neo-literates through local clubs. When reviewed, these reading materials did not include booklets on soil conservation, forest protection, tree planting, health and sanitation, pasture development, and the conservation of cultural heritage.

AA/N is currently operating in Kathmandu and Sindhupalchowk Districts, and also provides non-formal training courses and extension services for various community development activities. In the area of agriculture, courses are given to the farmers on improved farming methods, pest-disease control, proper use of chemicals, correction of soil acidity, livestock development, pasture management, horticulture and grain storage. Training and extension courses in forestry include nursery techniques, tree planting, forest and soil conservation.

Local people are trained in basic health care techniques with particular emphasis on maternal and child health. Health and hygiene awareness in children is promoted in the extension programme through mobile clinics. Training courses are also given to traditional birth attendants, traditional healers, parents and school teachers. Teaching methods for these courses include demonstration, audio-visual presentations, charts, pamphlets and booklets. The courses cover personal and family hygiene, sanitation, first aid, nutrition and family planning.

Training courses for skill development are organised for local people on carpentry, plumbing and masonry. These trained people are then available locally for construction, repair and maintenance of local infrastructure. They are not, however, made aware of the impact of their trades on the local environment and the importance of conservation of local building materials.

Centre for Educational Research, Innovation and Development (CERID)

Non-formal education and rural development is one of a number of programmes implemented by CERID. The adult literacy programme uses CERID's *Nawa Sakshar Pustika* (new literacy booklet) package. The package is designed to develop awareness of issues such as sanitation, health, tree planting, resource conservation

and livestock development. A self-study booklet *Swadhyaya Samagri* has also been developed for neo-literates, with chapters on sanitation and forest conservation. In addition, post literacy booklets on income generation activities and soil conservation have been produced.

Centre for Women and Development

The centre runs a ten-month course on communication for women. The course covers topics such as communication skills, public speaking, information technology, report writing and public relations. The training includes two months of practical work during which trainees conduct case studies. Some of these cover incidence of environmental degradation in Nepal as well as other parts of the world. To some extent the course also draws examples from fields such as population education, health and sanitation, and cultural heritage conservation.

Teaching methods used are lectures, discussions, practical work, audio-visual presentations and role playing.

Environmental Camps for Conservation Awareness (ECCA)

ECCA, a local NGO, provides young children aged 11 to 14 years a broad environmental programme through five-day camps, in close collaboration with IUCN - The World Conservation Union. These camps are designed to provide young people knowledge and experience that allows them to make informed personal judgements on environmental issues. Some of the major objectives of ECCA are to generate a sense of awareness amongst young children when they are at an age where they are receptive to ideas; develop in them a love and appreciation of nature; encourage more young people to pursue conservation and related activities as a worthwhile and respected career; and to teach young people good outdoor habits, so that they may enjoy nature without knowingly or unknowingly contributing to its deterioration.

The camps work to promote the notion of a caring community. This principle widely influences the day to day activity of each camp, for it governs the relationship between the campers. The camp design is aimed at firmly linking the campers' learning with real situations. ECCA, which is a member of IUCN, works together with a wide range of community level, national and international agencies to organise over 35 camps a year in areas in Nepal and neighbouring Bhutan.

ECCA organises regular three-day Counsellor Training Camps to train university level students, mainly drawn from local groups, in the conducting of the camps.

Special camps are also organised for disabled children. Fortnightly day hikes are regularly organised for urban children.

King Mahendra Trust for Nature Conservation (KMTNC)

KMTNC aims to strike a balance between the needs of conservation and basic human needs by raising awareness of the problems of environmental degradation. Mass media is being used for this purpose. The Trust is also planning to design and develop a National Conservation Education Programme which will develop a curriculum on conservation education for use in schools. Special groups of Conservation Education Officers will also be trained and sent to different parts of the country. Target groups for conservation education are policy-makers, village leaders, teachers and the public. The Trust has started various projects for environmental conservation such as the Annapurna Conservation Area Project (ACAP), the Snow Leopard Project, the Rhinoceros Trans-location and the Gharial (Crocodile) Conservation Project.

ACAP is engaged in building public awareness about fuelwood conservation, tree planting, agroforestry, fuelwood saving technologies and environmental sanitation in project areas. Door-to-door campaigns, public meetings, and audio-visual presentations are the usual extension methods. School teachers and children are the special target group for this awareness campaign. Various extension materials including posters, pamphlets and T-shirts have been produced to facilitate the process. The education unit of the project organises conservation classes for school teachers.

Lutheran World Service

The Lutheran World Service (LWS) considers non-formal education as a first step prior to launching other community development activities. The *Naya Goreto* package is used for the LWS literacy programme. The package stresses the use of discussion charts depicting various community development issues. These stimulate discussion and develop awareness of sanitation, tree planting, population education, nutrition and soil conservation.

Two bulletins, *Ukali* (upwards) and *Chautari* (resting place), are published for neo-literates. In addition, village reading centres provide access to simple reading materials. While these reading materials cover a wide variety of issues related to the natural environment, they do not provide exposure to the importance of conserving the nation's cultural heritage.

Training in skill development for income generation and extension courses on health, sanitation, forestry and agriculture are also included in the project programme.

Lutheran World Service is currently active in Baglung and Illam Districts.

Nepal Centre for Women and Children's Affairs (NCWCA)

NCWCA is a local NGO that organises various activities, in collaboration with IUCN, aimed at preparing future cadres in the country equipped with appropriate knowledge of the conservation of natural resources so that they may, among other things, understand and participate in the development process of the country by helping to create a sustainable resource base. Creative painting exhibitions, group discussion, and environmental art workshops and competitions are designed to direct the creativity of children towards their natural surroundings, depicting both structural and functional processes through their participation.

The main objective of the NCWCA programmes are to raise awareness of environmental conservation in school children through practical field exercises; and, through exhibitions of children's paintings, to provide opportunities for children to articulate their thoughts to each other and to visitors.

NCWCA encourages the involvement of students, teachers and the community in such programmes, and hopes to motivate participating schools to organise similar activities on their own initiative.

In collaboration with IUCN and CECI, NCWCA has also been broadcasting 'Paluwa', a 15-minute weekly environment radio programme for women and children. The programme focuses on the interrelationship between improvements in the quality of life, development, and the conservation and proper utilisation of natural resources, with a view to motivating and mobilising the audience for positive action.

Nepal Conservation Research Training Centre (NCRTC)

The King Mahendra Trust for Nature Conservation has expanded the Nepal Terai Ecology Project into NCRTC. The Centre conducts training for wildlife personnel, foresters and extension workers. The training curriculum deals with conceptual problems in protected-area management and reforestation at the village level. The main aim of these courses is to facilitate effective extension of nature conservation education at this level.

The course includes information on the general natural history of the Terai ecosystem and is based on research published by the Nepal Terai Ecology Project. Other topics covered include social forestry on the perimeter of national parks and other protected areas, case studies of park-people interaction and conflicts of interest, and general wildlife management. The Centre also plans to run field biology classes on ornithology, botany and mammalogy for university students with a strong conservation education component.

Nepal Forum for Environmental Journalists (NFEJ)

With the primary aim of providing training and experience for journalists in reporting on environmental issues, NFEJ, a local NGO, organises workshops for environmental journalists in collaboration with IUCN. Many journalists have little exposure to environmental issues, and media coverage of related problems therefore often tends to be superficial and irregular. Newspapers are widely read by the public at large and thus have a direct bearing on the public's perspective on environmental issues.

The workshops have two main objectives. These are

1. To impart knowledge on various aspects of the environment and to make journalists conversant with different branches of science, sociology and human behaviour.
2. To impart writing and investigative skills to journalists and other communicators. Environmental problems need to be clearly and simply communicated so that average readers, listeners and viewers can grasp them without difficulty.

Besides the workshops for journalists, NFEJ is also involved in the publication of a wall newspaper 'Batabaran', designed for and distributed to Nepal's large rural population. The wall newspaper provides environment related reading materials for rural literates to encourage their interest in environment and sustainable living.

Non-Formal Education Service Centre (NESC)

The centre uses the *Naulo Bihan* literacy package for its adult and out-of-school children's literacy programmes. In order not to overwhelm the participants with the size of the book and to maintain reader interest, lessons are provided in loose sheets. Neo-literates are provided continuing support through village reading centres and advanced post-literacy classes. NESC has also developed a bulletin called *Hamro Bhasha* (our language) and *Nawo Jyoti* (new light) which contain some stories with themes pertinent to environment and conservation.

Participants in the literacy programme are also involved in a range of activities including tree planting, tree seed collection, nursery establishment, and construction and installation of smokeless stoves. Special courses are conducted for traditional birth attendants and health volunteers. Skill development training in tailoring, weaving, carpentry and bamboo crafts is also provided to low-income rural poor. Extension courses and training courses are organised on different aspects of agriculture and livestock development. Facilitators are given pre-service and in-service training on skills and knowledge needed for running literacy and awareness classes.

Plan International Nepal (PIN)

Through its non-formal education programme, PIN conducts a six-month literacy course for illiterate adults as well as for children not attending school. The *Naya Goro* package developed by MOEC is used by the programme. Reading centres established for neo-literates in villages loan simple reading materials developed by various organisations. The reading materials cover many issues related to the rural environment, including tree planting, resource conservation and sanitation. PIN is implementing programmes in most areas of Kathmandu District.

PIN also conducts short-term (10-15 days) training for its front line staff of community workers. This training covers topics such as non-formal education, health, child care and other issues related to community development and rural income generation. Community workers' training does not currently stress the importance of natural and cultural resource conservation that would facilitate the trainees in assisting to develop environmental awareness among rural communities.

Redd Barna

Redd Barna has added a training section to its services in order to train its Community Development Workers. On completion of the three-year training programme, trainees are awarded a Diploma in Community Development. This training is completed in three phases, one per year. In each phase, training courses are conducted over a fifty-day duration. The trainees then return to their places of work where they have an opportunity to apply and test the knowledge and skills acquired.

The present training package comprises a general course, professional course and an optional course. The general course aims at making the trainees aware of community development as a field of knowledge and practice. This course consists of community, women and child development; extension methodology; and community

participation. The professional courses cover agriculture, forestry, health, sanitation and child care. Agriculture includes a fairly detailed study of agronomy, livestock development, pest and disease control, kitchen gardening, manure and chemical fertilisers, grain storage, horticulture and sustainable agriculture. Environmental management and forestry includes study of the people-environment relationship, deforestation and its causes, consequences and solutions, environmental degradation, identification of problems in regard to the natural environment in Nepal with special reference to the project area, protecting and wise management of environmental resources, the role of forestry in rural development and existing government policies regarding community forestry. The optional courses are designed to help trainees in fulfilling their individual needs in an area of training they choose, e.g., forestry, agriculture or health.

Redd Barna's non-formal education programme uses the literacy packages developed by the Ministry of Education and Culture and the Society for Participatory and Cultural Education (SPACE). Many environmental issues related to rural life are discussed in these lessons. Community development projects run by Redd Barna provide training and extension courses for local target groups on various disciplines. The main areas covered are nursery techniques, tree planting, construction of smokeless stoves, proper use of insecticides and pesticides, pasture development, primary health care and sanitation.

Topics such as preventive and rehabilitative measures of soil conservation, and conservation education are not covered by the curriculum.

Redd Barna's activities are focused on Palpa, Lamjung, Kathmandu, Udayapur and Solukhumbu Districts.

Save the Children Federation USA (SCFUS)

Under its education and human resource development programme, SCFUS conducts literacy programmes and staff training in its project areas. SCFUS has been actively involved in Gorkha District. The *Naya Goreto* package is used for the literacy programme. Simple reading materials for neo-literates are provided through the box library programme. While these reading materials could include wider coverage of issues related to the environment, they play an important part not only in continuing the benefits of the literacy programme but also in developing environmental awareness in participants.

A week-long training course as well as follow-up refresher courses are conducted for facilitators to develop necessary skills and knowledge to run the literacy classes.

Save the Children Fund/UK (SCF/UK)

SCF/UK runs a special two-week training course on disaster management. The main aim of this training is to raise awareness of various types of disasters and to enable the participants to understand the concept of disaster management. The target group includes the staff of social organisations and government officials responsible for social welfare. The training curriculum covers issues such as disaster management, disaster preparedness policy in Nepal, understanding various types of disasters (earthquakes, floods, fire, landslides), associated environmental degradation, contingency planning and disaster mitigation measures. The instruction materials used include books, handouts, case studies and audio-visual presentations. Lectures, discussions and role playing methods are employed in the training.

Society for Participatory and Cultural Education (SPACE)

SPACE is directly involved in the community literacy programme, using its own special package. Together with the literacy programme, participants are also provided non-formal training in agriculture, forestry, sanitation and soil conservation. The monthly wall magazines *Naya Chetana* (new awareness) and *Hamro Sansar* (our world) are published for neo-literates. These reading materials contain information and stories that help to develop awareness about the environment and conservation.

United Mission to Nepal (UMN)

With programmes in Palpa, Kashi, Syanjha, Gorkha, Lalitpur, Okhaldhunga and Surkhet Districts, UMN conducts a three-year literacy programme. The *Naya Goreto* package is used in its functional adult literacy programme which covers topics such as tree planting, terrace construction, smokeless stove construction, kitchen gardening and sanitation. For neo-literates, village reading centres are established with booklets produced by various agencies on topics related to rural settings. These booklets cover issues such as the causes and consequences of deforestation, pasture development, population education, and sanitation. Income-generating skills training courses are also conducted in some project areas. The non-formal education component of UMN's programme seeks to build environmental awareness among the rural poor. The facilitators are also given a two-week training course and refresher training on how to run the literacy awareness courses.

USC - Canada/Nepal

USC-Canada uses the *Naya Goreto* literacy package developed by the Ministry of Education and Culture for adult literacy classes, and the *Naulo Bihan* developed by Action Aid/Nepal for children not attending school. Both these programmes are of a six-month duration. The discussion charts used in these packages depict familiar village settings; the lessons centre around issues in village development such as the importance of hygiene, tree planting, and nutrition. Participants completing these courses achieve literacy, numeracy and an awareness of different environmental issues pertinent to rural life.

USC-Canada/Nepal programmes have been implemented in the Districts of Lalitpur, Bhaktapur, Kabhre, Kaski, Dang, Morang, Ramechhap and Kathmandu. A planned post-literacy programme has yet to commence, but the need for it is evident. Skill development courses on tailoring, cloth and carpet weaving, livestock development and agriculture are also provided for local people.

OBSERVATIONS AND SUGGESTIONS

The review team has proposed selected additions and alterations within existing curricula reviewed in order to orient available courses of study towards wider coverage of environmental issues. These suggestions do not provide a comprehensive evaluation of the environmental content offered by all of the agencies and institutions covered by this review.

School Level Education

1. The main purpose of environmental education should be to develop a general understanding of the life-support systems in nature, and disturbances in these systems due to both natural phenomena and human interventions. This should include the socio-economy of environmental degradation and give students an understanding of how these problems can be tackled. It should also create an understanding of the principles of sustainable living and practices of conservation while imparting some basic practical skills in environmental care.
2. The existing curricula for school students at primary, lower secondary and secondary levels should be revised and improved to make them more relevant and functional in meeting the objectives of environmental education.
3. Existing courses (science, social studies, health, agriculture, etc.) should be revised to incorporate units on environmental studies and conservation relevant to the needs of the students and their communities. These units should be integrated in the present courses of study, rather than presenting them as a separate subject.

The curricula should help students improve the quality of their lives through the application of their knowledge. It should promote solving of problems concerning personal health and public hygiene as well as those of natural resource depletion and environmental degradation due, for example, to air and water pollution and damage to cultural heritage in the country. Curricula should include the study of ecosystems, principles of ecological balance, socio-

economy of environmental degradation and the needs and practices of conservation in Nepal, including people's participation. Courses should stress laboratory and field work. Social studies and participatory exercises with villagers should be included in the field work, in addition to practical scientific studies. Students should have the opportunity for participation in group games and project. This will help to enhance their communication and team work skills. The science curriculum should introduce, in a more comprehensive manner, specific units on the effects of plants, animals and on environmental quality. Plant and animal genetic resources and their conservation, and the role and functions of protected areas and wildlife, including their economic values, should be covered in the course of study for biology. An understanding should be provided of the role of various biological or life support processes in maintaining the quality and productivity of the environment.

4. School students and teachers should be encouraged to organise and participate in nature study and nature conservation activities in the community. It is desirable for practical activities on environmental studies to be based as far as possible on traditional conservation practices, and to involve interaction of school children with local villagers so they can understand the issues. Time must be allotted while devising a school calendar for such activity to occur on a regular basis. Monitoring and evaluation of these environmental activities should be based on concrete action-oriented outputs along with grade performance. Practical field work such as afforestation and clean-up campaigns are examples of such outputs. There are a number of NGOs with first hand experience in carrying out such activities. These organisations can be called upon to provide valuable input so that no real extra burden is placed on the teachers.
5. Textbooks should contain more exercises to promote students' critical thinking, interpretation, deduction and classification capabilities. Diagrams and illustrations should be considerably improved, both in quality and quantity, especially in the textbooks prescribed for the primary and lower secondary level. For primary levels classes, textbooks should be supplemented by a range of resource materials, workbooks and teacher's guides. For the lower secondary and the secondary levels, laboratory manuals and teacher's guides are also important for the effective implementation of teaching programmes. Learning materials other than textbooks, such as handbooks, supplementary readers and audio-visual aids should be prepared for school teaching programmes. Findings of ecological and biological research carried out in universities and other institutions should be continually made available in appropriate form for use by school teachers. A documentation unit on environmental studies and conservation education should be developed at the Science Education Development Centre (SEDEC) in the Ministry of Education

and Culture; it should regularly publish bibliographies of publications related to environment and conservation education in the country.

6. School teachers of science and social studies should be given greater opportunities through pre- and in-service training to learn and practice new methods of teaching, including those which increase student participation, using modern teaching materials. Workshop and seminar programmes on environmental and conservation education would be useful in exposing teachers to new concepts and methods, in giving teachers an opportunity to share their experiences and in involving them in the design of appropriate teaching activities. Teacher training programmes should place stronger emphasis on field activities including social surveys and experiments in natural resources conservation and ecology. Teachers should be allowed a certain amount of flexibility to adapt the syllabus to their specific environmental and geographical needs. In addition to developing competence in basic science teaching, teachers should also be encouraged to organise problem solving and project activities for students.
7. A major problem facing teachers in schools is a lack of information. Teaching should be tailored to the environment in which students live. Relevant teaching materials should be made accessible to teachers. Curriculum development and preparation of teaching materials should be done with greater teacher participation. An environment education centre should be established to act as a clearinghouse for information, to conduct in-service and pre-service training, to involve teachers in the process of curriculum design and development of teaching materials, and to serve as a meeting place for teachers to exchange experiences and views. The electronic and print media can supplement this need for environmental information.
8. Audio-visual aids such as posters, pamphlets, slides, models, films, charts and specimens should be developed, made available and used more frequently at the lower grades. These should be supplemented with field activities. At the higher level, discussions, project work or experimental studies and field trips should be organised. This should be designed to develop skills in identifying environmental problems, and in designing and implementing local mitigation programmes in cooperation with, and with participation from, local communities. Here, once again, the expertise developed by NGOs can be drawn upon in devising, testing and disseminating such materials.

Certificate Level and B.Sc. Level Education

9. There should be more basic science courses offered at the Proficiency Certificate level. Courses on social science aspects of forestry, soil and water conservation and wildlife conservation need to be further strengthened. Courses at the B.Sc. level in the field of agro-forestry, soil and water conservation and wildlife conservation need to be updated. Qualified lecturers should be given the chance to teach new and innovative material and should be allowed to test students on this material.
10. Courses in biological sciences should introduce specific units on the conservation of biological diversity, and the role of genetics and the variety of ecosystems in biological conservation. Courses should cover conservation education and environmental science, including environmental planning and impact assessment. This needs increased course work on natural resource management to give students administrative skills for their future job placements. Graduates should be prepared to function as organisers, motivators, advisors, trainers, extensionists, facilitators, teachers and managers. Problems solving and independent thinking needs to be taught with a move away from mere memorisation of facts.
11. Technical skills for effective resource management should also be strengthened at the IOF. These include technical natural resources skills such as rapid rural assessment, biometrics, computer skills, resource assessment, data analysis, and extension work. Students must learn to use these skills in practical field situations as well.
12. Field work and practical work should be strengthened and graded. All field trips should require written or practical work that will be graded. Participation during field trips should also be graded. There needs to be greater involvement in research activities currently being undertaken in Nepal. This will link students and faculty directly to new developments in natural resource work in Nepal. More time and funding must be allotted for this to be achieved.
13. The administration of the university needs to be strong and able to enforce academic discipline. Teachers should have the support of the administration and be able to enforce rules. Students will then be challenged more effectively and become involved in their studies more fully. University and Institute libraries should contain more up-to-date material on environmental and natural resource information. Libraries should stay open after 5:00 pm so that students have time to utilise these resources.

14. Physics subjects should cover concepts of environmental effects of physical factors such as temperature, light, humidity, altitude, wind and sun. A basic grasp of alternative sources of energy, their use and technologies, ultra-violet and ionizing radiation and their effects on plants, animals and man, protection from radiation hazards, thermal and noise pollution should also be given to students.
15. Chemistry students should be aware of sources of chemicals, the chemical processes which have detrimental environmental effects and means of mitigating such effects to develop ability in prevention and treatment of chemical damage. Units on the chemistry of air, water and soil pollution could also be introduced to familiarise students with the chemical aspects of pollution.
16. The Proficiency Certificate in Forestry should be implemented with comparatively more modern tools of education using information based upon research findings, especially those on the problems of nature conservation in Nepal. A new unit should be introduced on the forest genetic resources of Nepal, both plants and animals, and their conservation.
17. The course on engineering chemistry in the Proficiency Certificate in Engineering should also include a unit on the harmful effects of chemicals, chemical products and pollution. This would cover corrosion of stone and alloys, poisoning by carbon monoxide, carcinogens and chlorine and the harmful effects of various chemicals used in agriculture and industries such as pesticides, detergents, defoliants and herbicides, toxic metals, acids and alkalis. A preliminary understanding of salination, geochemical cycles and the phenomenon of ozone layer depletion and radiation hazards should also be provided. Similarly, concepts should be introduced relating to the possible impact of various engineering works on the quality of environment.
18. Trainee nurses should be instructed in the possible sources of environmental pollution, polluting agents and ways to minimise their harmful impact on health at the community level.
19. The Proficiency Certificate in education should include further concepts on ecology, conservation of natural resources and pollution, and more emphasis should be laid on developing specific skills in teaching lessons on environmental education.

In-Service Training for Extension Workers

20. The Nepal Administrative Staff College should initiate a specific training programme in environmental planning, organisation, management and administration of projects and programmes related to environmental conservation. This would aim to:
- (i) Acquaint the trainees with the environmental problems of Nepal, their socio-economic and political reasons and the institutions dealing with these,
 - (ii) provide an understanding of the policies, principles and practices of environmental protection in Nepal,
 - (iii) familiarise trainers with the administration of environmental impact assessment procedures, with environmental planning and with the management of pollution control systems and standards enforcement,
 - (iv) enable them to prepare plans and programmes for conservation activities in the relevant sectors.

NASC should also integrate environmental units within courses for all its target groups.

21. Major environmental issues, principles and practices of natural resource conservation and protection of cultural heritage should be added in the training course for town and village community workers.
22. The in-service training courses provided to forestry and agriculture extension workers should place greater emphasis on water, air and land pollution. It should also emphasise methods of prevention of land erosion and landslides in crop lands, grazing lands and forests.
23. In-service training for government officials should include special seminars as fringe programmes, focusing on environment and conservation.
24. One of the training courses offered by the Water Supply and Sanitation Department of the Human Resources Development Centre includes the environmental effect of water supply and sanitation engineering. These courses should include environment protection topics such as water pollution and its prevention, possible environmental impacts of different engineering structures, dangers of sewerage leakage, and environmental sanitation.

25. The Legal Service Training Centre should include environmental law in its training programmes. Environmental law from different parts of the world should be included in the syllabus so that the trainees can gain knowledge on this specialised legislation, making them aware of the need for similar legislation in Nepal. This should be supplemented with special seminars on the role of law in addressing environmental problems and enforcing protection measures.
26. The courses offered by the Telecommunication Training Centre could include topics such as aesthetics, dealing with the overall negative effect of telecommunication lines and other structures on the scenic beauty and other environmental values of an area. The trainees should also be made aware of the dangers of sewerage leakage that can occur when laying underground telecommunication lines, and ways of avoiding this problem.
27. Training curricula of the Agricultural Projects Services Centre should include an emphasis on environmental planning and resource conservation, and the environmental impact of agricultural practices.
28. Training and refresher courses for facilitators offered by Save the Children Federation USA could be designed to emphasise the importance of building environmental awareness in the local target groups.
29. Training courses offered by USC-Canada/Nepal could include concepts related to the impact of human activities on environment and the cause of these actions, and resource conservation and means by which individuals can contribute to natural and cultural conservation.
30. The Centre for Women and Development, through its ten-month course on communications, should develop environmental awareness in trainees who, in turn, can be instrumental in communicating such concepts to the general public.

Non-Formal Adult Education, HMG

31. The environmental impact of agriculture, forestry and other human activities, problems and practices of natural resource conservation and national heritage protection, the role of village and town municipalities and development organisations in conservation, should be included in the courses of study for the Non-Formal Adult Education Programme.
32. Reading materials provided in the post literacy programmes should include booklets on soil conservation, forest conservation, tree planting, pasture development, sanitation and conservation of cultural heritage.

33. The extension component of the agencies involved in non-formal/adult education should incorporate environmental education in their programmes.
34. The facilitators' training should specifically emphasise the importance of building environmental awareness among target groups.
35. Non-formal skill development training should include concepts related to the impact of human activities on environment, resource conservation and the means by which each individual can contribute to natural and cultural conservation.
36. The package developed by the Primary Education Project needs to include perspectives on the importance of conserving the nation's cultural heritage.
37. The *tukis* of the *Tuki* programme within the Integrated Hill Development Project could play an important role in building environmental awareness in the villages if an environmental education component were added to their list of duties.
38. In a country like Nepal, where the majority of the people are still illiterate, the non-formal system of education has to play a major role in promoting the overall welfare and economic growth of the people. Conservation of natural resources and cultural heritage should be made an integral part of the curricula used in the non-formal training programmes for the adult population of Nepal. The impact of human activities, including agriculture, on the environment, common practices of natural resource conservation for soil, water and air, and the possible role of the district and village development committees and local organisations in the conservation of natural resources and cultural heritage should be included in the courses of study.

Technician and Vocational Training

39. The courses provided by the Mechanical Training Centre should include some content on the effects of hazardous chemicals, heavy metals and other commonly used substances on human health and the quality of environment and the prevention of such effects. In order to develop a general awareness among the trainees on the values of conservation of natural resources and protection of cultural heritage, specific relevant content should be introduced in the courses.
40. The present course of study for female workers and other rural women provided by the Women's Training Centre (WTC) should incorporate specific content on

major conservation issues of Nepal, conservation methods and their practices. The trainees should also be given an understanding of the possible environmental impacts of their specific jobs.

41. The Hotel Management and Tourism Training Centre's courses of study for tourist and trekking guides should include a separate unit on the impact of tourism on the environment. Environment components should be included in all courses offered by the Centre.
42. Trainees of the Cottage and Village Industries Training Centre should be provided with a course dealing with the possibly harmful effects of their job activities on the quality of the environment and on Nepal's cultural heritage, as well as measures to prevent these negative impacts on the environment.

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REFERENCES

1. Carter, A.S., (1989). A Pictorial Tour of the Nepal Australia Forestry Project, NAFF, Baneshwor, Kathmandu, Nepal.
2. CEDA, The Journal of Development and Administrative Studies, Tribhuvan University, Vol. 3: 1 and 2, (June-Dec. 1985), Kirtipur, Kathmandu, Nepal.
3. CTSDC, (1985), *Madhyamik Siksha Pathyakram* (Curriculum for Secondary Education), Part I & II, CTSDC, HMG, Sanothimi, Nepal.
4. CTSDC, (1985), Text Books of Primary and Secondary Level Education, CTSDC, HMG, Sanothimi, Nepal.
5. CDC, (1985), Science Curriculum for Secondary School (2041), Ministry of Education and Culture, HMG, Keshar Mahal, Kathmandu, Nepal.
6. Department of Agriculture, (1989), Annual Programme 2046-47, *Kendriya Krishi Taalim Kendra* (Central Agricultural Training Centre), Harihar Bhawan, Pulchowk, Lalitpur, Nepal.
7. Department of Cottage and Village Industry, HMG, (1989), *Pravidhik Tatha Vyawasaik Taalimko Vividh Pakshyahaaruko Parichayatmak Vivechana* (Preliminary Elucidation of Different Aspects of Technical or Vocational Training), HMG, Ministry of Industries, Tripureshwor, Kathmandu, Nepal.
8. Department of Soil Conservation and Watershed Management, (1986). Training Courses for Professional and Technical Levels, Ministry of Forest and Soil Conservation, HMG, Babar Mahal, Kathmandu, Nepal.
9. Department of Soil Conservation and Watershed Management. (1987), *Rameko Gaun* (Ram's Village - a pictorial designed for environmental protection), Ministry of Forest and Soil Conservation, HMG, Babar Mahal, Kathmandu, Nepal.
10. Department of Soil Conservation and Watershed Management, (1985), *Rastriya Srot Samrakshan Aygo* (An Introduction to the National Resource Management Commission), Ministry of Forest and Soil Conservation, HMG, Babar Mahal, Kathmandu, Nepal.

11. Department of Soil Conservation and Watershed Management, (1983), 'Some Questions on Conservation Answered', An Aid for Conservation Extension Workers, Watershed Management Conservation Education Project, HMG/UNDP/FAO, Ministry of Soil Conservation, Babar Mahal, Kathmandu, Nepal.
12. Department of Information (1982), *Mechi Dekhi Mahakali, Bhag - 1* (Mechi to Mahakali Part 1), Ministry of Communication, HMG, Singha Durbar, Kathmandu, Nepal.
13. HMG/IUCN, (1988), *Building on Success: The National Conservation Strategy for Nepal*, pp. 88-91, Kathmandu, Nepal.
14. Institute of Education, (1985), *Course of Study for Proficiency Certificate in Education*, Tribhuvan University, Sanothimi, Nepal.
15. Institute of Science & Technology, (1985), *Courses of Study for Proficiency Certificate in Science*, Tribhuvan University, Sanothimi, Nepal.
16. Institute of Medicine, (1985), *Courses of Study for Proficiency Certificate in Health Education & Sanitation and Nursing*, Tribhuvan University, Maharajganj, Kathmandu, Nepal.
17. Institute of Agriculture and Animal Science, (1982), *Courses of Study for Proficiency Certificate in Agriculture*, Tribhuvan University, Rampur, Chitwan, Nepal.
18. Institute of Forestry, (1985), *Syllabus for Certificate Level Forestry*, Tribhuvan University, Hetauda, Makwanpur, Nepal.
19. Institute of Agriculture and Animal Science, (1984), *Courses of Study for Non-Academic JTA Extension Workers in Agriculture and Animal Science*, Tribhuvan University, Tripureshwar, Kathmandu, Nepal.
20. Institute of Engineering, (1983), *Syllabus for Technician Certificate Courses in Engineering*, Tribhuvan University, Pulchowk, Lalitpur, Nepal.
21. Lohani, B.P., (1981), 'Environment Education in Nepal', (Country Report), pp. 116-121, Bulletin of the UNESCO Regional Office for Education in Asia and the Pacific No. 22 June 1981.
22. Ministry of Education and Culture, (1988), 'Educational Statistics of Nepal At a Glance', Ministry of Education & Culture, HMG, Keshar Mahal, Kathmandu, Nepal.
23. Ministry of Education and Culture, (1987). *Anaupcharik Prandh Siksha Karikramko Nirdesika* (Directory of Non-formal Adult Education Programmes) Ministry of Education and Culture, HMG, Keshar Mahal, Kathmandu, Nepal.

24. Ministry of Law, (1979), *Panchayat Van Niyamabali. 2035: Tatha Panchayat Sangrakshit Van Niyamabali, 2035* (Laws for Panchayat Forests and Panchayat Protected Forests), Law Book Management Committee, HMG, Singha Durbar, Kathmandu, Nepal.
25. Ministry of Local Development, (1989), Women Development Programme - Annual Report 1988-89. Women Development Centre, HMG, Jawalakhel, Lalitpur, Nepal.
26. Ministry of Tourism, (1987-88), Prospectus of Courses for Hotel, Catering and Tourism Industries, Ministry of Tourism, HMG, Ravi Bhawan, Kalimati, Kathmandu, Nepal.
27. Ministry of Industries, (1988), The Mechanical Training Centre, Mechanical Training Centre, HMG, Balaju, Kathmandu, Nepal.
28. National Academy of Science, (1976), Energy for Rural Development - Renewal Resources and Alternative Technologies for Developing Countries, NAS, Washington DC, USA.
29. Negi, S. S., (1982), Environmental Problems in the Himalaya, Bishen Singh Mahendra Pal Singh, Connaught Place, Dehra Dun, India.
30. Nepal Administrative Staff College, (1989), Training Programme: 1989-90 (2046/2047). Nepal Administrative Staff College, HMG, Jawalakhel, Lalitpur, Nepal.
31. Nepal Administrative Staff College, (1989), Annual Report: 1989-89 (2045/46). Nepal Administrative Staff College, HMG, Jawalakhel, Lalitpur, Nepal.
32. NAFF, (1985), 'Planning Framework for Forest Development Technicians, the Nepal Australia Forestry Project (NAFF), Baneshwor, Kathmandu, Nepal.
33. RECAST, (1983), Report of workshop/seminar on 'Environmental and Conservation Education', Tribhuvan University, Kirtipur, Kathmandu, Nepal.
34. Sharma, R.C., (1981), Environment Education, Metropolitan Book Co. Pvt. Ltd., New Delhi, India.
35. Shrestha, K.N., (1981), Education Management in Nepal, Institute of Education Report, Tribhuvan University, Kirtipur, Kathmandu, Nepal.
36. Shrestha, K.N., (1985), Technical Education for Women in Nepal, in 'Education and Development', CERID, Tribhuvan University, Tripureswor, Kathmandu, Nepal.
37. Shrestha, K.N., (1989), *Vatavarniya Siksha in Vikasko Nimti Siksha: Aajako Pariprekshama* (Environmental Education: In the Present Context of Education for Development), CERID, Tribhuvan University, Tripureswor, Kathmandu, Nepal.