



**ENVIRONMENTAL ACTIVITIES  
OF NON-GOVERNMENT ORGANIZATIONS (NGOs)  
RELATED TO UNEP PROGRAMMES**

**REPORT AND DIRECTORY**

**PREPARED FOR THE  
EIGHTH GOVERNING COUNCIL OF  
THE UNITED NATIONS ENVIRONMENT PROGRAMME**

**April 1980**

**ENVIRONMENT LIAISON CENTRE**

**NAIROBI, KENYA**

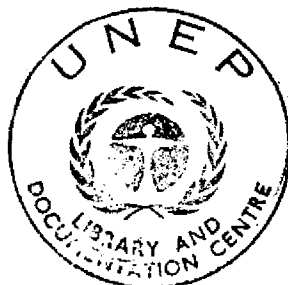
## foreword

For the third time the United Nations Environment Programme has co-operated with the Environment Liaison Centre (ELC) in the survey of NGO activities in subject areas to be reviewed in-depth by the Governing Council of UNEP at its eighth session (April 1980) and in the production of this report on the findings of the survey. We believe that the information contained in the Report will be valuable to Governments during and after the Governing Council and to others interested in the work of the NGO community to which UNEP attaches great importance.

The success of a survey of this kind would not have been possible without the final cooperation of the NGOs with the ELC. Such cooperation constitutes a concrete example of their commitment to the cause. I therefore wish to express our appreciation to the many NGOs that responded to the enquiries of the ELC during 1979 and earlier, and thus made possible the compilation of this report which provides supplementary information to that in the report of the Executive Director on the environment programme during the eighth session of the UNEP Governing Council.

Although collected with the support of UNEP, the views expressed in this report are not necessarily those of UNEP.

Mostafa K. Tolba  
Executive Director  
United Nations Environment  
Programme (UNEP)  
Nairobi, Kenya.



# contents



<u>Chapter Number</u>		<u>Page Number</u>
	Introduction	(i)
1.	Tropical woodlands and forest ecosystems	1
2.	Mountains, islands, coastal and other ecosystems	7
3.	Genetic resources	14
4.	Wildlife and protected areas	20
5.	Oceans : Living marine resources and marine pollution	28
6.	Environmental training	37
7.	Technical assistance	40
	APPENDIX I : Directory of NGOs Related to the Seven Subject Areas of the Report	43
	APPENDIX II : UNEP Objectives	69

## introduction

This document presents an overview of non-government organisation (NGO) activities in the seven subject areas selected for in-depth review at the eighth session of the United Nations Environment Programme's Governing Council. The NGO activities described here are those related to UNEP's objectives and strategies. It illustrates both the diversity and the intensity of NGO programmes, confirming the constructive contribution they make towards environment and development.

The report is intended to provide information on NGO activities as well as to serve as a directory to a sample of NGOs working in each subject area. Details about the NGOs mentioned in the report are given in the directory section rather than the report. Also in the directory are some other NGOs, relevant to the subject areas of the report, but not mentioned in the report for lack of space.

Due to financial constraints it has been possible to print the directory section only in English in all three language versions (English, French and Spanish). For this reason, in all the versions, the NGO names are given in English for easy identification in the directory. However, official French and Spanish names of NGOs are also given in the French and Spanish versions of the report and in the directory.

The contents of this report are based upon a survey which included the following elements:

- . Letter: A letter requesting information on the seven subject areas to be treated in-depth by GC VIII, was sent to 200 NGOs about which details available in the ELC files were inadequate. The information provided served the dual purpose of updating and validating the computer files on NGOs held by the ELC and providing information for this report.
- . ELC files: The ELC is in routine contact with a large number of NGOs, and therefore in regular receipt of current information which it uses to correct and update its files.
- . Infoterra (UNEP): An Infoterra search produced names of additional NGOs in relevant fields.
- . Directories: The ELC maintains a library of directories listing inter alia environmental NGOs. These were extensively used.
- . Other: Key NGOs and individuals in the seven subject areas were requested to pass comments and other NGO addresses to the ELC for the survey and UNEP personnel supplied comments and advice on the chapter drafts.

### The Limitations

Every effort has been made to ensure that the information contained in the report is accurate. However, readers should bear in mind the following limitations to the survey:

- . Most of the information has been supplied by the NGOs themselves. This ensured factual accuracy, but also introduces a subjective element in any evaluation of the NGO activities.
- . The vast majority of information in this document is current. In a limited number of cases, however, it may be somewhat dated as information from previous surveys was also used.
- . The NGOs covered in the report are examples only, representing just a few of the many NGOs involved in these areas. It is recognised that there are many others which could have been cited as well. For brevity and readability, however, we chose to cite only a few, and to avoid repetition of the same NGOs in several chapters. Furthermore, the NGOs cited are not necessarily the most significant in their field. The examples are intended instead to illustrate the range of NGO activity.
- . Where an NGO is used in the text to illustrate a particular NGO activity, it is not meant to imply that this is the sole or most important activity of the NGO.

### Non-Governmental Organisations (NGOs)

The determination of whether or not a given organisation is an "NGO" was difficult. For purposes of this paper, an organisation that is not directly controlled by any government or intergovernmental body has been defined as an NGO. In particular, this implies that partial government financing of an organisation does not eliminate its consideration as an NGO - unless the financing implies governmental control.

Organisations which were known to be commercial were not considered in this document.

## The Environment Liaison Centre

The Environment Liaison Centre was first conceived in 1972, at the U.N. Conference on the Human Environment by participating NGOs concerned with the environment as a means by which they could liaise with UNEP. The Centre was established in 1974 in Nairobi. It has 150 member organisations and represents more than 1,000 non-governmental organisations from around the world of which half are from less developed countries. In total, the Centre represents more than 2,000,000 people.

The Centre's purpose is to establish a working relationship with UNEP on behalf of NGOs and to assist communications among NGOs in the less developed and more developed countries.

The ELC has undertaken four surveys, three World Environment Day programmes, and an environmental education programme with partial funding from UNEP. It publishes a quarterly bulletin, 'The Centre Report'.

### For further information

Enquiries can be made to the Environment Liaison Centre, P.O. Box 72461, Nairobi, Kenya. Telephone: Nairobi 24770.

## Comments

The ELC would welcome suggestions, further information and comments related to making the information in this report of more use to Governments and NGOs. Especially helpful would be recent publications which would keep the ELC abreast of NGO activities.

## Acknowledgements

This document was written and researched by Serena Zwangobani and Patricia Bifani of the Environment Liaison Centre. Artwork and other assistance was given by Kat Honore. The ELC acknowledges with gratitude the assistance supplied by many others - in particular, the NGOs who gave their valuable time to reply to our enquiries, to various UNEP personnel associated with the project, and to the personnel who gave research assistance and advice during the preparation.

The views expressed herein are those of the Environment Liaison Centre and ultimately of the authors. They do not represent the views of UNEP.

# Tropical Woodlands and Forest Ecosystems



## INTRODUCTION

The two activities most destructive of the world's forest cover are the cutting of trees for fire-wood and the large-scale cutting of trees for commercial purposes. Both of these activities could continue without serious environmental degradation if there were careful programmes of forest management and reforestation. But in developing countries particularly, where the most serious reduction in forest cover is taking place, the planning and safeguarding of forests is inadequate. 'With world forest cover vanishing at the rate of 50 acres every minute, there is a real threat of a tree-bare Third World'. (International Planned Parenthood Federation, 1980).<sup>1</sup>

For the mass participation NGOs, particularly in developing countries, reforestation activities often meet a great need where over-grazing, firewood collection and lumbering has removed most forest cover. This reforestation task is particularly great in arid and semi-arid areas undergoing desertification, and where the planting of trees, with proper care, can provide shelter, hold back sand-dunes and ensure future firewood supply.

The need for reforestation has been recognized by NGOs in developing countries for years. Many are actively involved in tree-planting campaigns. But they still face great problems in getting the variety and quantities of seeds they need especially for trees which can be used for food crops and fast-growing energy plantations and adapted to local conditions.

In reaction to lumber activities, and in recognition of the multiple variety of uses served by forests, there has arisen widespread interest among NGOs in protecting forests from commercial exploitation. Often commercial interests have taken the approach of mining the forests as a non-renewable resource and the conditions resulting from such activities usually ensure that the forest never returns to anything like its previous growth and species variety. Sometimes regeneration is impossible.

It is in developing countries that some of the heaviest exploitation of forests is carried out and mostly by companies controlled by developed country interests. Often this exploitation is carried out with inadequate regard for the regeneration of the forest destroyed. When clear felling takes place, as for the woodchip industry, it can totally destroy a forest. The sentiment expressed in the following words is supported widely in NGO actions: 'Man has deforested one third of South America's native forests, one half of Africa's and two thirds of Southeast Asia's. It is critically urgent

that remaining forest cover be protected from indiscriminate harvest and that many now deforested regions be reforested' (Victmeyer, 1979).<sup>2</sup>

The Australian Conservation Foundation is most concerned for the destruction in the whole Pacific Basin by Japanese companies for the woodchip industry. They point to the destruction of forests in the Aleutian Islands, Philippines, Borneo, Malaysia, Indonesia, Papua-New Guinea, Australia, Alaska and the Solomon Islands. The economic and environmental impacts of such industries are often overlooked. "The full cost of woodchipping has never been drawn up in Australia: the true cost of the roads and bridges, their maintenance, water supply, the social cost of road accidents, environmental costs such as loss of soil and erosion control measures, silted and guttered rivers, loss of wildlife, the closing of tourist and recreational options." (Dunphy, 1979).<sup>3</sup> We could add, the loss of options on future use of virgin forests as genetic resources and of future employment opportunities. Often the processing of forest timber is far from the countries where it was cut, denying employment to the nationals of those countries and costing them highly to import the final industrial products.

Even the recognition of the uses of forests, for example in protecting watersheds and moderating micro-climates, has not saved them from massive destruction. Population pressure alone frequently makes it difficult for rational decisions to be made about forest conservation when basic food needs have to be met by those with no other land to exploit than that covered by forests and no other energy supply than firewood. However, if the increasing NGO interest in forest conservation and management can be taken as an indicator, it would appear that attitudes are changing in favour of forest utilisation for varying activities which do not entail forest destruction.

Somewhere between the rash over-exploitation of forests and absolute protection of forests lies the path to economic development, recognition of which is gaining. Forests are now recognized as multi-purpose resources for the present and future. They have differing characteristics which makes it necessary for them to be managed with different uses in view. Some, such as certain tropical moist forests, have ecosystems so fragile that with our present state of knowledge they are best left as virgin forest with the minimum of human intervention. Such forests also represent millions of years of evolution in their richly diverse species. Other forests can be harvested as a renew-

## TROPICAL WOODLANDS AND FOREST ECOSYSTEMS

able resource, or be farmed in an integrated relationship with crops and animals.

Particularly conspicuous is the growing concern among NGOs for the tropical forests of the world. This concern has arisen as scientific research has uncovered a wealth of possible uses both now and in the future for tropical forest plant species. However, scientific research is unable to reproduce the conditions which result in the rich variety of species and ecosystems found in tropical forests. At present tropical forests are enormously rich resources, but non-renewable resources. NGOs are making efforts to prevent exploitation and to continue scientific research to ensure that we can harvest the tropical forests and their products as renewable resources.

Scientific research and the uncovering of traditional uses and practices in relation to forests are indicating a wide variety of uses for forests offering excellent prospects for economic development without forest destruction. There have been great advances in reforestation, for example the discovery of various fast growing species of trees which can be used in reforestation which provide fodder, fertilizer, cash crops, fuel etc. offer good development prospects. (The National Academy of Sciences, USA, has recently produced several books on tropical plants.) This suggests that the tide may be turning towards increasing reforestation. However, there is far less hope when it comes to saving presently existing forests. To quote Erik Eckholm of the Worldwatch Institute: "A large amount of literature exists on the potential contributions that productive forestry can make to economic development. However, surprisingly little has been written about the economic costs associated with the lack of proper forest management." (U.S. Dept. of State, 1978)<sup>4</sup>.

In this report, it is this subject area of 'Tropical Woodlands and Forest Ecosystems' together with that of 'Wildlife and Protected Areas', which have the greatest interest among popular participation NGOs. Not only are there many NGOs formed to conserve forests and plant trees but many others, particularly those with outdoor or welfare interests, such as the Welfare Organisation for the Women of Lata Area, India, also have activities related to forest conservation and reforestation. This NGO delayed the indiscriminate cutting of forests by non-violent action which led to the government legally protecting the forest.

In relation to the UNEP objectives in this subject area (Appendix II) NGO activities will be described under the following categories:

1. Forestry research and the identification of trends of afforestation, reforestation, and deforestation.
2. Ecological effects of forests: such as maintenance of ecological diversity and wildlife habitat; watershed protection; prevention of soil erosion; moderation of climate; and provision of areas of scenic beauty and recreation.
3. Forest use for products of industrial use and for indigenous consumption: such as fuel wood, medicine, housing, equipment.

4. Land management to utilize forest trees in relation to animals and other plants.
5. Tropical forests :
  - i. tropical forest plants as a genetic pool;
  - ii. management of tropical forests for sustained use and multiple purposes;
  - iii. research and information dissemination on tropical forest ecosystems.

### DESCRIPTIONS OF NGO ACTIVITIES IN RELATION TO TROPICAL WOODLANDS AND FOREST ECOSYSTEMS.

#### 1. Forestry research and the identification of trends of afforestation, reforestation and deforestation.

There is increasing interest among NGOs in forests and their benefits to the environment. NGO activities range from laboratory research to field research, including the use of skilled manpower to identify environmentally unsound forestry practices. Thus the identification of trends which are destructive to forests and the education of the public about these trends are important aspects of NGO work.

The following are examples of NGO activities related to research and trends of afforestation, reforestation and deforestation :

- . research on silviculture, natural regeneration, afforestation and reforestation e.g. Philippine Association for Permanent Forests, Philippines.
- . research on forest ecosystems e.g. the Pyrenean Centre of Experimental Biology, Spain.
- . research and assessment of forest management policies including forests within national parks e.g. Society of Finnish Foresters, Finland.
- . research and control of forest fires e.g. Canadian Forestry Association, Canada.
- . provision of information on progressive forestry practices through publications, film and TV production e.g. the Team of Forest Botany and Nature Conservation, Poland.
- . organization of conferences, seminars and workshops to identify forest conservation needs and progressive forest practices e.g. the Swedish Forestry Association, Sweden.
- . popularization of forest conservation practices identified by research e.g. Polish Forest Society, Poland.
- . compilation and publication of directories for use by forestry researchers e.g. the International Union of Forestry Research Organizations, Austria, who produce a directory of geneticists and tree breeders, and of professional forestry societies.

## TROPICAL WOODLANDS AND FOREST ECOSYSTEMS

- . publication of information on trends in afforestation and deforestation e.g. Worldwatch Institute, USA.

2. Ecological effects of forests : such as maintenance of ecological diversity and wildlife habitat, watershed protection, prevention of soil erosion, moderation of climate, and provision of areas of scenic beauty.

It is frequently the case that development activities fail to take account of the environmental impacts of forest removal and its interference in ecological processes. One of the most widespread effects of deforestation in many developing countries has been the silting up of dams through soil erosion in hills denuded of their forest cover. Watershed protection by forest cover ensures that soil is not eroded, the streams and rivers are kept clean and remain suitable habitat for aquatic life.

The microclimatic effects of forests are also usually beneficial to local communities in their moderating influence. Forests reduce the range of daily temperature variation and help keep the air cool and moist. Improvements can be brought about by reforestation.

NGO activities, especially in developing countries, have tended to carry out reforestation to protect watersheds and restore microclimatic conditions, especially in arid and semi-arid areas. They also provide many opportunities for environmental education which serve to encourage the conservation of forested areas for recreation and scenic beauty.

- . Propagation of ideas and practices concerning the need to protect forests for watershed management and action to that end e.g. Himalaya Seva Sangh, India.
- . Protection of watersheds from development activities which prevent their proper functioning e.g. Conservation Council of South Australia, Australia.
- . Protection and cultivation of indigenous woody plants within forest ecosystems e.g. Native Forests Action Council, New Zealand.
- . Identification and special care for rare indigenous species of trees e.g. Tree Society of Sri Lanka, Sri Lanka.
- . Protection and conservation of indigenous forests as wild animal habitat e.g. Royal Forest and Bird Protection Society of New Zealand, New Zealand.
- . Provision of information on forest conservation, and management through publications e.g. Forestry Association of Nigeria, Nigeria.
- . Public education campaigns and national tree planting action to combat desertification, improve micro-climates, provide fuel wood e.g. National Council of Women of Kenya, Kenya.
- . Reforestation and forest management to provide places of recreation, scenic beauty, and of national and historical importance e.g. Caribbean Conservation Association, Barbados.

- . Forest conservation as part of nature co-servation for scenic beauty e.g. New Zealand Scenery Preservation Society Inc., New Zealand.



3. Forest use for products of industrial use and indigenous consumption : such as wood, timber, medicine, housing, equipment.

This is an area of NGO activity ripe for conflict when conservationists among NGOs meet up with commercial interests. Forest exploitation can serve to support development efforts and there are NGOs which seek to find ways to cooperate with forest industry interests to ensure that forests are harvested as a renewable resource and without destructive environmental impacts. One NGO which exemplifies this approach is the American Forestry Association which has an 'Areas of Agreement Committee' where conservationists and forest industry representatives can meet to seek mutually agreed on guidelines for forest exploitation. 'There is a solution to every controversy. There is a compromise for every conflict. Somewhere can be found "areas of agreement" between even the most bitter of adversaries. The challenge is to find them.'<sup>5</sup> (American Forestry Association, undated.)

It has been estimated that over 80% of the volume of wood cut in developing countries is for fuel. This is having very adverse effects on the environment and has contributed towards desertification, soil erosion, siltation etc. It is an area which requires various solutions depending on factors specifically relevant to local communities, but whatever the solution it can only be achieved with substantial community participation and thus NGO action is particularly appropriate.

Supply of fuel wood would seem to be a problem which could be met simply by planting many fast growing species of trees. However, complex political and social factors in many instances have made the solution more difficult to reach. Examples of aspects which may need to be worked out before trees can be planted are: who owns the land on which woodlots are cultivated? How will the fuel wood be sold and distributed to village members? Who will tend the trees? These problems aside there are also technical difficulties in finding the best species of trees for fodder, fuel, food crops, etc. and in having adequate numbers of seedlings available. There are NGOs working to find fuel alternatives rather than continue forest destruction, but it is an area which needs much more concentrated effort if further environmental degradation is to be prevented.



vented and restoration begun.

In developing countries, the different views on land ownership can easily make indigenous people who rely on forest products displaced people when timber concessions are given out without care for their needs. This is an area of NGO activity which seeks to protect the interests of indigenous peoples to continue to use the forests for purposes such as food, bee products, medicines, housing, fodder, religious and decorative purposes. There are also attempts to offer opportunities to shifting cultivators where their activities become destructive to forests.

A brief description of NGO activities with examples is given below:

- . Protection of forests from exploitation as timber to make possible continued use of the forest for fodder, herbal medicines and soil protection for the employment of indigenous peoples in small-scale farming e.g. Highlanders' New Life Society, India.
  - . Research in the use of forest resources for local technologies and village industries e.g. Eastern Caribbean Natural Area Management Programme, U.S.A. Virgin Islands. This programme is jointly carried out by NGOs and governments in the region.
  - . Provision of information and advice to the government on policy affecting forest exploitation and afforestation e.g. the Society of Appeal for Vanishing Environments (SAVE), India. SAVE have a particular interest in the Himalayan region.
  - . Providing fuelwood plantations and other alternatives to forest destruction for fuelwood e.g. Mitraniketan, India.
  - . Integration of shifting cultivators into national development activities e.g. North-East India Council for Social Science Research, India.
  - . Employment of local people in forest activities and improved conditions for them e.g. Van Shramik Sahakari Samiti, Manan, India.
  - . Providing information and taking action to ensure forest products remain in good supply with forest management that does not allow forest destruction e.g. Forestry Association of Nigeria, Nigeria.
4. Land management to utilize trees in relation to agriculture.

Although the land management practice now known as agroforestry has been carried on traditionally by various peoples, its value for modern application is only just becoming recognized and few NGOs are involved in it at present. Agroforestry is the association of agriculture, animal husbandry and forestry in a symbiotic relationship in the expectation of certain benefits to production, soil fertility, prevention of soil erosion, reduction of pests and plant and animal diseases.

As a way of utilizing land, agroforestry offers particular benefits on marginal land in the tropics. Much of the land in the tropics is not suitable for permanent agriculture. Yet, because of mounting population pressures it is used for shifting agriculture or the forests exploited for fuel and timber. Agroforestry offers the possibility of permanent agriculture in such areas where trees are planted, or those where some trees remain, and they are cultivated in conjunction with other plants and farm animals.

Even on good land, agroforestry practices can offer benefits. Trees can be planted in conjunction with agricultural activities so that they serve as fences, provide fodder, fruit, fuel wood, rope, etc. Despite the practical benefits possible from agroforestry the concept is little known and understood. The main, and almost the sole, NGO working on agroforestry is the International Council for Research in Agroforestry, (ICRAF), Kenya. The very absence of almost any other NGO activity in this field points to the essential nature of the work of ICRAF.

ICRAF provides a number of services which are as follows:

- . Support for research in agroforestry in developing countries.
- . Dissemination of information on agroforestry through a newsletter, publication of conference proceedings, the answering of specific questions from a documentation service and expert advice.

Although another NGO, the International Union of Forest Research Organizations, Austria, also supports research in this field, there is no other organisation at the international level which is supporting the popularizing of this concept apart from the work of ICRAF.

At the national and regional level two other organisations are doing research. Tropical Agronomic Centre for Research and Training, Costa Rica, and the College of Forestry, Philippines. The College of Forestry is also assisting in the practical application of agroforestry with local farmers.

We have identified three NGOs which are involved in the practical application of agroforestry at the local level. They are:

- . The Agri-Silviculture Institute, USA, which is publishing a newsletter and expects to start the development of land in a semi-arid area as an experimental farm along the lines of agroforestry.
- . Auroville, India, which is a community of people who subsist off the semi-arid land which they live on and farm applying agroforestry practices.
- . The Gokhale Education Society's Agricultural Institute, India, which works with farmers to improve their agricultural activities by the integration of tree cultivation into other farming activities.

5. Tropical forests

The identification of tropical forests as a very important source of genetic material for developing new and improved strains of plants and animals has been one of the major reasons why there is mounting pressure from NGOs to be cautious about exploitation of these forests. In a publication of the Natural Resources Defence Council, Inc. of the USA, a special case is made for the tropical moist forest: 'The biome with by far the greatest abundance and diversity of species is the tropical moist forest. Anywhere from 20 to 50 per cent of all the plant and animal species of earth are found here. The tropical moist forest is also less well understood than virtually any other biome - yet is being so rapidly cut down that many authorities believe little will remain except in grossly degraded form by the end of the century.' (Myers, 1977)<sup>6</sup>. When cut down, not only is the tropical forest lost as a genetic resource. 'Ecologically the forest is a desert covered with trees', the forest nutrients are mostly contained in the standing biomass and when the trees are removed so too are the nutrients. After a couple of years of heavy rainfall, leaching of the soil is only able to sustain inferior secondary forest.

Tropical forests have proved to be of great use to both commercial exploiters and indigenous peoples who live in them or on their fringes. 'The tropical forest contains the planet's largest biomass, and its total primary production is greater than that of any other ecological region. In addition to wood fibre, the forest yields a large variety of fruit, nuts, leaves, flowers, resins, gums, fungi, bee products, drugs etc. that may be used for food or feed, or for medicinal, religious, decorative, and other purposes.' (Bene, 1977).<sup>7</sup>

Two of the gaps in knowledge which make discussion of tropical forest exploitation difficult are the lack of agreed on maps of tropical forests and on a generally agreed on system of classifying them. Tropical forests exist in ecological regions within the tropics which have differences between them which are on a par with differences between tropical and temperate ecosystems. The problem of mapping tropical forests arises partly because of the rapid rate tropical forests are disappearing. Also, there are differences over what to include as tropical forests where such growth as the secondary forest, which comes after clearing, is so very different from the virgin forest it replaces. IUCN has produced a map of various categories of tropical forests in their 'World Conservation Strategy', launched 5 March, 1980. Other NGOs have become involved in a wide variety of research aspects including that of recording in maps the change in tropical forest cover.

The ecological functions of tropical forests such as watershed protection, climate modification, and restoration of soil fertility following shifting agriculture, are known in general but it is not yet clear the actual extent of the effects from such large forests as the forest in Amazonia. This forest is sometimes described as 'the lungs of the world' because of speculation about the importance of its function to the atmosphere

in absorbing carbon dioxide and producing oxygen.

There is evidence that there has been a global increase in atmospheric carbon dioxide as a result of greater burning of fossil fuels for energy. This increase could have the effect of increasing the temperature in the lower atmosphere and altering climatic patterns all over the world. The amount of carbon dioxide in the atmosphere varies with the natural cycles of plant growth and decay, variations in solubility of surface ocean water (the greatest reservoir of carbon dioxide) and variations in emissions from energy production. It now appears likely that the fourth factor to be considered is the world wide trend of deforestation, especially of tropical forest regions.

The Amazon forest, being the largest in the world, and playing a significant part in absorbing carbon dioxide and producing oxygen, is a particular focus for unease. There has been a rapid rate of deforestation and lack of consideration for environmental management and environmental impacts.

For any tropical forests, those in Africa and Asia included, when consideration is given as to which areas to open up to settlement and tree-felling, the cost in national and international terms of interfering with ecological functions and the cutting of future options for genetic research need to be taken into account. The loss of soil coverage alone in tropical moist forests, after tree felling, can rise from less than three pounds of soil per 2½ acres to 34 tons. (Myers, 1977).<sup>6</sup>

Another cost which is not made is the loss to indigenous peoples represented by deprivation of their usual means of livelihood. These peoples may not be adding to the national balance of payments however they are not adding to the unemployment figures either. They usually maintain themselves fully from the forest and its products and become a source of national concern only when they are limited to too little area for their shifting agricultural activities. Were they always given consideration when forest exploitation was considered, and were opportunities for them made to enter the mainstream of national life, all would not be lost. However, frequently they are left to fend for themselves and the substantial loss of humanlife in Amazonia from disease, accident and other causes among indigenous peoples has given great cause for concern.

Various aspects of tropical forest concerns are highlighted in the objectives and strategies of UNEP, these are:

- i. tropical forest plants as a genetic pool.
- ii. management of tropical forests for sustained use and multiple purposes.
- iii. research and information dissemination on tropical forest ecosystems.

## TROPICAL WOODLANDS AND FOREST ECOSYSTEMS

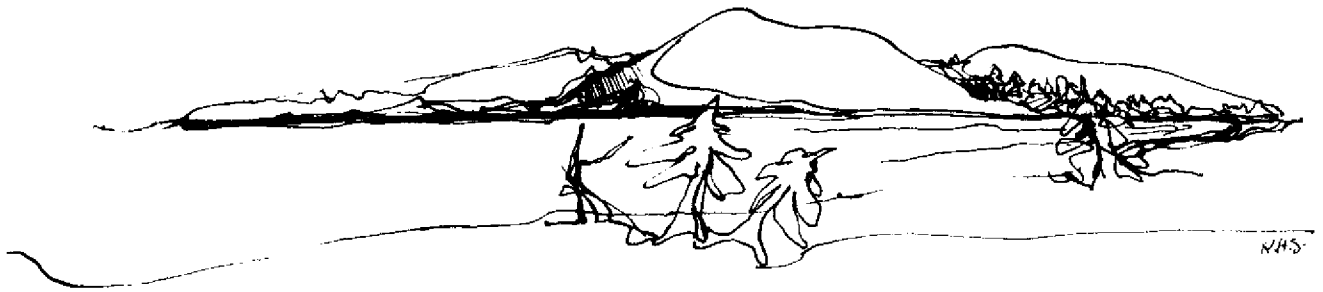
Examples of NGO activities in the above mentioned areas are given below:

- . research into tropical ecology e.g. International Society for Tropical Ecology, India.
- . research into the development potential and protection needs for tropical forests e.g. International Union for the Conservation of Nature and Natural Resources. Their Commission of Ecology has a tropical forests working group to 'crystallize major issues, identify land-use options and advise on practical measures to protect representative areas'.
- . propagation of factual information on the need for tropical forest protection from commercial exploitation as timber e.g. National Committee for the Environment, Ivory Coast.
- . research on human impacts on tropical rainforests e.g. Rio Palenque Science Centre, Ecuador.
- . publication of directories relevant to tropical forests conservation e.g. Natural Resources Defence Council, USA
- . facilitation of contact and communication between researchers in tropical silviculture, e.g. International Union of Forest Research Organizations, Austria.
- . serve as advisers to policy makers in government concerning tropical forests e.g. National Academy of Sciences/ National Research Council, USA.
- . acquisition of forest areas for holding as forest reserve e.g. Nature Conservancy, USA, which established the Corcovado Park forest reserve in Costa Rica, with financial assistance from other NGOs and private donors. Corcovado is the largest tropical moist forest protected in Central America.
- . support for resource management schemes in tropical countries which are ecologically sound and enhance economic development e.g. Sierra Club International, USA.
- . organisation of public education and action programmes to protect nationally and internationally significant tropical forests e.g. The Malaysian Environmental Protection Society, Malaysia.
- . mapping of forest cover and deforestation trends e.g. the Brazilian Society of Silviculture, Brazil and the Tropical Science Center, Costa Rica.

## Footnotes:

1. Johnson, Brian, Earthwatch International Planned Parenthood Federation, No. 1, 1980.
2. Vietmeyer, Noel. A front line against deforestation. Ceres. Vol. 12, No. 5, 1979. pp 38-41.
3. Dunphy, Milo. The Deforestation of Australia. Habitat, Vol. 7, No. 4, 4 August, 1979.
4. U.S. Department of State and U.S. Agency for International Development. Proceedings of the U.S. Strategy Conference on Tropical Deforestation. Washington D.C. 1978.
5. Towe, W.E. In Search. American Forestry Association, USA. Undated.
6. Myers, Norman. Garden of Eden to Weed Patch. NRDC Newsletter. Vol. 6, Issue 1, Jan/Feb 1977.
7. Bene, J.G. Beall, M.W. Cote, A. Trees, Food and People: Land Management in the Tropics. I.D.R.C., Canada 1977.
8. Prepared by the International Union for Conservation of Nature and Natural Resources. World Conservation Strategy : Living resource conservation for sustainable development. IUCN, UNEP, WWF, Gland. 1980.

# Mountains, Islands, Coastal and Other Ecosystems



## INTRODUCTION

The study, understanding and protection of the major types of "terrestrial" communities of biomes, have become an important concern for mankind. "A biome constitutes a complex biotic community covering a large geographic area and characterised by the distinctive life forms of climax species of plants and animals." (McGraw-Hill, Encyclopedia of Environmental Science)<sup>1</sup>. These communities differ greatly from one another; yet this ecological and genetic diversity plays a vital role in the functioning of the whole earth's system and its evolutionary process.

The structure of the earth's ecosystems is linked to history: they become more complex and richer as time passes (Margalef, 1963)<sup>2</sup>. Some complex and mature ecosystems, like coral-reef ecosystems or tropical moist forests, are reputed to be, respectively, amongst the most productive and the most rich biological system on the planet.

Besides its ecologically vital role, biome diversity plays a basic utilitarian role for human survival and development, supporting earth's basic biological systems: fisheries, forest, grasslands and croplands.

The increasing capacity of man to transform the earth's ecosystems, and the different impact of human activities from biome to biome, necessitates improving our knowledge about major ecosystem changes, the nature of man's impact, and current measures for conservation of genetic and ecological resources of the earth's ecosystems.

On these concerns, NGOs are, and have for a long time been, particularly active in the field of conservation - which can be said to be their major concern. NGOs all over the world devote a great deal of their capacities to the protection of earth's resources, or focus on the protection of particular ecosystems.

Currently they advocate the establishment of national parks and reserves; collect and disseminate information on endangered ecosystems; influence political decisions and promote public involvement in conservation issues. Important activities are those related to formal and non-formal education. Besides purely conservation activities, NGOs orient their efforts to:

- . research on typical ecological characteristics of certain biomes;
- . identification of main categories of impacts affecting them;
- . assessment of likely impacts of proposed development projects (e.g. Mackenzie

Valley Pipeline Enquiry, Tundra section);

These activities provide additional knowledge for the rational management of the diverse biomes throughout the world.

NGO actions in this field have been organised according to the particular ecosystems they concentrate on. Due to the large numbers of them interested in these topics it has not been possible to cover more than a sample of their wide ranging activities.

The main ecosystems considered are those related to UNEP's objectives (see Appendix II) and are as follows:

1. Coastal Marine Ecosystems
  - a. Coral reef ecosystems
  - b. Mangrove ecosystems
  - c. Coastal marine and estuarine habitats
2. Freshwater Ecosystems
3. Tundra Ecosystems
4. Other ecosystems

## DESCRIPTION OF NGO ACTIVITIES IN RELATION TO MOUNTAINS, ISLANDS AND OTHER ECOSYSTEMS

### 1. Coastal Marine Ecosystems

Coastal marine ecosystems are influenced by both open-ocean and terrestrial ecosystems. Organisms that inhabit the intertidal zone must be able to endure daily exposure to very different kinds of conditions; they live in a delicate balance between the extremes of marine and terrestrial fresh water environments. Use and abuse of these transition zones between the fresh water and marine habitats is becoming so critical, that it is important that the unique features of such ecosystems are properly understood and preserved from disruption.

Diverse forms of deterioration of coastal and marine ecosystems have been observed throughout the world, causing deep concern. Among phenomena observed the following can be mentioned:

- . Destruction of coastal habitats, with subsequent destruction of valuable spawning and nursery habitats for fish, invertebrates and aquatic life, by land-based pollution. Municipal and industrial wastes - metals, chlorinated

## MOUNTAINS, ISLANDS AND OTHER ECO-SYSTEMS

hydrocarbons, petroleum hydrocarbons, solid wastes, etc. - leads to the degradation of the marine environment. "Red tides", due to nutrient increase, cause fish kills.

- . Coastal degradation by marine transportation, increasing oil spills, exploration and exploitation for petroleum hydrocarbons on the continental shelves.
- . Destruction of coastal, marine and estuarine habitats, especially mangroves, river deltas, and coral reefs and other environmental disruptions (e.g. disturbance of migration routes) by coastal industries, residential developments, ports and harbours, coastal recreation facilities, etc.

In general, NGOs are engaged in conservation and protection activities, related to diverse coastal ecosystems (coral-reefs ecosystems; mangrove ecosystems; coastal marine and estuarine habitats).

### i. Coral Reef Ecosystems

Conservation and protection of coral reefs is in the early stages as compared to advances made in conservation of terrestrial ecosystems. Since they are centres of high biological productivity and a major source of food in tropical areas, marine biologists view with alarm the over-exploitation of the last two centuries resulting in elimination of coral reefs in some parts of the world.

Coral reefs are among the most productive ecosystems of our planet. They have the highest rates of photosynthetic carbon fixation, nitrogen fixation and limestone deposition of any ecosystems. The reef ecosystem probably also supports a larger number of animal and plant species than any other. The key to this prodigious productivity is the unique biology of corals, which plays a vital role in the structure, ecology and nutrient cycling of the reef community.

The living reef which grows only a few millimetres a year is a complex topography of superimposed ancestral reefs. In Jamaica, as much as nine metres of reef have built-up since the present sea level stabilized some 5000 years ago. True reef corals are limited in geographical distribution to the clear, warm, sunlit waters of the tropical ocean; they are found in the great reef tracts of the Indo-Pacific and the Western Atlantic. Most of the countries that possess coral reefs are developing nations.

The spread of tourist resorts along coral coasts in many parts of the world is threatening these highly complex and vulnerable ecosystems. Such developments are almost always accompanied by increased dumping of sewage, over-fishing, physical damage to the reef, resulting from construction, dredging, dumping and landfills, and by the destruction of the reef on a large scale to provide tourists with souvenirs. In many areas such as Bermuda, the U.S. Virgin Islands and Hawaii, developments and sewage outfalls have led to extensive eutrophication (Goreau, Goreau and Goreau (1979))<sup>3</sup>.

Among NGOs engaged in activities against overexploitation and destruction of coral

reefs is the Ecology Group of the University of Tolima, Colombia, who also make available scientific data allowing a better understanding of these ecosystems.

The Tolima group has reported the destruction of coral resources in the area through the utilization of coral reef as building material for the construction of summer residences. Besides the direct destruction of coral resources, the people working in such settlements are polluting waters and over-fishing. As fish is becoming a scarce resource, fishermen are using dynamite, destroying in that way coral structures and the fauna. Similar deleterious effects are due to increasing marine traffic, affecting also the birds that nest in the area. In addition to the impact of tourists there is another source of impact caused by military, heavy artillery exercises, practised in El Tesoro Island, which constitutes part of the reef. Some animal species have already disappeared while others are threatened by the destruction of their habitat.

In Australia, the conservation of the Great Barrier Reef and the utilization of its vast resources are one of the country's major environmental problems. The Great Barrier Reef is the largest coral reef province in the world. It stretches along the Queensland coast for over 1,200 miles, and is the result of about 9,000 years of growth. The reef shelters a wealth of marine life, such as over 1,500 species of coral reef fish, besides molluscs, crustacea and worms.

The Australian Conservation Foundation, pointed out that a key factor in the maintenance of the Reef ecosystem is the protection of the quality of the waters in the area. The presence of toxic materials, such as pesticides, petroleum hydrocarbons and many others, will have a detrimental effect. The Queensland coast is exposed to drainage from the mainland; the coastal rivers of north Queensland have been extensively polluted by wastes from sugar, meat and similar processing industries. Wastes also originate from processing of metals and metal ores, sewage from urban areas and agricultural wastes.

Other threats to reef animals are fishing and shell collecting, intensive commercial fishing and mining - for the Reef is made up of practically pure limestone, secreted over the ages by the corals which built it. The silting which would result from mining would certainly cause coral death. So investigations related to the Reef should consider it as a dynamic system with many interacting components, that can be disturbed by man's activities. Without this knowledge, management of the Reef and control of man's interaction will be destructive or ineffectual, stated the Foundation. They have been very active on the promotion of the Great Barrier Reef conservation holding a major symposium on the Great Barrier Reef in Sydney. Other Australian organizations having similar concerns are the Total Environment Centre, the Environment Action Centre and the Australian Littoral Society.

Coral reef studies were emphasized at the XIV Pacific Science Congress, Khabarovsk, USSR, 1979, organised by the Pacific Science Association, Hawaii, USA. Coral reefs are considered a major functional component of the Pacific Ocean ecosystem, contributing to its productivity. Since corals are sensi-

## MOUNTAINS, ISLANDS AND OTHER ECO-SYSTEMS

tive indicators of pollution, such investigations are also important for perfection of environmental protection methods. Whereas coral reefs are mostly confined to the territories of developing countries, it was resolved to initiate a coral reef research programme with the support of appropriate international agencies. Specifically, the Association condemns those human activities which are destructive to coral reefs and resolves that an appeal be made to all nations to stop the international trade of reef corals and molluscs for ornamental purposes.

Beautiful reef structures are found in the Saint Lucia coasts in the Caribbean. Their fishing industry depends almost entirely upon spawning or breeding areas available around the shores. "If these areas are allowed to continue deteriorating", stated the Saint Lucia National Trust, "our fishing industry, as we know it, will cease". They proposed the creation of an underwater park on the Pigeon Island Causeway area and the protection and rational management of other areas of the reef. Some parts of the coastline are fringed with mangroves, the feeding habitat of young fish. Therefore, the establishment of parks and reserves is abundantly justified in regard to fishery activities as well as on cultural, aesthetic and scientific grounds.

Specific impacts on reef ecosystems, such as their deterioration through chlorine bleach fishing, has been studied by the Bahamas National Trust, Nassau. In a paper presented to the 'Third International Coral Reef Symposium', the problem of the coral death attributable to bleach infection was mentioned. A number of other factors, such as siltation or physical stress by divers could initiate the infection. Findings show that the "the community structure of a bleached reef changes as well. Many fish leave the region; those that remain often show symptoms of disease. Crustaceans, annelid worms and molluscs become scarce. Generally there is a population explosion of echinoids: *Diadema antillarum* and *Lytechinus variegatus*, which feed on the over-covering algae. Re-establishment of community structure and recolonization by corals is incomplete years later".

The Bahamas National Trust hoped that a dialogue could be established enabling better monitoring and enforcement of protection of Bahamian reefs by bringing the bleach problem to the attention of scientists.

The National Audubon Society, USA; reported on some impacts on coral reefs through the world, (Audubon, 1976)<sup>4</sup> such as the ones due to erosion and coastal sedimentation in Puerto Rico, some reefs in Hawaii and the Great Barrier Reef in Australia. Other causes of destruction mentioned are ill-managed dredging in the US Virgin Islands, Micronesia, Fiji, Samoa, Malaysia, as well as problems due to sewage and tourism. In Malaysia, coral is mined for construction material - the same activities in India lead to the elimination of a reef area.

When a coral reef is destroyed, it does not necessarily ever recover. The most important step to be taken to protect it, according to National Audubon Society, is to minimize pollution in the tropics through sound environmental education.

### ii. Mangrove ecosystems

The mangrove forest is of special interest because it accurately delineates the saline and freshwater soil boundaries. They are generally considered a vital link for estuarine fisheries. In general, mangroves are abundant around the deltas of big rivers. It is common to see fishing villages near mangrove swamps, relying on the swamps for a living, harvesting food from estuaries and obtaining wood for diverse uses from the forest. The mangrove trees also protect the communities from tidal waves and prevent erosion of the waterways.

The progressive disappearance of mangroves throughout the world, via ill-advised freshwater management schemes, coastal mining activities, conversion to agricultural land use, timber exploitation, and regional development practices, has caught the attention of some NGOs. For example, the Scientific Committee on Oceanic Research (SCOR), created a working group on Mangrove Ecology in late 1977, aiming at providing a general scientific framework for mangrove ecosystem studies, including the need for research on structure, geographic range and ecosystem dynamics, to make the management and conservation of mangrove ecosystems possible.

The total mangrove area in Southeast Asian countries excluding Papua New Guinea is about 5 million ha. An important NGO dealing with the land-water interactive system and resource management in Indonesia, is the Centre for Natural Resource Management and Environmental Studies, Bogor. Coastal wetlands include some of the most fertile land and water areas but also are among the most fragile and most difficult to manage for a good balance among primary resource uses. These habitats require non-conventional management strategies that can provide a framework for full use of the available resources. A case study on an integrated strategy for multiple use of coastal swampland and estuary ecosystems in Southeast Sumatra has been carried out by the Centre, in the belief that swampland development is one of the most significant environmental transformations likely to take place in Indonesia.

If mangroves and tidal creeks are altered or if bulk-heading and other destructive practices are conducted in rich feeding areas, fisheries can be expected to decline. Mangroves do actually provide several products for local settlers (wood, leaves, "nipah", "nibong"), and also provide fishery nursery areas and freshwater and brackish water for migratory shrimps. Production from the ricefields and canals alone could meet most of the fish protein requirement in settlers' diet. Overfishing, habitat destruction and toxification of waters will, individually or as a total effect, reduce the potential of a resource base already exploited by more than 5,000 fishermen.

Another NGO in Southeast Asia interested in mangroves is the International Centre for Living Aquatic Resources Management, ICLARM, Manila, Philippines. They stated that mangrove forests are under heavy exploitation via conversion to areas for agriculture and urban development; logging activities, mining - that generally destroys the swamps; diversion of freshwater or modification of the water regime; and pollution.

## MOUNTAINS, ISLANDS AND OTHER ECO-SYSTEMS

ICLARM proposed a research programme on mangrove resource management, comprising the inventory of existing mangroves in Southeast Asia and the Southwest Pacific by remote sensing. They study alternative uses of the mangrove resources. Information is needed on the role of mangroves in fisheries and socioeconomics of small scale fishermen who depend upon fishing in mangroves/estuarine areas for their livelihood; and the evaluation of existing knowledge on mangrove ecosystems with the aim of identifying parameters to predict fishery potential.

In many areas mangrove and coral reef structures are associated, as is the case of some of the Saint Lucia Islands, where the most important breeding area has the appearance of a "fringing reef", which creates the effect of a protected lagoon, with all the factors necessary to produce an ideal habitat for the propagation of fish. St. Lucia National Trust is concerned with the establishment of nature reserves and preservation of such resources.

A wise utilization, protection and better understanding of mangrove resources is being promoted by ASCONA, Costa Rica. In addition to the already mentioned uses of the mangrove trees, the organisation refers to its content of tannin in the bark, used for leather treatment; the medicinal properties of the bark in healing diarrhoea, hemorrhage and possibly, leprosy; the utilisation of their sweet fruits as food, etc.

In New Caledonia, the New Caledonian Association for the Conservation of Nature is interested in coastal protection, particularly in relation to mining development in coastal areas. Such development destroys mangrove ecosystems. They advocated the establishment of protected areas in order to avoid any form of mangrove exploitation.



### iii. Coastal Marine and estuarine habitats

"From man's viewpoint, estuaries must always be considered as a "multiple use" environment, which means that compromises on conflicting uses must be made in terms of the welfare of the whole. Since "everybody" (man and organisms) lives downstream from everybody else in an estuary, modification or pollution at one point affects distant points in both tidal directions and even in the adjacent oceans. Accordingly, the entire estuarine ecosystem must be studied, monitored, managed, and zoned and human uses regulated in terms of the whole." (Odum - 1971)<sup>5</sup>. Estuaries tend to be more productive than either sea or freshwater, function-

ing as the nursery and feeding grounds for a very large percentage of fish. Prawn and oyster production is almost entirely estuarine dependant.

In addition many species of local and migratory water birds breed, rest and feed in estuarine areas. Finally, coastal wetlands store nutrients and regulate their passage into the estuary and shore region. Wetlands also have the ability to remove contaminants (various hydrocarbons and heavy metals) from the estuarine waters.

The biological importance of estuaries and estuarine wetlands necessitates their conservation and management, especially as man is now looking to the shallow coastal seas and the estuaries to augment the world's supply of protein. (The Australia Marine Science Association 1977)<sup>6</sup>.

Coordination and support for environmental management in the protection, development and exploitation of estuarine and coastal resources is a matter of concern to NGOs in the diverse regions of the world.

In North America, several national environmental groups (The National Audubon Society, Sierra Club, the Oceanic Institute, Friends of the Earth, the Environmental Policy Centre, and many others) formed a coalition, the Coast Alliance, who launched an unprecedented agenda for saving the coast, designating 1980 the "Year of the Coast". Their efforts aimed at educating the public on the importance of protecting, conserving and enhancing coastal resources. It is the feeling among the Alliance that "America's 88,000 miles of coastline are now stretched to the limits of their capacity. The bluffs, beaches, bays, and rich estuaries that provide food, recreation, habitat for wildlife, and constantly changing patterns of beauty cannot continue to absorb the pressures of humanity's voracious use. It has become increasingly clear that the 1972 Coastal Zone Management Act has done little to slow the degradation of the coast and that more must be done to save what is left of our unspoiled shoreline!" (Not Man Apart, 1980)<sup>7</sup>.

Some of their legislative initiatives for the coast include fisheries habitat protection, acquisition of critical threatened sites, tax incentives to discourage development in critical coastal areas, etc. It is expected that the Year of the Coast can provide a climate for these achievements and some others, such as the establishment of marine sanctuaries.

Threats to the ecological diversity of North America's coast have been emphasized by the Natural Resources Defense Council, Inc., New York, also supporting the Coast Alliance.

In Australia, the Australian Marine Sciences Association provides a set of basic principles for the management and conservation of estuarine wetlands and estuaries, together with an outline of some actions which the governments should take in order to achieve a balance between the use of estuarine resources and their conservation. The designation of national parks or marine reserves for estuarine wetlands and estuaries that merit special protection is recommended. Another recommendation refers to the need for carrying out a national programme of public

## MOUNTAINS, ISLANDS AND OTHER ECO-SYSTEMS

education on the need for the conservation of estuaries and estuarine wetlands. Very similar concerns are those of the Australian Littoral Society, Australia.

In France, the Information and Liaison Association for the Environment (AILE), is involved in disseminating information on coastal protection. Their aims are to facilitate the contact between organizations interested in a conservation programme based on land acquisition of wild areas, coastal areas and lake shores.

The protection of the cultural and natural heritage of Brazilian coasts, and of coastal communities, has been undertaken by the Society for the Protection of the Brazilian Coast, Brazil.

### 2. Freshwater Ecosystems

Freshwater habitats comprise, on the surface, both standing-water or lentic habitats (lake, pond, swamp), and running-water or lotic habitats (spring, stream, river). They also include the underground pool which is estimated to be 10 times larger than the surface inland water pool (Odum, 1971)<sup>8</sup>.

Chemical, thermal and biological pollutants and mismanagement are threatening the quality of fresh water resources for domestic consumption and for industrial, agricultural and other socio-economic developments.

There are a large number of NGOs concerned with conservation and protection of fresh water resources. Their activities range from provision of information on major threats to water quality in lakes, rivers, streams and domestic water supply, to research and the provision of measures for water protection.

NGO activities cover the following:-

. Urging the authorities to conduct investigations and to prevent effluent discharges into the rivers. The Consumers Association of Penang (CAP), reported the threat to 2,000 fishermen's livelihood by the effluent discharge from a palm oil processing mill along the Krian River. Effects of sugar industries, dairy wastes and pesticides of fish have been researched by the Department of Zoology and Entomology, India.

. Preservation of fresh water biological resources, e.g. Amalgamated Conservation Society, Canada, is concerned about the conflict between the logging industry and its effects on lakes, rivers and marine estuaries with respect to the salmon resources. Research on the use of incubation boxes, spawning channels and a storage dam to provide rearing water for salmon during dry summer periods, have increased salmon production.

. Information and research on limnology, e.g. Australian Society for Limnology. Chemical and physical limnological studies of estuaries with particular reference to pollution; studies on discharge of industrial effluents into river systems, e.g. Institute of Aquatic Biology, Ghana. Limnological and estuarine studies on pollution, monitoring and

ecology, e.g. Resources and Ecology Projects Inc., USA.

. Research, education and dissemination of information on polluted bodies of water, urging legislative and other protective measures. In Venezuela, the Institute for the Conservation of Lake Valencia and the Oceanographic Institute of the University of Oriente are engaged on this task. The pollution of Lake Maracaibo by petroleum hydrocarbons, and petrochemical wastes-most of the time causing eutrophication; thermal pollution by hydroelectrical energy developments; organic wastes, fertilizers, industrial effluents; etc., have been matters of research by these institutions. Destruction of 32 ha. of mangroves depletion of fish and bird populations, health hazards for human populations and threats to 10,000 fishermen who live on the aquatic resources of the area, are among the impacts caused by the pollution of lake. The Oceanographic Institute has been concerned about Venezuelan policy on marine parks and reserves some of them include important coral reefs and mangrove areas. As a complement to their research activities they carry out academic work at diverse educational levels.

. Academic and research activities are provided by Foundation for the Study and protection of the sea and lakes, Switzerland. The organisation carries out studies oriented to understanding the ecology of regions where projects, such as a petro-chemical complex, are developed. The detection of possible changes in the local ecology makes it possible to solve pollution problems. They provide courses mainly for governmental employees in their International Institute of Ecology.

Other activities include:-

. National and international provisions for water protection, e.g. German Water Protection Union.

. Monitoring river management systems, e.g. California Committee of Two Millions, U.S.A.; Institute of Oceanography, Taiwan.

. River and lake water quality studies, e.g. Bogor Agricultural University, Indonesia, and the Botany Department, University of Nairobi, Kenya.

. Promotion of the permanent protection of islands and other significant natural, scenic, cultural properties of the coastal zone, e.g. Main Coast Heritage Trust, U.S.A.

### 3. Alaska: A Tundra Ecosystem

The interest of a wide variety of NGOs is concentrated on the Alaska tundra ecosystem. Commercial pressures to exploit the country's energy resources have faced unprecedented public participation oriented to the conservation and protection of the remaining wilderness.



## MOUNTAINS, ISLANDS AND OTHER ECO-SYSTEMS

Alaska contains thousands of miles of open arctic tundra and hundreds of species of animals, that depend on this wilderness for survival. It is the home of the last large populations of free-roaming animals: the caribou, the Dall sheep, the bear, the wolf, the wolverine, the moose, the mountain goat. It also nurtures sea mammals: the seal, the sea lion, the sea otter, the walrus; and the many kinds of whales; and millions of migratory birds. Fish, such as salmon, is essential to Alaska's native peoples for their subsistence.

The original inhabitants of Alaska - Indians, Aleuts, and Eskimos, lived for hundreds of years in the region in relative ecological balance with their ecosystem as hunters and fishermen.

Most of the surface area is tundra, a fragile layer of plant cover highly vulnerable to any disturbance; tracks of vehicles and animals can remain visible for decades in the frozen soil. Large surfaces of permafrost prevent the establishment of trees. The low nutrient availability of the soils, together with an average temperature below  $-5^{\circ}\text{C}$ , minimize the rates of nutrient absorption. Plants grow and also decompose at very slow rates, affecting the migratory habits of the caribou, who migrate according to the seasons, travelling hundreds of miles in pursuit of food. The lichen they eat may require as long as forty years to replace itself once grazed. (Sierra Club Bulletin)<sup>9</sup>.

In 1968, large oil and gas reserves were discovered near Canada's Mackenzie River delta, in the neighbouring Alaska North. Oil and gas exploration was actively pursued in the Arctic Islands and the Beaufort Sea north of the Mackenzie delta, encouraging project proposals for extraction, collection and shipment of gas to southern markets.

In the early seventies, a project to build a pipeline along the Mackenzie Valley to carry natural gas 5,000 kilometres from the Arctic Valley to the metropolitan countries of the mid-continent, provided the opportunity for a public debate between environmental, industrial and commercial groups who were interested; territorial and local government officials; and native peoples of northern Canada. Diverse views were submitted to a public enquiry, the "Mackenzie Valley Pipeline Enquiry (1974)", where, for the first time in Canadian experience, "the impact of a large-scale frontier project was determined before and not after the fact". (Justice T. Berger).

Among NGOs involved in the Inquiry the following could be mentioned: Union of British Columbia Indian Chiefs, Canada, who claimed land and the right of self determination; United Fishermen and Allied Workers, Vancouver; the Canadian Arctic Resources Committee (CARC), the Northern Assessment Group, and the Canadian Scientific Pollution and Environmental Control Society (SPEC). They were concerned about likely impacts on native way of life and on the environment.

Among potential impacts was stressed disturbances on bird populations through aircraft, construction activities, human presence, pollution, habitat destruction and hunting. Serious depletions of marine mammals, sheep and notably caribou populations were likely,

as they are the most sensitive of all arctic and sub-arctic wildlife species to habitat disruption. Fish and other marine life would be destroyed through excess fishing, introduction of toxic materials into the water, destruction of spawning beds, pollution of air and/or water through emissions of chemicals or other substances which are toxic themselves, or when concentrated through a food chain, or when combined synergistically with other naturally-occurring or emitted substances; damage to the habitat of significant members of a food chain, with resulting ramifications; accidental disaster, for instance, an oil blowout or accidental spill of fuel oil, particularly if off-shore and/or under ice cover; all these have been mentioned as additional environmental hazards.

A SPEC publication "A trip north, Observations of an Environmentalist"<sup>10</sup> stressed impacts related to the pipeline infrastructure highways, drilling rigs as well as oil transportation and discharges of city wastes and chemicals to the near marine environment. Also mentioned as environmental impacts were destruction of tundra, vegetation, leading to ice melting, soil erosion, mudslides and pollution of clear water streams.

The report on the Inquiry recommended an alternative route for the pipeline, urging the establishment of an international wilderness area in northeastern Alaska and in the northern Yukon, a whale sanctuary in the Mackenzie Delta, and bird sanctuaries in the Mackenzie Valley, and that there should be subsidies for the native economy in the Valley with no large-scale industrial development for ten years to enable the native economy to be strengthened, the whole renewable resource sector to be enlarged, and to settle native claims.

Besides NGO activities concerning the Mackenzie Valley pipeline, the protection of Alaska's wilderness continues to be a main concern of conservationist groups in Canada and the USA. The attempt to establish 45 wilderness areas in the Tongass National Forest has been a task undertaken by the Alaska Conservation Society, USA, formed to secure the wise use, protection and preservation of the scenic, scientific, recreational, wildlife and wilderness values of Alaska. Research on wildlife ecology and management on the area and academic activities are provided by Alaska Cooperative Wildlife Research Unit, USA. Similar concerns are the ones of Alaska Center for the Environment, Alaska, USA.

"Alaska is America's last true wilderness, and there will never again be an equivalent opportunity to make such positive studies towards conservation a first time", affirmed the Animal Protection Institute of America, California, USA. The Interior Department has held a series of hearings on a proposal for added protection to Alaska's wilderness. (Audubon Leader, 1979)<sup>11</sup>.

#### 4. Other ecosystems

Activities oriented to improve knowledge and to protect mountains, islands, tropical and temperate grasslands, warm deserts and semi-deserts, are more or less widespread throughout the NGOs.

## MOUNTAINS, ISLANDS AND OTHER ECO-SYSTEMS

From the above-mentioned ecosystems it is perhaps the deserts that deserve the major NGO interest. Just some examples of such activities are:-

- . evaluation of the resources of deserts and planning for their optimum utilization; research on controlling desert movement and expansion, Central Arid Zone Research Institute, India .
- . research on renewable natural resources in dry areas; studies and classification of flora and fauna, introduction of new species; new methods for grass cultivation; afforestation e.g. Argentine Institute for Research on Arid Lands.
- . projects on reafforestation and arid and semi-arid zones; development of fast-growing species, e.g. National Forestry Research and Experimentation Centre, Algeria.
- . climatology, dune biology and conservation issues, e.g. Desert Ecological Research Unit, Namibia.

A preoccupation with the protection of mountain ecosystems could also be mentioned among NGO activities.

In India, for example, several NGOs work on the conservation of the Himalayas, through the protection of forest resources, river catchment areas, watersheds, springs; researching on geological processes to prevent different environmental disruptions; protecting the highest elevations as unique scientific "laboratories", e.g. the High Range Game Preservation Association; the Society of Appeal for Vanishing Environments; Highlanders' New Life Society, Department of Geology, Kumaun University.

Mountain research activities are also carried out by Swiss Foundation for Alpine Research, Switzerland.

## Footnotes

1. McGraw-Hill Encyclopedia of Environmental Sciences. McGraw Hill Book Company, New York 1974.
2. R. Margalef. On Certain Unifying Principles in Ecology in Readings in Ecology. E.J. Kormondy. Prentice-Hall Biological Services. New Jersey 1965.
3. T.E. Goreau, N.I. Goreau & T.J. Goreau. Coral and Coral Reefs. Scientific American Vol/241 No. 2 - August 1979.
4. R. Johannes and D. Faulkner. Life and Death of the Reef. Audubon. Vol. 78/No.5, Sept. 1976.
5. Eugene P. Odum. Fundamentals of Ecology. W.B. Saunders Company. Philadelphia 1971.
6. The Australian Marine Science Association. 1977.
7. Not Man Apart. Friends of the Earth. January 1980. Volume 10 Number 1.
8. E.P. Odum. co. cit.
9. P. Wayburn, Alaska Wilderness. The 140 Million Acre Challenge. Sierra Club Bulletin. Vol. 61/No. 9.
10. G. Gallon. A Trip North, Observations of an Environmentalist. SPEC. 1974.
11. Audubon Leader. Vol. 20, No. 13, June 22, 1979.

# Genetic Resources



## INTRODUCTION

Life preservation and evolution has been sustained on natural genetic diversity and variation. Such diversity has protected animal and plant species against diseases and environment constraints. At the same time, it has provided an immense range of possibilities for human survival and development.

Now this multiple range of possibilities is being threatened by the reduction of the number of species on which man is relying. The main threats occur via habitat destruction, overexploitation of some resources, pollution etc.

The introduction of artificial selection (selection carried out by man for the purpose of adapting plants and animals to his needs) sometimes accelerates the loss of reserves of genetic variability in crop plants, variability that is needed to develop new strains.

In order to face the increasing pressure on earth's biological systems-fisheries, forests, crops and grasslands- and to maximize yields and to permit the development of new varieties, it is necessary to implement a policy of genetic resources conservation. These conservation activities are carried out at two levels :

Conservation of plants and animals in situ, that is in their natural habitats such as grasslands, swamps or forest, is an area where conservation NGOs are actively involved. The same does not apply to conservation ex situ (formation of collections representative of as many varieties as can be found), which requires highly specialized research activity. That is why there are few NGOs working in the area, and the majority of them carry out research in combination with governments and intergovernmental organisations. Thus in this field it is very difficult to establish clear boundaries between NGO and Governmental organizations.

An important achievement in the field of major crops and food animals has been the coordination of research activities in the diverse ecological zones of the developing world under the support of the Consultative Group on International Agricultural Research (CGIAR), USA. A basic component of research activities in the field is education and training.

NGO activity is concentrated mainly in the field of crop genetic resources. Some activities are being carried out in relation to conservation of fish genetic resources, basically as a complement of aquaculture research and fish restoration. An example of

an NGO working on these activities is the International Atlantic Salmon Foundation, Canada.

In relation to UNEP's objectives and activities one area where no NGO activity was detected is the field of farm animal genetic resources.

NGO activities in the field have been organized as follows :-

1. Conservation of crop genetic resources -
  - a. Arid and semi-arid ecosystems
  - b. Tropical ecosystems
  - c. Diverse ecosystems
2. Forest genetic resources
3. Apiculture
4. Wildlife genetic resources
5. Microbiological genetic resources

## NGO ACTIVITIES IN THE FIELD OF GENETIC RESOURCES

### 1. Conservation of Crop Genetic Resources

"The world can feed itself. The basic problems affecting food supply result from decisions made by governments and individuals, not from uncontrollable or irresistible forces of nature. Solutions lie in new policies and new actions", stated CGIAR.

An important part of these policies and actions is that related to crop genetic improvement and conservation, aiming to solve present and future food problems. Therefore, the world food situation cannot be isolated from its socio-political context. That is one of the reasons, among others, why some efforts to improve food intakes into developing countries, such as the 'green revolution', have not attained their objectives and continue to be a controversial issue. (see H.M. Cleaver, Jr. 1972)<sup>1</sup>.

Research efforts oriented to conservation of crop genetic resources in particular ecosystems or regions, are as follows :-

#### a. Arid and semi-arid ecosystems

"A major part of the food supply of some 500 million people depends on the success of

## GENETIC RESOURCES

the dryland farmers of the semi-arid tropics. They are found in parts of Australia and Southeast Asia, India, the Middle East, two wide belts in Africa, areas of South America and much of Mexico and Central America", stated CGIAR.

The International Crops Research Institute (ICRISAT), India, orients its work to helping the drylands farmer carry out a programme which is intended to serve as a world centre to improve the genetic potential for grain yield and nutritional quality of sorghum, pearl millet, pigeonpea, chickpea and groundnut. Major activities in this field aim to :- collect and salvage the endangered landraces and their wild relatives and weedy companions from their centres of diversity and origin; assemble the desirable genes for their timely utilisation in crop improvement programmes of ICRISAT; maintain the viability of the germplasm under proper storage conditions; evaluate and record the variability of the germplasm under different environmental conditions including their own natural habitat; rejuvenate and multiply the rare seeds for conservation and distribution wherever they are needed.

As improved varieties alone cannot solve the farmers' problems, the Institute has embraced a comprehensive research programme, aiming to develop farming systems and water management methods, which will help to increase and stabilize agricultural production through better use of natural and human resources in the seasonally dry semi-arid tropics. They have also undertaken technological research, oriented towards the creation of technology packages acceptable to the farmer.

The ICRISAT work is intended to identify socio-economic and other constraints to agricultural development in the semi-arid tropics and to evaluate alternative means of alleviating them through technological and institutional changes. They currently assist national and regional research programmes through cooperation and support and contribute further by sponsoring conferences, operating international training programmes and assisting extension activities.

The Argentine Institute for Research on Arid Lands (IADIZA), Argentina, is involved in the ecological study of flora and fauna in arid zones. Their activities include the creation of a germplasm bank.

### b. Tropical Ecosystems

Research on traditional farming systems and various aspects of intercropping are being undertaken in several institutions and locations in West Africa. The biggest programmes are those of the International Institute of Tropical Agriculture (IITA) and the Institute of Agricultural Research (IAR), Ahmadu Bello University, both in Nigeria. They have cooperated in studies of peasant agriculture in different parts of North Nigeria. An Experimental Cropping Systems programme has been launched involving investigations of various aspects of relay and intercropping with sorghum, millet, cotton, groundnuts, cowpeas, etc.

IITA is one of the International Agricultural Research Centres engaged in problem-oriented interdisciplinary research aimed at

quantitatively and qualitatively contributing to increased food production in the developing countries of the world, but complimentary to and in support of national agricultural research programmes. More specifically, IITA mandate calls for research in the major grain legumes, cereals and root crops of the humid and subhumid tropics with emphasis on the development of efficient permanent farming systems to replace the intermittent traditional small farmer food production systems.

The Institute is also engaged in training in research and production and other related activities, such as monitoring activities related to agrilimatology; soil physics with relevance to crop production and soil erosion data; agroforestry research.

In the area of conservation of Genetic Resources, IITA includes a Germplasm Unit and a Micro-organism (Rhizobia) Conservation of Genetic Resources Research Project (see point 5).

The functions of the Germplasm Unit are to collect, conserve, evaluate and document the genetic resources of roots and tubers, food legumes and rice from sub-Saharan Africa. In addition to this, the Unit is involved in distribution and exchange of germplasm and in an International Board for Plant Genetic Resources (IBPGR) sponsored training project in crop genetic resources conservation.

Studies of traditional farming systems are being carried out with the objectives of understanding the farmers' social, political, physical, biological and cultural environment, his farm business, constraints in production, and economics of peasant agriculture. Production economics studies of improved practices are also being carried out.

Agronomists at IITA are also doing field experiments on intercropping involving various multiple cropping systems (double, relay, row intercropping, etc.) with major staples (yams, maize, cassava, coco yams), grain legumes and vegetables of the human tropics (cowpeas, lima beans and pigeon peas). The Institute is cooperating with the International Maize and Wheat Improvement Centre (CIMMYT), Mexico and International Rice Research Institute (IRRI), Philippines, on the local adaptation of maize and rice.

In the crop improvement programmes (Cereal Improvement Programme, Grain Legumes Improvement Programme) emphasis is being given to breeding for intercropping and evaluation of different plant types in intercropping.

Studies of various aspects of intercropping are also being carried out at the University of Ibadan, and the University of Ife, Ile Ife, and the Crops Research Institute, Kwadaso, Ghana.

Some studies of cropping systems of varying intensities are being conducted at Institute for Tropical Crop Research (IRAT) in Bambey, Senegal, and other locations in Francophone, Africa.

The Association for the Advancement of Agricultural Science in Africa (AAASA), Ethiopia, is engaged in the promotion and

## GENETIC RESOURCES

development of African agriculture. They provide exchange of experiences among scientists and professionals engaged in agricultural research, aiming at improving existing cropping systems.

The International Centre for Tropical Agriculture (CIAT), Colombia, has the objectives of improving agriculture in the humid lowland tropics, especially in Latin America. They have focussed specifically on six commodities that have the potential for significantly improving both food production in the region and the general welfare of the rural and urban poor who live there. CIAT's main aim is to improve production technology in these commodities: beef, beans, cassava, maize, rice and swine.

The beans programme works to improve Phaseolus bean crops. Beans are a very important protein source for rural and low-income families throughout Latin America. Consumer prices for these grain legumes are very high, largely because of low crop yields caused by diseases and insects. Scientists are striving to alleviate bean production problems through research and training in all phases of Phaseolus crop improvement. CIAT rice scientists direct a comprehensive international testing network in Latin America, in collaboration with the International Rice Research Institute, IRRI, Philippines, and conduct agronomic and breeding work to meet the demand for increased rice production under Latin American conditions. Several improved rice varieties developed jointly with the Instituto Colombiano Agropecuario (ICA) have been released in cooperation with various countries in the region.

The Genetic Resources Unit provides evaluation, storage and distribution support to scientists working with plant germplasm materials of beans, cassava and tropical forages. Activities of the Unit ensure that valuable and, sometimes rare, genetic resources will be carefully protected but, at the same time, fully utilized both in CIAT and throughout the world.

The Regional Andean Maize Unit is a special project directed by the International Maize and Wheat Improvement Centre (CIMMYT), Mexico in collaboration with CIAT's international cooperation office. Its objectives are to develop and strengthen collaboration work in maize research and testing within and among national programmes of the Andean countries. Cassava is an important source of energy in many regions of the world. The cassava team works to produce the most efficient plant varieties possible that incorporate resistances or tolerance to important insects and diseases. Additionally, work is done on improved cultural practices and on low-cost, effective root storage methods to achieve optimum production and utilization of this crop.

In addition there is a programme on beef and swine production oriented to increasing production by developing pastures and adapting local protein to make swine feeding more efficient and economic.

### c. Diverse Ecosystems

The Cytogenetic Laboratory - Weibullsholm Plant Breeding Station, Sweden, preserves a gene-bank of peas (*Pisum*). In this collection the type-lines of most genes published are now maintained. The main objective of this gene-bank, which is soon to become a part of the Nordic Genebank, is to forward and encourage genetic knowledge in *Pisum*, to collect and preserve material for this purpose and to distribute it to interested parties. The Institute also develops and elaborates a system of computer information storage and retrieval.

Among genetic resources projects, the Agricultural Experimental Station, University of California, USA, is involved in the development of computerized storage and analysis of population genetic data on crop germ plasm collections; domestication efforts in amaranths for high protein and meadowfoam, a native California wild flower genus, for its industrial oil with long-chain fatty acids to substitute for sperm whale oil; population studies of an endemic sunflower species, "*Helianthus exilis*". In the academic fields, courses on crop plant evolution and biosystematics of genetic resources are worth mentioning.

Training students from developing and developed countries in the theory and practice of conservation and utilization of plant genetic resources, is an activity of the Department of Plant Biology, the University of Birmingham, UK.

The Eucarpia gene-bank committee (European Association for Research on Plant Breeding) coordinates the work of the European gene-bank, i.e. stimulates the evaluation of the available plant genetic material and the use of a standardized documentation system. Through their work they promote scientific and technical cooperation in the field of plant breeding, in order to contribute to the progress of agricultural production.

Mexico and Central America have been considered as one of the most important centres of plant genetic diversity in the world. A gene bank for Central America and the Caribbean region has been established at Costa Rica, aiming at the conservation, documentation and exchange of indigenous plant genetic material, (Tropical Agronomic Centre for Research and Training, CATIE, Costa Rica).

The greatest genetic diversity of the tuber-bearing *Solanum* species is in Peru, where the International Potato Centre, CIP, is located. Potatoes are the world's fourth most important food crop, after wheat, rice and maize. They are grown mainly in temperate zones of advanced countries. CIP aims to improve potatoes and potato growing in developing countries, and to extend the potato's range of adaptation to new areas, including lowland tropics.

It is now considered that most of the existing cultivated germplasm of the Andes are available within the 11,000 accessions assembled in the CIP potato gene bank. Consequently, efforts have now been shifted to the exploration and collection of wild potato species. The collection is being

## GENETIC RESOURCES

evaluated for several pests and diseases, environmental parameters and agronomic characteristics.

The International Maize and Wheat Improvement Centre (CIMMYT), Mexico, has been, together with IRRI, the artificers of the so-called "Green Revolution", of the '60s. Their input to agriculture consisted basically of a technology package, including a combination of improved grain varieties, mainly rice and wheat, controlled irrigation systems, and a heavy use of fertilizers and insecticides.

Today the Centre's activities include evaluation of genetic resources, breeding and testing of new grain varieties, agronomic research, biochemical and nutritional analysis of grain protein assistance with production programmes and consultation on agricultural policies, campaigns against plant diseases and pests, training of future wheat and maize specialists, exchange of scientific information and development of new educational techniques and materials.

As CGIAR state, "at least a third of the world, 4 billion people, depend on rice for more than half of their food". The International Rice Research Institute (IRRI), Philippines, has 20 years experience researching to produce a range of high-yielding rice varieties, and to overcome the yield gap on rice production between temperate and tropical regions. Their research on genetic Evaluation and Utilization (or Varietal Improvement Programme) includes breeding of rice varieties resistant to pests, diseases, soil problems, etc., minimizing the use of chemicals. Their germplasm bank preserves the seeds of more than 30,000 rice varieties.



### 2. Conservation of forest genetic resources

The Forest Research Institute, Bulgaria, has a special section devoted to "Genetics Tree Breeding and Forest Seeds", aiming to organize high-quality seed production in the country. The range of specific research work deals with preserving and utilizing the forest genetic pool, the genetic structure, the variability and heredity of the features in the population and the selection of valuable forms, the geographic and ecological variability of the forest species.

The International Union of Forestry Research Organisations (IUFRO), Austria, through its division of Forest Plants and Forest protection, is engaged in the study of Population and Ecological Genetics; Genetic Resistance

to insects and diseases; and seed problems. IUFRO organises meetings in diverse parts of the world, involving their various research units.

Search for wild and lesser-known tree and shrub species in their native environments which exhibit superior yield and adaptability characteristics, and the breeding of genetically improved cultivars of important tree crops has been undertaken by the newly created International Tree Crops Institute U.S.A. Inc. (ITCIUSA). Through its cultivar collections and nursery operations ITCIUSA will make available seed, scionwood and stock tree crops which would otherwise be difficult to obtain.

### 3. Apiculture

The International Federation of Beekeepers' Associations (Apimondia) Italy, is involved in the promotion of the scientific, technical and economic development of Apiculture in all countries. Proposals for the creation of a Genetic Centre, on a regional basis, for the conservation and extension of beestock, was an outgrowth of the International Congress on Apiculture held in Australia in 1977.

For the past three decades research has been done on the goal of breeding a better honey bee. In the breeding of bees, a very promising basis of improvement lies in the controlled utilization of heterosis (hybrid vigor) that is known to occur in hybrids of certain genotypes. This genetic principle, which has been thoroughly documented for corn and many other crops, applies as well to honey bees. Honey yields of starline hybrids are usually 130 to 200% to those of common Italian stock kept in the same apiary. (Apiacta - 1976)<sup>2</sup>.

### 4. Wildlife genetic resources

The need for zoological parks to act as "gene banks" is a relatively new idea, whose realization has been undertaken by the New York Zoological Society, USA.

Captive propagation could provide another way of fighting the continuing reduction of the earth's diversity - and give an opportunity to preserve options.

Ideally, gene banks could fulfil three functions in biological conservation: as substitutes for wild populations in the development of care and management techniques; as demographic and genetic reservoirs for isolated and depauperate populations of wild animals from which infusions of "new blood" may be obtained or new populations founded; and as homes for species that have no immediate opportunity for survival in nature.

Once a species is obtained, maintaining it relatively unchanged over long periods is the heart of the gene-bank task.

"Disease, competition, successional changes, and predation are protected against in captivity. While this insurance makes its subjects vulnerable to random biological events, such as genetic drift and pressures of selection for atypical characteristics, gene-bank management could reduce the

## GENETIC RESOURCES

opportunities for genetic change. An animal that is part of a captive-breeding programme can produce more young over many more breeding seasons than its wild counterpart, and more of these young can survive to breed themselves. Thus captive parents may have the opportunity of passing on more of their genes in more combinations. This potentially rapid expansion of a captive population could help to mitigate the effects of inbreeding in comparison with wild populations of comparable size. Most importantly, with the slowing of the rate of turnover of the generations in captivity, the opportunity for selective processes to exert pressure upon the genotype is reduced, compared with short-lived natural populations of the same size.

It is clear that gene-bank strategies will require national and international coordination if gene banks are to become a reality, affirmed the New York Zoological Society. "The chances of a single collection maintaining a species for long periods is remote. Gene-bank efforts will be specialized and inter-related. While extant zoos will have an important role to play, they are land-poor; coordination with rural breeding farms and ranches also will be needed. And if captive gene-banks are not subjected to management by rigorous long-term reproductive strategies based upon suitable genetic, demographic, and behavioural-ecological models, all advantage of zoo longevity is likely to be lost."

In view of the scope of change now being imposed upon the earth's ecosystems and the impossibility of natural evolutionary response within its time frame, man has a responsibility to preserve biological diversity even to the extent of transplanting species - of constructing new ecologies - or of preserving diversity by captive propagation, stated the organisation. The necessary technology is complex and the space and support requirements demanding. Nevertheless, they said, "the acceptance of such a task is a new recognition of responsibility for the earth's other creatures".

### 5. Microbiological genetic resources

Use of selected strains for food technology :-

. Fermentation capacities of eleven strains of brewer's yeast (*Saccharomyces carlsbergensis*); production of microbial enzymes for food industry; production of fungal protease for food processing; culture development for the production of threonine, aflatoxin degrading enzyme and glucose isomerase; utilization of agricultural and industrial wastes for microbial growth and product formation, are among the subjects studied by the Central Food Technological Institute, India.

. Conservation of Resources of Micro-organisms (Rhizobia); on the basis of supplementary funding from UNEP and UNDP, IITA has a research project aimed at collection, evaluation, conservation and efficient utilization of nitrogen fixing rhizobia of legumes. About 180 species of rhizobia effective on cowpeas, winged beans, lima beans, etc.; 73 species effective on soyabeans and

some effective on other *Phaseolus* spp. lupines, clovers and peas have been collected and are being evaluated and distributed. There is also a training component in the project.

Research activities in the field of soil microbiology were mainly concerned with the isolation of local *Rhizobium* strains from soyabeans and cowpeas and testing for the effectiveness of the isolates in increasing the yield of respective legumes using different varieties under monoculture and intercropped conditions, has been undertaken by the Department of Soil Sciences, University of Dar es Salaam.

IRRI have been trying to isolate bacteria from the root surface of rice and determine whether they fix nitrogen, and they describe a method which seems to catch more bacteria in the act of fixing nitrogen than was possible previously. Paddy field productivity depends on the ability of some bacteria and blue-green algae to fix nitrogen. These organisms can incorporate atmospheric nitrogen directly into ammonia, a form usable by plants, thus providing this essential nutrient for crops growing in poor soil.

IRRI researchers were able partially to identify and isolate as an aerobic, free-living nitrogen-fixing bacterium resembling the genus *Achromobacter* in which the well-known nitrogen-fixer *Klebsiella pneumoniae* was originally placed. The Institute organised a symposium on "Nitrogen and Rice", aiming to give recommendations for research to enhance nitrogen fixation in paddy fields and to increase the efficiency of nitrogen utilization by rice.

. Recombination of DNA molecules:

A Scientific Committee of the International Council of Scientific Unions (ICSU), the Committee on Genetic Experimentation (COGENE) was created to study the implications of the new science of recombinant DNA molecules. The possibilities of being able to analyse the molecular basis of gene expression and heredity in higher organisms and eventually to create new organisms with desired genetic characters have evoked both excitement and concern among scientists and laymen, ICSU affirms.

In the field of medicine this new technology opens up the possibility of curing genetic disease, and of using bacteria to synthesize molecules of medical importance. In agriculture there is the possibility of transferring to crop plants the genes of micro-organisms which cause the fixation of nitrogen. In industry the possibility of creating micro-organisms specifically designed to synthesize food protein, and other important natural products is created.

The concern stems from the fact that at present, detailed predictions concerning the behaviour of new forms of life, which are essentially hybrids between species that do not normally exchange genetic information, are not possible. This concern, shared by molecular biologists, led to a self-imposed limitation on the exploitation of these new genetic techniques, while guidelines were

GENETIC RESOURCES

drafted to regulate the safety conditions  
under which this work should proceed.

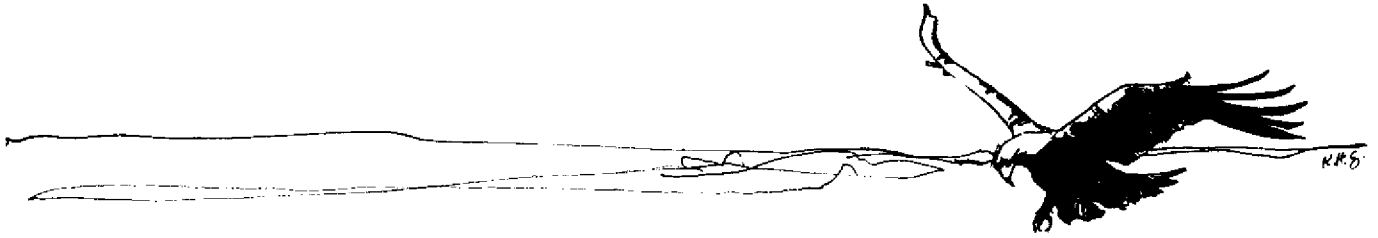
-----

Footnotes

1. Cleaver, Harry M. Jr. The Contradictions of the Green Revolution. American Economic Review. Vol. LXII, No. 2, May 1972.
2. Witherell, P.C. A story of success - the Starline Hybrid Bee Breeding. Apiacta. Vol. IX, No. 2., 1976.



# Wildlife and Protected Areas



## INTRODUCTION

The days have passed when the conservation of wildlife and protection of natural areas was an interest of a few naturalists, an interest thought to be in recreation and science rather than in needs more basic such as for clean air and water, food and shelter. In pursuing these interests it is not an exaggeration to state that the non-government organisations, the pioneers in the movement for the conservation of wildlife and protection of natural areas, were preparing for the disasters and famines of the future a storehouse of provisions, of solutions.

Only recently, and almost too late, has come the recognition that we need to protect life support systems to prevent deterioration of our present and future life on earth. Wild flora and fauna have an essential part to play in ecological processes basic to the survival of man. As man's activities disrupt natural systems vital ecological processes malfunction and fail and so wild species disappear; soil, water and air is poisoned; climates change; and forests are destroyed etc.

Non-government organisation activity concerning wildlife and protected areas usually begins where there is an identified conflict between conservation needs for the maintenance of vital ecosystems and human economic interests. It is in developing countries that much of the world's most precious resources of wildlife exist. In these countries investment in conservation of wild flora and fauna needed as a national and world heritage conflicts with present basic needs for food, shelter and energy where these basic supplies are already short. In developed countries the same cannot be said. Rather is it a question of getting short-term economic returns by wildlife and habitat use and destruction, or maintaining wildlife and protected areas for other longer term interests.

It is now apparent that wildlife conservation and protection of wildlife habitat is a basic need itself. It is a need which challenges the giving of priority always to satisfaction of presently understood basic needs or consumer demands for non-essential products. Without the conservation of wild flora and fauna, and without the protection of their habitat, vital ecological processes of significance from local to international levels will break down and life for man will deteriorate - this process of deterioration has begun.

It is in this area of conflict over land use, where wildlife interests conflict with other needs, that NGO activity could provide more assistance. NGO activity tends to concentrate on maintaining present protected areas or increasing them - in recognition of the

importance of this priority. But there is little support of agricultural practices and other economic activities which would provide alternatives to people who are displaced from areas which become protected or whose livelihood is threatened by wildlife conservation and protection activities. This need for NGO support is most obvious in developing countries.

There is something of a quandary when it comes to deciding where our priorities should be in using limited resources most productively in conservation and protection of wildlife and natural areas. If we knew all there is to know about how the life-support systems of earth work, and which flora and fauna are essential to maintain them in the present and future, the problem would not be so complex. However, with so many species of plants and animals on earth there is still a long way to go to identify them let alone to understand their part in ecosystems.

Sometimes it is only when the ecological processes break down through the loss of some vital species or quantity of a species that we discover we have already destroyed a life-support system. The floods might come because a natural forest has been exploited for timber; the land which before had renewable pastures for periodic grazing by cattle and camels turns to desert from overgrazing; lakes which before were rich in aquatic life now support none because of acid rain; wild animals which before provided a major proportion of protein to local peoples now are nearing extinction through loss of their habitat - the effects of man's destruction of wildlife and habitats are numerous. Perhaps the greatest achievement to date of the NGO movement concerned for wild fauna and flora is that at last the links between wildlife and sustained human well-being are recognized. The next step would be to get greater agreement on our priorities in conservation and protection.

One attempt to come to some international agreement on priorities is the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). It came into force in 1975 with the intention of gaining international cooperation for the protection of certain species of wild fauna and flora against over-exploitation through international trade. The convention has a secretariat provided by one of the main organisations behind its development - the International Union for the Conservation of Nature and Natural Resources (IUCN), Switzerland. Several other international and national NGOs have participated in the meetings of CITES parties. Both the convention and the Red Data Books, the latter prepared by IUCN's

## WILDLIFE AND PROTECTED AREAS

Survival Service Commission, keep a record of endangered and threatened species of both flora and fauna. The collection and recording of this information has drawn attention to the great numbers of known species which are threatened with extinction or not yet threatened but which could become endangered if certain steps are not taken to protect them. This applies particularly to endangered plants, where one in ten of the estimated 250,000 different plant species are said to be rare or threatened.

The main causes of species becoming endangered are limitation or interference with habitat, destruction of species for their products - such as foods, skins, shells etc., commercial trade in live plants and animals, and medical uses of wild flora and fauna. Great difficulty has been experienced by governments trying to meet the requirements of CITES in preventing trade in species listed for protection and this is an area ripe for greater participation by NGOs, particularly consumer NGOs who already have the means to trace products sold in the market. Part of the reason for government difficulty in preventing international trade in endangered species is because some wildlife products require considerable expertise to identify just exactly which species they belong to in determining whether they are on the endangered or threatened lists or not. There are NGOs which have this expertise available among their members and who could help to identify wild flora and fauna products when they appear on the shop-shelf - in agreement with the wise adage 'better late than never'.

Where about 10 years ago interest in wildlife and protected areas tended to concentrate in local and national areas, improved environmental consciousness worldwide - greatly a result of NGO activities - has meant an internationalization of this interest. Many NGOs whose primary interest in wildlife conservation is local or national also have secondary activities concerning wildlife activities in other parts of the world. This has resulted in considerable gains for conservation where ecosystems which support wildlife cross national boundaries and international support is needed for their protection, e.g. migrating birds and whales. Even where wildlife species remain within the boundaries of only one country there may be considerable interest internationally and support for their protection where a species may be endangered or be of special biological and ecological interest e.g. the endangered rhinoceros of Kenya.

Wildlife and protected areas are of interest to NGOs for the following variety of reasons:

1. As a medium of knowledge to advance science, education, and culture.
2. As a genetic pool of great biological diversity which includes species already endangered.
3. As a part of terrestrial and aquatic ecosystems of great biological and ecological significance.
4. As a source of exploitable commodities and services e.g. food, timber, skins, medicines and tourism.
5. For enjoyment culturally and aesthetically.

6. As a sport or recreational resource such as bird watching, hunting, bush walking.
7. As a humanitarian concern for the welfare of animals where they are treated cruelly.

### DESCRIPTION OF NGO ACTIVITIES IN RELATION TO WILDLIFE AND PROTECTED AREAS.

It will be seen, in the description of NGO activities related to wildlife and protected areas, that NGOs are supportive of the objectives of UNEP (see Appendix II) in this subject area. They have assisted in identifying 'terrestrial and aquatic ecosystems of great biological and ecological significance'. The examples in the text will illustrate that NGO activity has included restoration of such ecosystems and conservation. Some NGOs have acquired and manage protected areas, this includes protected areas which are open to the public and those which are open only for controlled research activities. More numerous are NGOs which support various activities related to the acquisition, management and maintenance of the health of ecosystems but which do not themselves manage natural parks and protected areas. They may give this support by carrying out public information campaigns, lobbying members of the legislative bodies, doing research and publishing the results on areas and species identified as those which need protective measure. Some NGOs breed animals and cultivate plants which are to be released into the wild in an effort to preserve minimum population sizes necessary for the survival of a given species.

NGOs in many countries make a major contribution by keeping the general public and governments aware of pressing environmental needs for wildlife conservation and in bringing to public notice the enormous benefits man receives from wildlife - aesthetic, economic, industrial, genetic, environmental health, nutritional and cultural. The following descriptions will illustrate the wide ranging and significant NGO activities concerning wildlife and protected areas.

#### 1. Advancement of science, education and culture.

##### (i) Science

Only by understanding the complexities of the living and non-living components in the biosphere and their relationships will man be able to plan and manage his environment for development rather than destruction. Protected wildlife and natural areas offer opportunities for scientific research of natural environments, they serve as irreplaceable laboratories of science.

"The interrelations between the myriad organisms and the environment form a highly complex web; to weaken or destroy any part can disrupt and jeopardize the entire system. Despite only elementary knowledge of how the system operates, humans have abused and ravaged the land. Little now remains in its natural state, and many species of plants and animals are threatened with extinction. We apparently have forgotten that we are a part of the system as well - that the natural community has provided us with food, medicine, and clothing, and that in the wilderness we have found refuge, inspiration, and identity!" (Nature Conservancy, 1979.)

## WILDLIFE AND PROTECTED AREAS

The concern of the Nature Conservancy, Virginia, USA, expressed in their words above is a concern reflected in the activities of many other NGOs with an interest in setting up sanctuaries for wildlife flora and fauna. For example, in acquiring the 6,000 acre preserve in Costa Rica, the Monteverde Preserve - the home of six different ecological communities, the Nature Conservancy received donations from virtually every internationally oriented private conservation organization in the the USA and elsewhere. Various research programmes are carried out in the Preserve.

Wildlife plants and animals provide essential links in food chains and ecosystems which ultimately benefit man and there is still much scientific research needed on this aspect before the place of each species in its ecosystem is fully understood. At the rapid rate at which plant and animal species are disappearing - perhaps as much as one species a day - following disturbances of human intervention in the ecosystems, it may be too late to find out enough about a species to know how valuable it may have been to proper environmental management.

There are cases where a particular plant or animal served as an essential link in a food chain but was not seen as such until it was eliminated or drastically reduced in numbers. An example in case is that of snakes. In India snakes were killed for their skins in vast numbers. Only too late was it realized that the decrease in snakes was related to a vast increase in rats which destroyed the already limited supply of grain reserves and endangered human health.

Research evidence uncovered by the Canadian Nature Federation, Ottawa, has indicated that the common farming practice of burning off land in spring can reduce the water table level, exposes nesting wild ducks to predators such as coyote and skunk and so reduces the numbers of these game birds, and spoils catchment areas. Although the burning-off practice has been accepted agricultural practice over many years it is only as such research evidence becomes available that farmers can improve their methods in the interests of both wildlife and agriculture.

Research on relationships between living things, and between living and non-living things, related to wildlife and protected areas is carried out by NGOs from two different approaches. Some NGOs concentrate on one aspect of wildlife, for example on birds or orchids, the International Council for Bird Preservation, England, is an example. Others carry out research, or collect research results on ecosystems which include wildlife such as the Pacific Science Association, Hawaii, USA.

Research on wild flora and fauna has provided information on possible new species and strains which can improve the present and future domestic animals and agricultural crops. It has also come up with some plants and animals which previously were wild but can be developed for commercial uses. For example, the discovery within recent years that the water hyacinth is not just a pest but has economically useful purposes such as for animal feed, pollution removal of heavy metals from water, textile yarn, and other purposes. Research on water hyacinth is being carried out by the Institute for Small Scale Industries, Philippines.

In medical science, wild plants and animals are used extensively in research and the production of pharmaceuticals, so too are they utilized for indigenous medicines. Such has been the demand on primates internationally - particularly monkeys and apes, for research that all of them are listed on the CITES appendices I or II, meaning they are either 'threatened with extinction' or 'not yet threatened but which could become endangered, if trade is not controlled' (Earthscan, 1979). There is also heavy use of wild plants such that some in common use for treating sickness or in making contraceptives e.g. the wild variety of Dioscorea from which a steroid chemical called 'diosgenin' is obtained in India, is facing extinction due to excessive collection by the pharmaceutical industry for use in manufacturing contraceptive pills. (Forest Bulletin, 1979)<sup>3</sup>

Wild plants are invaluable in the research carried out on potential crops. At present man depends for the bulk of his crops on less than 30 plant species. The danger in such dependence is that any disease which destroyed a particular kind of staple food crop such as wheat might have consequences internationally before improved varieties of wheat could be introduced. The International Centre for Tropical Agriculture, Colombia, utilizes flora and fauna found in the wild in their research to improve basic food commodities in the tropics.

### (ii) Education

In both formal and non-formal education, wildlife provides resource material for the understanding of the interrelatedness of various living and non-living things and is also a great source of spontaneous interest to students in many subjects as widely ranging as botany and psychology. Education which gives the student an understanding of plants and animals, including those in their natural state, and which provides an opportunity for the student to actually see wildlife, has been found to be one of the most effective ways of committing individuals to wildlife conservation. Most environmental education carried on by NGOs is outside the formal education system.

NGOs tend to rely on an interdisciplinary approach to the environmental education field not on one academic discipline alone. They draw particularly from ecology and from field experience, approaching education about environmental aspects from any angles. The Colombian Society of Ecology, Colombia is an example of an NGO involved in non-formal conservation education. An example of an NGO involved in formal education is the African Wildlife Leadership Foundation, USA. It offers programmes of conservation education at all levels from grade school courses to advanced degrees in ecology.

### (iii) Culture

The contribution of wildlife to the cultures of peoples cannot be underestimated. Stories of wild animals both true and fictitious, have been used to pass on cultural values, amuse and interest peoples from the earliest oral literature to present forms of literature. Many countries, regions and local areas use as symbols particular wild flora and fauna, so too do groups of peoples - tribes and clans etc., all to express particular unifying ideas in their cultures and

## WILDLIFE AND PROTECTED AREAS

and sub-cultures. For example, in some parts of Africa the use of a totem name attached to a particular kind of wild animal identifies all descendants from one common ancestor for all generations giving a sense of unity among those descendants and assisting in understanding the complex interrelationships between extended families.

NGOs who are involved in advancing present cultures e.g. the Tribal Trust, Belgium, frequently recognize the need to refer back to past cultural foci as a basis for moving forward. The disappearance of wildlife important to the past of a people is a substantial loss - for example, any cultures which had the whale, African elephant or Indian tiger as an important symbol are likely to lose living examples of these animals within one life-time. A national symbol which was saved from extinction by the government of Peru's timely actions is the vicugna.

Wild animals and plants had a very significant part to play in the religious development of many peoples. Sacred plants and animals are still revered in many parts of the world particularly in African and Asian countries. Even where the religious beliefs have changed and the beliefs about the sacredness of wildlife forms is lost in some cases, these wildlife forms are held as important parts of the historical development of their cultures. Holding wild flora and fauna sacred has protected them so that the sacred Kaya forests on the coast of Kenya and the sacred Hindu groves near Hindu temples in India are places of rare plants of as much benefit to science and culture as they are to religion. An Indian NGO which actively supports the maintenance of existing 'sacred groves' and establishment of new ones is the Millions of Trees Clubs, Tumkur.

In the advancement of science, education, and culture, NGO activities cover the following :

- . establishment of protected areas e.g. National Audubon Society, U.S.A., which acquired 62 wildlife sanctuaries for wildlife habitat, genetic stores and places of natural beauty.
- . establishment and maintenance of educational nature centres e.g. Royal Society for the Protection of Birds, England.
- . research e.g. New York Zoological Society, U.S.A.
- . assistance with the publication of articles and papers in periodicals including the mass media, e.g. Bolivian Ecological Association, Bolivia.
- . recording of wildlife observations - by photography, painting, drawing, and written records, e.g. British Trust for Ornithology, England.
- . publication of periodicals and other literature e.g. Wallenceana Group, Malaysia, who publish an ecology newsletter for South East Asia.
- . organization of meetings on topics related to wildlife and protected areas e.g. National Institute of Ecology, India.

- . education through provision of courses, field experience, educational materials and the mass media e.g. the Swiss World Wildlife Fund, Switzerland.
- . provision of a service to the community by contributing both intellectual and material resources for the public and government in scientific, educational and cultural fields in which they have expertise e.g. the Conservation Foundation, U.S.A.
- . restoration of natural areas, either apart from or in relation to, the built environment e.g. Athens Friends of the Trees Society, Greece.

## 2. Genetic resources and Endangered Species

Currently new recognition is being given to the overriding need to maintain a genetic pool by conserving of wild plants and animals. This is in some contrast with past NGO concerns which focused on conservation as a means of maintaining wildlife for its aesthetic appeal and renewable use for game. These latter concerns have not been replaced nor is the interest in the aesthetic appeal of wildlife ever likely to be lost, but they are taking their place along side one another.

Scientific research relies on wild plants and animals to turn up species which already, or through cross-breeding, will provide some use to man in such fields as agriculture, animal husbandry, fuels from bio-mass, medicine, building materials, and industrial processes.

As we use up more of our resources which are non-renewable and it becomes more expensive to tap them so the search for alternatives has become critical. Yet, already, many of the wild plants and animals which could be regarded as a genetic pool from which alternatives might be found are extinct, threatened with extinction, or not yet threatened but which could become endangered at the rate they are currently dying.

In arguing for conservation, the task in some ways may be harder for NGOs when reasoning for maintenance of a genetic pool. A genetic pool may have few discernable uses for the present, but is a savings account for the future. Most NGOs base their strength on public support, and as members of the public we are usually more concerned to spend what we have at present than conserve what we have for the future. Maintaining a genetic pool can also mean setting up sanctuaries which are off-limits to humans, or used by humans only minimally and under strict controls. Such areas are protected habitats for plants and animals needed because the main threat to wildlife is habitat reduction or disturbance. Some ecosystems, such as tropical rainforests and islands, are so fragile that relatively small changes can have a marked detrimental effect. For example, the seeds of trees in tropical rainforests are so sensitive to environmental changes that only a few degrees centigrade increase in soil temperature when timber is removed can cause all the seeds of some trees to die. Species of plants and animals on islands may not develop protective devices such as prickles on plants to prevent herbivores from eating them. When goats or sheep are then introduced they

## WILDLIFE AND PROTECTED AREAS

rapidly cause extinction of such plants. (Myers, 1979)<sup>4</sup>

Greater NGO concern is being placed on demarcating wilderness areas which remain untouched, or almost so, by humans, other animals and foreign plants. However, not even these protective measures can be absolute insurance against the future for a genetic pool. Cross boundary threats can still disturb ecosystems such as acid rain; climatic change; in the case of marine ecosystems - current change, such as the El Nino events off the coast of Peru where an intermittent warm current radically alters the ecosystems; and land-based pollution and there are thousands of NGOs concerned with these. These threats to terrestrial and aquatic ecosystems only point more clearly to the need to find ways to protect areas for wildlife until such time as a balance between environment and development activities are understood and maintained.

New interest is being taken in an area of wildlife research previously neglected, that of 'small wildlife', both flora and fauna, particularly for their use as genetic resources e.g. Office for Eco-Entomological Information, France. Action to save large wildlife such as the redwood trees of California and the whales and seals of various oceans have been well publicized and supported by NGO action but we hear little of the destruction of insects, fungi, ants etc. related to such activities as logging. NGO interest in 'small wildlife' has tended to be around those flora and fauna which are known to be of use to man because of their particular place in some ecosystem, and which are destroyed purposefully or as a by-product of agricultural and forestry activities. Agricultural activities such as spraying crops with pesticides, burning off tracts of land for grazing animals, and taking over wild animal habitats for agricultural use, frequently have the effect of killing off much small wildlife almost without being evident. Such animals as frogs, lizards, honey-bees, birds, rodents, shrews, bats, can be affected. NGOs most interested are those concerned with ecology e.g. the National Wildlife Federation, U.S.A., whose interests include butterflies, bees and spiders.



Another implication for NGO actions concerning genetic resources is the need to be concerned with whole ecosystems and entire food-chains if animals and plants are to survive. The days are fast diminishing when NGOs concentrate their actions on specific animals or plants such as whales, butterflies and cactii. Harder times are ahead when the much visible and more sympathy-raising wildlife will have to take their place in NGO concerns

among the less visible and -some might say- less interesting such as algae, krill and all the wildlife lower down the food chains. This wholistic approach has been taken by some NGOs from the beginning, such as the Society for the Promotion of Nature Conservation, England. There are others now moving in that direction. The concern for keeping wildlife as a genetic pool is a unifying influence among NGOs in that those whose interests seemed specific and clearly demarcated such as those working in the fields of agriculture, wild animals, antarctic resources (Antarctic and Southern Ocean Coalition, U.S.A.), can now be seen to have interests which merge with one another in the grey area of food chains and ecosystems where all wildlife has a place.

NGO involvement in the field of genetic resources is covered more fully under the chapter of that heading. However, in relation to wildlife and protected areas NGO activities are as follows :

- . protection of endangered species by habitat protection; breeding in captivity; arousing public concern; influencing legislators e.g. the Wildlife and Nature Protection Society of Sri Lanka, Sri Lanka.
- . establishment and/or arousing support for protected areas such as natural parks, wilderness areas e.g. World Wildlife Fund International, Switzerland. This organisation is one of the major international conservation organizations active in all aspects of wildlife conservation.
- . recording of wildlife observation with photography, painting, drawing and written records e.g. the Conservation Council of South Australia.
- . publication of periodicals and literature e.g. the International Institute for Environment and Development, England, recently published a booklet in english and spanish entitled 'International Trade in Wildlife'. (Inskipp, 1979).<sup>2</sup>
- . organisation of meetings on such topics as national parks and protected areas

e.g. Life and Environment, Isreal.

- . education through provision of courses, field experience, education materials and the mass media e.g. British Trust for Conservation Volunteers, England.
- . contribution of intellectual and material resources for the public and government in the fields of gene-

## WILDLIFE AND PROTECTED AREAS

tic resources, endangered species, ecology etc. e.g. Environment Foundation, Mexico.

### 3. Identification, restoration & conservation of terrestrial and aquatic ecosystems of great biological & ecological significance.

The protection of some natural areas ensures the normal evolutionary processes can continue undisturbed by human intervention. It can also ensure the continuation of certain regulatory functions of the biosphere. Particularly important are those areas which, if exploited, would allow soil erosion and interfere with the high quality of water systems. Protection of watersheds from erosion makes possible the maintenance of agriculture, fisheries, transportation and recreation activities, and prevents flooding.

NGO activities related to this area are as follows :

- . provision of information on environmental impacts of agriculture and other human activities e.g. the Canadian Council on Rural Development, Canada.
- . establishment and/or arousing support for protected areas such as natural parks, wilderness areas e.g. Swedish Society for the Conservation of Nature, Sweden.
- . evaluation of national park management and policy e.g. Superior Council of the Colleges of Architects of Spain, Spain.
- . publication of periodicals and literature e.g. Foundation for Nature Conservation and Protection of the Environment, Netherlands, whose publications include books and periodicals.
- . provision of information on ecosystems and their protection e.g. the International Council of Environmental Law, Federal Republic of Germany.

### 4. Wildlife exploitation for commodities and services

Use of wildlife for the economic benefit of man has come into some disrepute due to the over-harvesting of wild plants and animals and the consequent danger to their continued existence. The diminished supplies of wildlife, particularly for use as food and medicine, is a substantial loss to man. There are parts of the developing world where, for example, wild animals were the source of more than 50% of the protein intake in the diet of the people. Reduction of these wild animal supplies of food has not necessarily meant increased supplies from domestic stocks. More frequently, the same pressure of population and limited land have led to general deterioration in the environment such that the capacity of the soil and grazing lands to support crops and domestic animals has been reduced. Industrial uses of wildlife products are also numerous, oils, fibres, gums, waxes, spices, resins, tanning and dyeing materials, ingredients for beverages.

It is in developing countries particularly that it has become urgent to bring an end to the constant competition for land between wildlife and domestic animals and plants. Unless a balanced environmental management system is instituted in places where such competition is evident, wildlife invariably is the loser in the first instance, and ultimately man also.

For reasons of economics and conservation both governments and NGOs have been encouraging such activities as wildlife farming and tourism. Wildlife farming can be carried out without the usual changes made to the environment by livestock farming such as ploughing and planting of improved seeds for pastures, and spraying of pesticides. Wild animals can require less water than domestic cattle, sheep and goats, and graze at different levels of pasture such that overgrazing is less of a risk. There are problems with wild animal farming, such as the difficulty of breeding in captivity, but environmentally it seems worthwhile to persevere with these farming attempts at present. Several kinds of wildlife farming have already proved economically feasible. For example in Papua New Guinea - crocodiles; Peru - vicugna; England - deer; Kenya - Thompson's gazelle.

NGO activities in this area include the following :

- . funding of wildlife farming research e.g. African Wildlife Leadership Foundation, USA.
  - . research in wildlife e.g. Wildlife-Research Centre, England.
  - . environmental management to encourage tourism at the same time as protecting and conserving flora and fauna e.g. Committee for Management and Protection of the Human Environment of the Socialist Union of Polish Students, Poland.
  - . publication of informative materials on wildlife farming, tourism, wildlife e.g. Tribal Life Fund, Belgium, which publishes a periodical called 'Tribal'.
- ### 5. Conservation for cultural and aesthetic enjoyment

One of the easiest ways to attract the interest and support of the general public for wildlife conservation is to point out the attractive qualities of wildlife to watch, photograph, draw and paint. The only people who may not succumb to such an appeal are those whose livelihood or well-being is threatened in some way by wildlife. Wildlife seems to have some intrinsic appeal to most people such that as long as they do not threaten man, people will want to see wild plants and animals.

In some ways, cultural and aesthetic enjoyment of natural areas and their flora and fauna may be more of a result than an aim of conservation activities. Whatever other activities the NGO aspires to - be it education, research, protection of animals etc., in almost every case at least one of the absolute goals is to make wildlife and natural areas safe from adverse interventions while at the same time providing enjoyment for viewing and use by humans. The follow-

## WILDLIFE AND PROTECTED AREAS

ing gives an indication of the kind of activities NGOs are involved in under this heading :

- . publication of materials which illustrate and inform about wildlife such as periodicals, books, greetings cards, calendars, posters e.g. Assam Valley Wildlife Society, India.
- . support for national parks and protection of their plants and animals e.g. National Fauna Preservation Society of Malawi, Malawi.
- . organisation of lectures, short courses, nature walks, tours, e.g. Regional Union for the Protection of Life, Nature and the Environment, France.
- . developing and maintaining museums of natural history which include life-like replicas of wild animals e.g. General Whale, U.S.A.

### 6. Sport and recreation

Certain sporting interests of NGOs go together with conservation and protection of wildlife and their habitats. For example, NGOs which encourage the following sports frequently also have wildlife conservation programmes : bush-walking, cultivation of native plants, field naturalists study, rock-climbing, mountaineering, skin-diving, yachting, speleology, bird-watching.

The following are examples of their activities :

- . cultivation and planting of native plants e.g. Bahamas National Trust, Nassau.
- . listing and collating of wild flora and fauna e.g. St Lucia National Trust, St Lucia.
- . taking steps necessary to protect endangered species such as ensuring their habitat is not disturbed by sporting and other activities e.g. Friends of nature : Interamerican Association for Study and Defence of the Environment, Costa Rica. This organisation is also carrying out activities related to tropical forests.
- . provision of information on ecology and environmental impacts of human activities e.g. Australian Underwater Federation, Australia.

Also included under the category of sporting NGOs are those concerned with hunting and fishing - this can mean that members of the NGO participate in game hunting or fishing but also includes NGOs which are interested in game animal conservation alone, and which may be opposed to hunting and/or fishing. They tend to have an interest in environmental management aimed at ensuring a balanced harvesting of game as a renewable resource and maintenance of their habitat. Activities of such NGOs include the following :

- . support for establishment of protected areas and protective devices, such as legislation, to provide suitable

habitat for game animals e.g. International Foundation for the Conservation of Game, France.

- . provision of protections for wildlife habitat to ensure breeding of animals and/or fish and continuation of various species e.g. the International Anti-Hunting Committee, Italy.
- . training of personnel to see that conservation laws applying to hunting and catching are observed e.g. Nilgiri Wildlife Association, India.
- . research into the life-cycle and habitat of game animals e.g. National Rifle Association, U.S.A.
- . lobbying and/or educating others in the interests of wildlife and protected areas e.g. Across Uttarakhand on Foot, India.
- . collection of records and statistics e.g. International Game Fish Association, U.S.A.

Under this category can be included also NGOs whose direct interests may not be in sport as such but which have as part of their activities concern for provision of recreation facilities, preservation of historical and/or cultural monuments both built and natural. Such NGOs include those whose activities concern the establishment of youth hostels, countryside protection and preservation, leisure and recreation, wildlife, wilderness, and landscaping. Their activities include similar characteristics as those mentioned earlier in this section, and in addition the following :

- . promotion of interest in out-door activities and countryside conservation e.g. Himalayan Club, India.
- . preservation and development of facilities for out-door activities which do not conflict with wildlife needs but make possible enjoyment of wildlife, such as providing access to and through the countryside by way of footpaths, roads, railways, and waterways e.g. Committee for the Protection of Natural Sites, France.

### 7. Animal Welfare

Animal welfare is a long established interest of some NGOs. From an interest in domestic animals most of such NGOs usually now include wild animals e.g. the Irish Society for Prevention of Cruelty to Animals, Ireland. There are also NGOs with a specific interest in wild animals who include an interest in animal welfare e.g. Wildlife Conservation Society of Zambia, Zambia.

In relation to wild animals, there has been much concern shown by NGOs in the trade in wildlife. Well-reported cases include those of the illegal transport of gibbons and tapirs from Thailand when the animals were exposed to hunger, thirst and heat, (International Union for the Conservation of Nature and Natural Resources, Switzerland).

Most of activities of such NGOs are around the following :

- . investigative work to uncover mal-treatment of wild animals e.g. World Federation for the Protection of Animals, Switzerland.
- . informing the public and government authorities about illegal and cruel treatment of wild animals e.g. Animal Welfare Institute, U.S.A.
- . protection of endangered species such as the Sierra Leone Nature Conservation Association, Sierra Leone.

- - - - -

Footnotes

1. Nature Conservancy News, May/June 1978. p3.
2. Inskipp T. and Sue Wells. International Trade in Wildlife. IED and the Fauna Preservation Society. London. 1979. pp. 104.
3. The Forest Bulletin. Vana-Mahotsava. Edition 1. 16-31 July, 1979.
4. Myers, Norman. The Sinking Ark: A new look at the problem of disappearing species. Pergamon Press. Oxf. 1979.



# Oceans: Living Marine Resources and Marine Pollution



## INTRODUCTION

The oceans constitute the most extensive habitat - 71% of the Earth's surface. They play a key role in controlling the world's climate, the composition of the atmosphere, and the functioning of major mineral cycles; therefore, they influence the lives of all organisms.

Besides their vital ecological functions, the oceans are an important source of food and a potential source of raw materials and energy. As a food supplier, the major significance of oceans is as a source of protein. On a global basis this contribution is not very high, since the figure for recent annual average harvests is a total of about 70 million tons, 6% of the total world supply of protein, and 18% of the world animal protein. (FAO, 1977).

Nevertheless, in some regions and countries the fish catch makes an important contribution to national economies and the protein food needs of the population. This is for example the case of many South Asian countries.

Even when fisheries production has expanded very rapidly, developing countries participation in world fisheries remains small. Ceres (1979)<sup>2</sup> pointed out that two thirds of the well over one hundred "fishing nations" belong in the developing group, and they account for about one third of the total catch. This biased distribution, it stated, "does not reflect the abundance of fish resources in the oceans, but is primarily a result of the historical structure of world fisheries and of consumption patterns".

The growing world pressures on oceans' living and non-living resources, and the significant contribution to development that marine resources could make, necessitate a scientific management of the marine resources, as well as political and legal agreements on the use of the ocean space.

The mineral wealth of the sea bed, which is considered as mankind's common heritage and the regulation and protection of the living resources of the sea, presupposes international agreements. The deliberations of the third UN Conference on the Law of the Sea, suggested an international management of shared natural resources and the global commons as one of the means to overcome world inequities.

There is an increasing awareness of the enormous potential of the oceans, and of the need to utilize this potential without damaging the environment, and, when possible enhancing it. From the ecological point of view it is

quite evident that man must consider oceans as an integral part of life support systems, and not as an inert supply of food, raw materials and other commodities, or an unlimited waste disposal ground. Increasing marine pollution; the heavy exploitation and the eventual collapse of some fisheries due to over-fishing and environmental changes; the destruction of some coastal marine and estuarine habitats; the decline of some stocks, etc. have attracted the attention of NGOs, mainly in developed countries on the need to orient their efforts "to maintain the productivity and health of marine ecosystems and their population of plants and animals at, or restore them to optimum levels" (UNEP objectives Appendix II).

NGO efforts are related mainly to environmental assessment and environmental management of living marine resources; and support activities such as training, education, information and public participation. They are focused on:

- a. Living Marine Resources
- b. Marine Pollution

In relation to the first topic a, the following can be mentioned:

1. Research activities and operational projects oriented to rational management of fisheries resources, through improvement of natural fish resources (aquaculture, and related fields of small scale fisheries; fish pathology and fish genetics.)
2. Conservation of marine mammals and other threatened marine species.
3. Protection of critical marine habitats (see chapter 2 Mountains, islands and other ecosystems).
4. Conservation of Antarctic waters.
5. Training and education in marine conservation.
6. Political and legal actions.
7. Oceanographical Research.

Under b the description will concentrate on activities related to environmental impacts of petroleum hydrocarbons. In this area, NGO interests cover a wide range of activities, among which can be mentioned the following:

1. Increasing frequency of oil spills

## LIVING MARINE RESOURCES

- from large tankers and oil marine terminal operations.
2. Effects of oil discharges on marine life forms.
  3. Development of intervention systems against marine pollution.
  4. Monitoring organizations concerned with marine environmental protection.
  5. Research on endangered bodies of water.

### DESCRIPTION OF NGO ACTIVITIES IN RELATION TO LIVING MARINE RESOURCES AND MARINE POLLUTION

#### a. Living Marine Resources

1. Research activities and operational projects oriented to a rational management of fisheries resources.

"Oceans have been exploited by methods that are essentially mechanized and often competitive hunting rather than carefully managed cropping, and some resources have, as a consequence been wasted by over-exploitation", stated a Scope report, 1976<sup>3</sup>. "It is believed by some investigators that, with proper management, the yield from the oceans could be greatly expanded and this production sustained. New species (such as the krill of the Antarctic) are being cropped as well as the more traditional fisheries. This expansion in the use of the seas must be based on adequate scientific knowledge, relating the productivity of exploited stocks to the overall ecological balance."

Scientific research that ensures a wise management of the sea as a resource of food, is becoming a widespread interest among NGOs. An important concern has been that related to fishing strategies. For years countless institutions such as Friends of the Earth, England, the International Society for the Protection of Animals, England, Sierra Club, USA, the International Union for the Conservation of Nature and Natural Resources (IUCN), Switzerland, the World Wildlife Fund, Switzerland, had a critical view of the traditional approach to regulating the harvest of wild species and particularly marine mammals.

The traditional management concept of the "maximum sustainable yield" (MSY), states that a total catch is set at a level which will not cause any decline in future catches. However, there are ecological complexities due to the fact that yields from one stock may be related to the stock size of other species of fish through their common dependence on certain food webs.

IUCN, WWF and other organisations concluded at the 12th General Assembly of IUCN (1975) that MSY and other single species management concepts are not adequate as a basis for management of wild living resources, including marine resources. Therefore, new principles, based on ecological relationships, should be applied.

A response to these concerns is the ecosystem approach that attempts to consider catch levels in terms of their effects at all the points in the food chain. This approach was adopted in draft form by the Convention on

Antarctic Living Marine Resources (1979) in relation to krill, the key element in the Antarctic food web. (Earthscan, England). The debates of the Convention have been actively followed by NGOs such as the Centre for Law and Social Policy, USA, the International Institute for Environment and Development (IIED), England, Sierra Club International, Earthcare Center, USA, Monitor International, USA, as well as some NGO coalitions, among which it is worthwhile to mention the Antarctic and Southern Ocean Coalition (ASOC).

A third approach that interests many NGOs throughout the world, including some developing country NGOs, is to look to the improvement of the natural fish resources, and particularly to the cultivation of highly valued species. The New York Ocean Science Laboratory, USA, the Ocean Institute, Hawaii, Trout Unlimited, USA, Consumers' Association of Penang, Malaysia, the International Center for Living Aquatic Resources Management (ICLARM), Philippines, can be mentioned among them.

The culture and husbandry of aquatic organisms and the management of aquatic plants and animals in controlled environments, has experienced rapid progress in the last few years. The production of food is the most important aspect of aquaculture, but there are many others, such as the strengthening of the wild stocks by artificial recruitment and transplantation, the cultivation of molluscs and seaweed for production of chemicals, energy, fertilizer, pearls, etc. Mariculture in the open sea, which requires large investment, awaits legal protection and more research.

"Meanwhile attention is increasingly given to the possibilities of raising more fish and shellfish in coastal waters, where the effort would at least have the protection of national laws. Old traditions of shellfish culture are being re-examined and new techniques are being considered such as the possibility of using mangrove swamps and productive estuarine areas, building artificial reefs, breeding even more efficient homing species such as salmon, enhancing natural production with nutrients or warm water from coastal power stations, controlling predators and competitors, shortening food chains and so on. Progress in such endeavours will require a better predictive ecology." (Holt, 1969)<sup>4</sup>.

Major threats to fish culture, particularly coastal ones, are the growing pollution of the sea (e.g. the case of Japan, reported by Jishu Koza, in b.5). Other problems result from the utilization of sophisticated technology in aquaculture developments. These technologies, such as the use of acoustic, electric or optic barriers, or feeding conditioning, to enclose fish (Eurocean, Monaco) are difficult to transfer to developing regions.

Figures provided by the Royal Swedish Academy of Sciences in 1975 shows that of the total world catch from "wild" harvesting and farming, about 40% of freshwater production and 3% of the saltwater production comes from aquaculture activities. World production has been estimated to be over 6 million tons which represents nearly 9%<sub>5</sub> of the total world harvest. (Ambio, 1979). About 80% of the total comes from developing

## LIVING MARINE RESOURCES

countries in Asia, (where except in China) production is dominated by small scale farmers (FAO, 1977).<sup>6</sup>

In Malaysia, a report dated July 1977 pointed out an increase in the annual production from aquaculture in Malaysia of about 40,000 tons, about 10% of the overall fish production in the country. The same report stressed the importance of aquaculture as a source of protein supply in the inland areas where marine fish are not easily available, and as a source of employment for people involved in the culture and marketing of the harvested products (Seminar on "Malaysian Fisheries - A diminishing resource, organised by the Consumers' Association of Penang").

### Small-scale fisheries

A problem that preoccupies NGOs and fishermen in developing countries, is the deteriorating situation of small-scale fishermen who traditionally live from fishing activities. The competition with heavily-capitalized, export-oriented large-scale fishing operations is seriously affecting catches by small fishermen.

- The Institute Masyarakat, Malaysia, in a dialogue with fishermen, NGOs, researchers, etc., asserts that solutions and policy recommendations to face artisanal fishery deterioration requires an integrated bottom-up approach, involving the direct participation of small fishermen. Other related areas to fisheries management are:

### Stock assessment

Stock assessment and the estimation of potential yields when appropriate, are necessary inputs for suitable management and conservation procedures.

East African Marine Fisheries Research Organization, Zanzibar, furnished the partner states with the relevant information concerning the natural resources within the West Indian Ocean along the East African Coast. Their research activities cover shallow and deep water prawn stock assessment; stock assessment and evaluation of suitable catching techniques of pelagic fish, and cost effectiveness, maturity, size selectivity, relative abundance and distribution of demersal fishes.

### Fish pathology

Pathogens may cause grave problems in aquaculture activities, increasing mortality or retarding growth. The development of aquaculture sites, not only for finfishes but also for a wide variety of shellfishes, and the development of non-profit fish hatcheries which are now releasing chum salmon fry to the estuarine and ocean environments, stress the need of pathology programmes concerning fish, affirmed the Institute of Marine Sciences, Alaska, USA. The knowledge of diseases is an important aspect of the development of bottom-fisheries programmes.

### Reproductive Physiology and research on genetic resources of fish.

Mass propagation of marine fishes has been the ultimate goal of the aquacul-

ture programme at the Ocean Institute, Hawaii, USA. The programme has emphasized the control of reproduction and production of quality seedstock of cultivable marine fish. These objectives have been approached by intensive research in the reproductive physiology behaviour and ecology of the grey mullet.

Research on genetic resources of fish specieses with a potential for aquaculture is also becoming an NGO concern. An example of these activities is provided by the North American Salmon Research Center, Canada, who research on Atlantic salmon genetics and selective breeding, developing strains suited to salmon restoration, sea ranching and aquaculture.

### 2. Protection agreements and conservation measures regarding depleted populations of whales, sirenians, dolphins, porpoises and other endangered species.

The interest in endangered species was an outgrowth of ecology movements of the late 1960's. Even though the survival of whales was a pressing issue at the UN Stockholm Conference, still many species of marine mammals are overexploited or their stocks are affected by pollution or deliberate or accidental interference with their habitats. Since 1946, when the International Convention for the Regulation of Whaling was signed, the concern of diverse organizations for marine mammals has considerably increased. Although their interest converges on conservation measures to tackle the problem of depletion of some stocks, NGOs deploy many different ways to approach marine mammal conservation. The magnitude of NGO interest in marine mammal conservation and particularly in whales is so strong, that it is impossible to detail the extensive range of their activities. A major strength of NGOs is their ability to involve broad sectors of the community in this issue, promoting communication among interested groups, developing public information, education programmes, whale museums, campaigns, and encouraging governments to take legislative and other measures to protect threatened populations. Some examples of these activities are the following:

- encouraging and conducting observational research on whales and dolphins in their natural habitats e.g. the Grand Manan Whalewatch Project in the Gulf of Maine - Animal Protection Institute of America, USA.
- Influencing public opinion and attitudes away from the commercial and military use of whales, dolphins and porpoises. An embargo on the importation and use of whale products has been promoted by Project Jonah, France.
- The halting of the whale industry, through direct confrontation with whaling ships e.g. Greenpeace Foundation, Canada.
- Research activities on substitutes for whale products have been actively pursued as in the case of the Jojoba bean (*Simmondsia Chinensis*). The jojoba, found growing wild in much of the American southwest produces a seed that contains a colourless liquid wax that has many of the same properties as

## LIVING MARINE RESOURCES

sperm oil. It can be processed to produce a sperm oil substitute suitable for many uses including as a high-pressure lubricant. "Should this prove to be the case, there will be a major world-wide market for it and absolutely no reason to continue killing sperm whales. Sperms are pursued principally for their oil; their meat cannot be used for human consumption", affirmed the Office of Arid Lands Studies, University of Arizona, USA.

- Supporting a moratorium in all commercial whaling, campaigning to influence governments to take measures to avoid mass killing, educating people and providing information on these matters e.g. the Society for the Protection of Marine Mammals, Federal Republic of Germany. An International Whale Day has been organised by the Connecticut Cetacean Society, USA, for this purpose, as well as a "People-to-people whale petition campaign".
- Scrutiny of the meetings of the International Whaling Commission (IWC), proposing modifications for the legal protection of whales and other cetaceans and in accepted management practices e.g. Friends of the Earth International, USA, and the Society for the Protection of Animals, U.K.

The 31st IWC meeting 'made some gains and some losses for the cause of whale conservation', stated New Scientist (1979)<sup>7</sup>. Among the gains were reported the official establishment of an "Indian Ocean Sanctuary" and the banning of factory-ships for sperm whaling. Among the losses, the quotas which IWC set and the refusal of the the commission to agree on a temporary halt to hunting of sperm whale.

- Organization of symposia and conferences for the multidisciplinary study of marine mammals e.g. The National Whale Symposium, Indiana. The Mexican Institute for Renewable Natural Resources and the Environment Foundation, Mexico, organized a symposium on the grey whale with the aim of preparing a complete report on the issue.
- Some conservationist groups in USA including Friends of the Earth, the Society for Animal Protective Legislation and Sierra Club, attracted public attention on the tuna-porpoise issue. Porpoises commonly accompany yellowfin tuna and are frequently also trapped together with the tuna in the large purse-seine nets used for tuna fishing. Before the air-breathing porpoises can free themselves they are asphyxiated. Sierra Club called for a boycott on "chunk high" tuna, in order to protect porpoises. A documentary film on the tuna/porpoise problem has been produced by the Environmental Defense Fund, USA.

- A marine mammal that is the subject of a strong controversy in the media and within the scientific community is the harp seal. Intensive sealing has been going on in the Western Atlantic since the early 19th century. A high percentage of the kill involves pups, prized for their fur. The Department of Zoology, University of Guelph, Canada, Friends of the Earth (FOE), U.K., Green-

peace, USA, and the Animal Protection Institute (API), USA, advocate a conservative approach to the management of the harp seal in the Western Atlantic. API campaigning against sealing in several cities in Canada, obtained a strong public response. The Institute has been also dealing with experiments with dolphins, using the sound of the killer whale to frighten other marine mammals away from an underwater territory where they may be hunted. This experiment has been tried or proposed in various parts of the world.

Protection and research on the manatee (aquatic mammal of the order Sirenia) - that represents a natural biological control agent and a source of protein for human consumption. Until very recently the manatee has received little or no scientific attention. Now, the International Centre for Manatee Research, Guyana, the Conservation Society, USA and the International Development Research Centre, Canada, are endeavouring to fill this gap.

The manatee, who inhabits warm coastal waters, eats almost any form of aquatic vegetation, preserving waterways and irrigation canals from overgrowth of tropical vegetation. In the early 1900's, recommendations were made to restrict hunting and to protect the existing populations and their habitats (matupas).

In Guyana, although there was legislation to protect the manatee, this was difficult to enforce because the country had poor communications as well as a shortage of meat. Since 1974, progress has been made in attempts to establish an internationally coordinated manatee research centre based in Guyana, at the International Centre for Manatee Research. This Centre has been conceived as a non-governmental, autonomous and internationally supported organisation, reflecting the needs of the international community.

The objectives of the centre are to undertake basic research especially into the fundamental questions on physiology, endocrinology, anatomy, reproductive biology, biochemistry, ethology, and ecology; to use the manatee as a research animal for basic life sciences; to assess the value and effectiveness of manatee for weed control; to develop a means of repopulating depleting stocks, promoting conservation, and fostering domestication; to provide guidance in planning and techniques of mammalian research, and to establish a closer research liaison between Guyana, the Caribbean, South America, and the rest of the developed world, (IDRC, 1979).<sup>8</sup> Furthermore, groups have been formed in collaboration with the U.S. Fish and Wildlife Service, National Fish and Wildlife Laboratory, USA, and in Manaus, Brazil.

At the University of Miami, researchers are involved with a manatee captive breeding program. In Florida a Manatee Sanctuary became law on July 1st, 1978.

## LIVING MARINE RESOURCES

### 3. Protection of critical marine habitats (see chapter 2 Mountains, Island and other ecosystems)

### 4. Conservation of Antarctic waters

The rapid development of an Antarctic fishery for krill and fin fish and the speculations about the existence of important deposits of oil and minerals in the Antarctic ocean and continent, stimulated the debate about the future of such resources, and involves several NGOs. Concern over the need for proper management and conservation of Antarctic marine resources has been voiced by members of the scientific community and national/international agencies and organizations. A research activity of many co-ordinated non-governmental and intergovernmental organisations on the biology of living marine resources in the Antarctic is an international programme, called BIOMASS (Biological Investigation of Marine Antarctic Systems and Stocks), carried out by SCAR (The Scientific Committee on Antarctic Research), together with SCOR (Scientific Committee for Oceanographic Research), both committees of International Council of Scientific Unions, France, ICSU. The programme responds to the world's renewed interest in the living resources of the Southern Ocean. Notable among these resources are marine mammals (whales and seals), krill (primarily *Euphausia superba*), fishes, squids, spiny lobsters, crabs and seaweeds. There is little doubt that compared with the areas of conventional/historical fish production, the Antarctic resources are indeed enormous. As an indication of richness of one resource, krill, some fishery experts have speculated that 100 million tons of krill could be taken annually without depleting krill stocks. This figure is slightly less than double the 1973 world fish and shellfish catch. A number of countries are now engaged in the exploitation of these living resources while several others are planning their future exploitation.

Biomass research on the trophodynamics of the Southern ocean are aimed at improving knowledge on marine ecosystem processes. The following are the areas of concentration of such research:

- . Development of suitable models oriented to the study of the Antarctic ecosystem as a whole.
- . Physical, chemical and biological environments of the Antarctic seas which are unique in the world: Research on the effect of such characteristics on the distribution, abundance, productivity and behaviour of the marine organisms.
- . Biological characteristics, population distribution, swarm characteristics and position of the krill in the Antarctic marine ecosystems. Research is oriented to develop a sound ecological strategy for exploitation and conservation.
- . Marine mammals and birds: The two groups of marine mammals to be found in the Southern Ocean are seals, and whales. Both represent substantial potential sources of food. Sea-birds, are represented by albatross, penguin, and petrel. The exploitation of other resources could have a significant impact upon their population and on the ecosystem as

a whole.

- . Information on the dynamic of fish populations: There is a large number of species but a small number of individuals.
- . Cephalopods (squids and octopuses): These are important organisms in the trophic structure of the Arctic ecosystem. Cephalopods inhabit both pelagic and benthic habitats and are known as fast swimming predators.
- . Benthic invertebrates of potential commercial importance (rock lobsters, lithodid crabs, spider crabs).
- . Benthic marine algae: These are an important component of coastal ecosystems, that contribute significantly to the overall primary production. They are also a substantial food resource for many fish and invertebrates, and provide substrata and shelter for a wide range of animal species.
- . Introduction of remote sensing techniques.

The accomplishment of the programme presupposes the coordination of non-government organisations (ICSU - SCAR; ICSU - SCOR; ICSU - IABO, The International Association for Biological Oceanography) and inter-governmental organisations. The complete results should be ready for presentation at a major symposium in about 1986.

The implications of exploiting both living and non-living resources in and around the Antarctic continent has been a matter of research by the International Institute for Environment and Development, (IIED), UK, since 1976. Their major objectives have been to protect the delicate Antarctic ecosystems and to ensure that the international community's interests are not ignored. During the first two years, the programme concentrated on the political problems of establishing an equitable resource management regime, with special emphasis on non-living resources of the Southern Ocean.

International interest in these resources has been growing rapidly and the issue has received priority treatment in the Antarctic Treaty Forum. The programme examined a number of options that could accommodate the interests of the international community. These range from the provision of technical or financial assistance to helping developing countries harvest and process the resources; to the redistribution of krill, krill-based products or revenue derived from krill to the Third World. IIED completed a Southern Ocean study for IUCN. It is stated that even when there is great potential in the biological resources of the Southern Ocean, the economic constraints acting against early exploitation seems to be formidable. Conventional fishery management principles (based on the concept of MSY) will not suffice for a krill fishery, said the report. For example, if one of the management objectives for the Southern Ocean ecosystem is to protect and restore the large predator species, such as the baleen whales, then a very careful analysis of the permissible yield of the prey species, krill, will be needed. The conclusions call for a major research effort before the fishing industry expands so that the science on which it is based will be adequate.

## LIVING MARINE RESOURCES

Besides IIED's interest in promoting resources regimes for the Antarctic continent and the Southern Oceans, IIED's media information unit, Earthscan, increased public awareness on key issues related to the Antarctic and its resources, particularly the krill.

Another organization carrying out oceanographic and biological research on the Antarctic seas is the Natural Environment Research Council, England, through the British Antarctic Survey. The survey maintains five permanent bases for field work in the Antarctic. In the past, it has been concentrated on near-shore water, benthic systems and on land breeding birds and seals. Now it is developing a phase of open-ocean research, mainly focused on krill, aiming to understand the krill's role in the Antarctic marine ecosystem and, in particular, the balance between krill and those animals, who depend on it for food.

An NGO coalition oriented to increase public awareness, leading to effective international lobbying to protect the Antarctic, is the recently formed ASOC, Antarctic and Southern Ocean Coalition, USA.

ASOC's long range objectives include the protection of the unique and fragile Antarctic environment; preservation of endangered species, especially blue, fin, and humpback whales; freedom of scientific research over the entire region inside the Antarctic Convergence; continued demilitarization of the area; prevention of substantial commercial exploitation of Antarctic fish, squid and krill until scientists understand enough about the region's ecology to ensure that harvesting does not cause unacceptable harm; and prevention of adverse climatic change due to human activities.

### 5. Training and education in marine conservation.

NGOs undertake extensive activities in information, education and training programmes on Marine Conservation. They direct their resources at both the general public - (particularly in relation to the whale issue) - and to specialised students in ocean related fields.

An NGO devoted to oceanographic research and education is the Ocean Trust Foundation (OTF), USA. They promote a responsible world ocean policy, based on maximizing harmony and minimizing conflict in human inter-action with the seas, avoiding irreparable harm and acting on the basis of knowledge. Their activity includes a comprehensive baseline research, i.e. total ecological assessment, at each major study area, comparing conditions in natural areas with conditions in sites that have been altered through human activity. The programme encourages students in field research projects.

Other organizations can combine educational activities with recreational ones, like the Australian Underwater Federation, or orientate their efforts to academic and scientific research. Woods Hole Oceanographic Institution, Massachusetts Institute of Technology. Joint programme in Oceanography/Oceanographic Engineering; Biological Station, Norway.

### 6. Political and Legal Actions.

NGO political and legal actions at international level on ocean related issues tend to be particularly important, "since the emerging law of the sea as reflected in UNCLOS represents a major change in the legal framework within which man's activities in the open space are undertaken". (IFDA 1979).

Leading NGOs in the field focus their attention on the problem of ocean management, international agreements and conventions on multiplying uses and development of marine resources. (e.g. IIED, U.K. IUCN, Switzerland, ICSU, International Ocean Institute, Malta).

In 1970 an international conference was called in Malta to discuss, among NGOs, "the question of the peaceful uses of the seabed and ocean floor, beyond the limits of national jurisdiction. The conference was called Pacem in Maribus, the first in a series, attended by 300 legal experts, marine scientists, ocean industrialists and diplomats. It was in the wake of Pacem in Maribus that the International Ocean Institute (IOI) was founded, with the cooperation of the University of Malta and the United Nations Development Programme.

The work of the IOI consists of the annual Pacem in Maribus convocations, involving public opinion leaders from many countries and the research programme, focusing on particular projects and seminars. The results of the projects form the basis for discussion at the annual conference. IOI have focused increasingly on the issues of the law of the sea in the wider framework of the New International Economic Order. Their study, "Marine Resources, Ocean Management, and International Development Strategy", attempts to provide a conceptual framework, backed by a series of case studies, integrating ocean management and ocean space resources in a broad international development strategy.

### 7. Oceanographic Research

Among NGOs devoted to Oceanographic research can be mentioned the Department of Oceanography - Texas A and M University, has programmes on diverse Oceanographic fields. The efforts of the Department are concentrated in the Gulf of Mexico and the Caribbean Sea, but special projects relate to the Tropical Atlantic and Pacific, as well as to the Antarctic Ocean.

The biological oceanography programme at Texas A and M is strongly oriented toward the composition and ecological relations of marine populations of the Gulf of Mexico and adjacent portions of the Caribbean, and these studies span the estuaries, continental shelf, and deep sea. Investigations in progress seek to determine the distribution patterns of phytoplankton, zooplankton, fish and bottom-dwelling organisms, as well as primary and secondary production, bioacoustics, and toxicity of marine animals. An effort is being made also to develop a meaningful bioenergetic model of the Gulf of Mexico ecosystem. A program to study the biological productivity of the Southern Ocean which was initiated several years ago has now expanded to include investigations on the

## MARINE POLLUTION

dynamics of trophic relations in the Antarctic marine ecosystem.

### b. Marine Pollution

NGO activities related to marine pollution cover almost all the types of pollution that affect coastal waters and open ocean. A large number of NGOs are engaged in monitoring or assessment activities relating to the disturbance of coastal marine and estuarine habitats by the increased discharge of domestic sewage, litter, industrial waste and petroleum hydrocarbons. These activities have been mentioned in chapter 2, in relation to particular coastal ecosystems. A major focus for NGOs interested in marine pollution is pollution by petroleum hydrocarbons. The following activities illustrate this interest:

#### 1. Increasing frequency of oil spills from large tankers and oil marine terminal operations.

The amount of oil already polluting the oceans and the increasing potential for further spills, have engaged a large number of NGOs in the search for solutions. Problems arise from the increasing volume of petroleum imports, which requires an extensive tanker traffic and the formation of super-tanker ports.

Besides pollution resulting from tanker accidents, there is a serious cause of oil pollution in the discharge of the ballast water taken into empty tankers to provide stability on the return voyage to the loading terminal (deliberate or operational marine pollution). This problem has been reduced by L.O.T. (load on top) system, in which the ballast water is allowed to settle so that the oil rises to the surface. The tank is then drained until only surface oil in the tank remains, and this then forms part of the new cargo (Pitt, 1979)<sup>10</sup>.

Measures and regulations are being employed to reduce oil-spill risks regarding vessel traffic management systems, oil marine terminal operations, tanker designs, etc. Sometimes, research activities, together with preventive or curative measures against these risks have been taken by NGOs or coalitions of them, generally in relation to specific oil project proposals.

One example of these kinds of activities are those undertaken by the Kitimat Oil Coalition, Canada. Several Canadian NGOs such as Sierra Club, Save Tomorrow Oppose Pollution (STOP), and Energy Probe, have joined with seventeen other groups to form the Kitimat Oil Coalition. The coalition together with native people representatives, made a presentation under the West Coast Port Inquiry, into the environmental, social and navigational safety aspects of a proposed oil port at Kitimat and broader concerns related to west coast oil tanker traffic. Such proposals were viewed as posing one of the most serious single threats to the environment ever faced by British Columbia, leading to the local extermination of the Pacific salmon, losses of shellfish and danger to herring stocks and many other forms of wildlife, including several species of whales, porpoises and dolphins, seals and sea lions, bald eagles, peregrine falcons, and grizzly bears. Concerned citizens' group banded together in

an attempt to ensure full public participation in the Government's decision. Environmentalists were concerned about the lack of oceanographic knowledge of the area, indispensable to the prediction of the distribution of water masses, characteristic circulation patterns and the likely movement of pollutants.

Scientific reports were prepared by the Kitimat Oil Coalition on major oil spills in the world, and on diverse aspects of tanker traffic, climatic and topographic conditions related to the incidents, as well as on its effects on marine ecosystems and the effectiveness of oil spill clean-up operations.

Oil spills on the British Columbia West Coast were the subject of a submission to the Minister of Environment, Canada, by the Canadian Scientific Pollution and Environmental Control Society (SPEC), who called the attention to some deficiencies in the equipment for the containment and removal of spilled oil from water and on the need for allotting adequate funds for the proper development of oil spill control.

Similar problems were posed by a superport proposal at Palau Islands. Some USA NGOs - (The Oceanic Society, FOE, the Oceanic Institute, Natural Resources Defense Council) advocated for environmental impact studies on likely threat to Palau's coral reefs, flora and fauna, considered as the richest and most diverse in the world.

In developing countries there are some few NGOs dealing with oil spill problems. Among them is The Bermuda Biological Station for Research, Bermuda, who have been investigating pollution in the sea since 1970. The Uruguayan Institute for the Preservation of the Human Environment, Uruguay, promoted a draft law on the control of oil discharges along the coast. The Environmental Protection Society Malaysia, attempted to prevent pollution from oil spills on their coast caused by heavy tanker traffic nearby. The Gandhi Peace Foundation, Environment Cell, India, gives information on major oil spills along the Indian Coast.

#### 2. Effects of oil discharge on marine life forms.

Effects of oil pollution-beyond decimation of populations of fishes, shellfishes, and sea birds at the site of the spill, are not fully understood. New discoveries on the matter have been provided by the spill at West Falmouth, close to Woods Hole, where the barge Florida went aground spilling 170,000 gallons of fuel in 1969, providing an on-the-spot laboratory for the Woods Hole Oceanographic Institute's research activities.

Several teams of scientists from Woods Hole went to work immediately, documenting not only the original massive kill but the long-term biological and chemical aspects of the spill.

Among the revelations from the West Falmouth spill, was that some prominent species like mussels and oysters survived the spill itself but failed to reproduce the following spring and died the following summer. And there was great mortality among other

## MARINE POLLUTION

organisms that are studied less often. Interestingly, into the vacuum left by the devastation flowed "opportunistic species", mostly polychaete worms, which increased dramatically in numbers." It was found that some pollutants were incorporated into oysters and scallops harvested for human consumption. Most toxic pollutants had a high resistance to metabolism, remaining in the organisms even after they had been removed from contaminated water.

Blumer mentioned the possibility that the carcinogenic constituents of oil, which are absorbed unchanged by oysters, shellfish and other small organisms, may in time be incorporated into and contaminate entire food chains. As years passed, the oil did not disappear at West Falmouth but spread through sediments to other areas and affected other marine populations. One of the most complete studies was carried on for seven years with fiddler crabs. Although those animals were not killed in great numbers at first, many aberrations appeared in the survivors, including increased molting, nuptial colour display at inappropriate times of the year, and lethargic response to danger. Perhaps the most destructive aberration was the general failure of fiddler crabs in the affected area to dig adequate burrows. Thus many of them did not survive the winter.

The variety of responses of marine organisms to crude and refined oils and their ecological implications, made it necessary to study such effects at the ecosystem level, as recommended by Ecolog, England, and not by single species bioassay.

The Sea Fisheries Institute, Poland, is also concerned with this field, carrying out research of biocenotic effects of eutrophication of the Baltic. They are also interested in sea estimation of resources and production of living stocks in the Baltic sea.

The Biological Station, Norway, deals with ecological research of Norwegian fjords in natural and polluted conditions and on the condition of benthic fauna before the possible discharge of "red mud".

### 3. Development of intervention systems against marine pollution

In the European region, the lack of effective techniques to combat the ecological disasters represented by oil spills, have moved diverse organisations, mainly of international scope, to face the problem.

Eurocean, Monaco, has formed a study group to investigate the industrial possibilities of the conception and development of an operational intervention system against marine oil pollution, in order to provide the relevant authorities with a proposal for practical and effective system when a breakthrough in the legal/political arena has been achieved. After making a brief survey of existing intervention systems in the North Sea, the group is carrying out a similar survey in the Mediterranean. In order to promote understanding between oil companies, industries and other concerned organisations, Eurocean will organize in 1980 an International Conference on "Petroleum and The Marine Environment" in Monaco.

Concawe, Netherlands, the oil companies' international study group for conservation of

clean air and water in Europe, is concerned with environmental control by anticipating measures against pollution caused by the oil refining industry and its products. They work in contact with IPIECA, U.K. and other organizations having similar aims.

The European Centre for Studies on Problems of the Marine Environment, who promote scientific cooperation in Europe in oceanographic matters, is also concerned in pollution control.

### 4. Monitoring organisations concerned with environmental protection

For years NGOs undertook monitoring diverse ocean related organisations, such as the IWC, IMCO, the Convention for the Conservation of Antarctic Marine Living Resources. NGOs have been active participants in UNCLoS deliberations. A number of environmental organizations such as the Sierra Club, USA, Ocean Education Project, USA, etc. produced regular coverage-publications on the conference.

IIED, U.K. involved in monitoring at UNCLoS, continues as an NGO information and monitoring centre in London on the work of the Intergovernmental Maritime Consultative Organization (IMCO). Their work is available to a wide range of organisations via the mailing coalition ECOLoS that operates from the IIED offices.





## MARINE POLLUTION

### 5. Research on endangered bodies of water

The environmental degradation of some regional seas has encouraged NGO marine pollution research and monitoring activities.

In Japan in recent years has been an increase in discharged volumes of industrial and municipal wastes into the sea. One industry which has had considerable impact on marine eco-systems has been the heavy chemical industry.

The main cause of pollution and of damage to fisheries was oil pollution followed by red tide. This latter phenomena has increased considerably due to a progressive eutrophication of some marine environments by discharge of waste.

Other pollutants, such as mercury, PCBs and agricultural chemicals were found to have concentrations exceeding environmental quality standards.

As an island nation, Japan must depend upon the fish and shellfish of the sea for almost all of its animal protein needs. Besides wild stocks the sea yields, Japan has developed advanced fishery culture techniques for fish, shellfish and seaweeds. Now, pollution has set limits on the amount of fish that the nation can eat. According to Jishu-Koza Citizens Movement, Japan.

"Japan has become the world's first living laboratory for research into the effects of large-scale environmental poisoning". This citizen action group aims to fight against pollution through educational and research activities, provision of information, and organization of meetings and seminars.

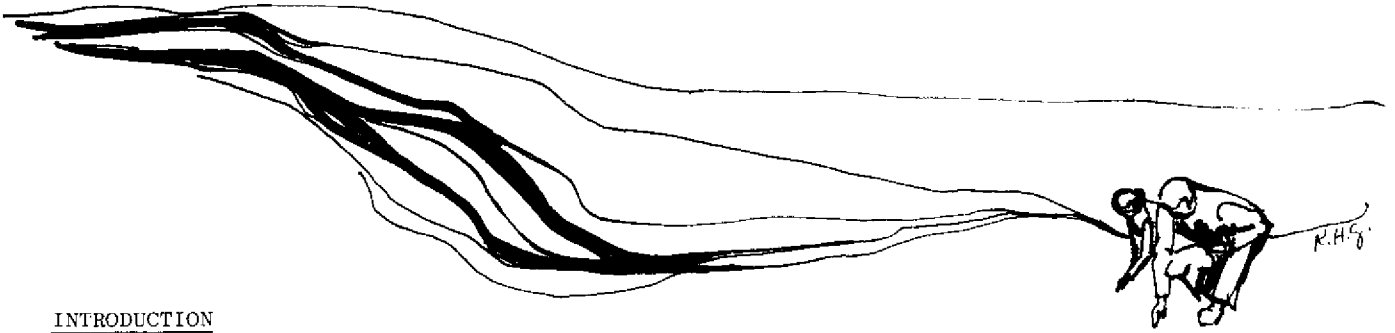
Among large spills of crude petroleum in Japanese coastal waters has been the incident concerning the Juliana, a Liberian tanker which released six thousand tons of oil, affecting land and sea. Another incident was the spill of about 10,000 kilolitres of oil which leaked from the ship Misubishi and spread over 50,000 square metres. Its damage to local fisheries was estimated at US \$20 million.

In Europe, Pacem in Maribus launched in 1970 an interdisciplinary study on the pollution of the Mediterranean Sea, one of the most endangered bodies of water on our globe. The study dealt with the industrial, recreational, and military uses, and abuses of the sea, and proposed new forms of international organisation, management, and regulation. It was the first study of its kind and initiated a long line of activities, leading, eventually, to the adoption of the Barcelona Convention. The IOI conducted a similar study on the Caribbean.

### Footnotes

1. FAO. The State of Agriculture and Food. 1977.
2. G. Saetersdal. Nutrition First. Fisheries Policies. Ceres. July-August 1979.
3. SCOPE. Environmental Issues : Scope report 10. 1977.
4. S.J. Holt. The Food Resources of the Ocean. Readings from Scientific American 1971.
5. H. Ackefords & C-G Rosen. Farming Aquatic Animals. Ambio; vol. 8 No. 4 1979.
6. FAO op. cit.
7. J. Chertas. The Great White Wash, New Scientist, July 1979.
8. K. Ronald, L.J. Selley & E.C. Amoroso. Biological Synopsis of the Manatee IDRC 1978.
9. A. Pardo & E. Mann Borgese. Marine Resources, ocean management and the new international development strategy. IFDA dossier 13. Nov. 1979.
10. D. Pitt. Throwing light on a black secret. New Scientist, March 1979.

# Environmental Training



## INTRODUCTION

One of the most positive aspects of NGO activity is the opportunity it provides citizens to train in skills related to informing the wider public, and influencing public opinion on environmentally important issues. This aspect of NGO activity is included under environmental training, that is 'the generation of specific skill(s) for a particular task or series of tasks related to environmental activities'.

There are NGOs whose activities may be rather remote from the average individual member, such as those which are mainly to provide a service such as publication of a professional journal or organization of conferences. Such NGOs do serve useful purposes but could not be included as those which provide environmental training. However, there are numerous NGOs all over the world whose environmental work is carried out by individual members, paid or voluntary, which in a sense, provide in-service training to members in skills related to raising the public awareness of environmental issues. The following are examples of the skills acquired through such training: writing on environmental issues; organizing public meetings, seminars, and workshops; publicity activities to gain media coverage on environmental concerns; interpersonal communication skills in informing and influencing others including lobbying government members; research and surveying techniques; public speaking; documentation.

The effect of the use of such skills as those mentioned above, in raising the environmental consciousness of community members and in improving their knowledge, has been substantial. Public alertness and willingness to take action to prevent environmental problems before they arise and solve them when they do arise is ultimately the only sure environmental protection available.

The environmental training opportunities provided by NGOs also include a wide range of courses for specialists and community workers whose educational qualifications may range from basic literacy and numeracy - such as for some community leaders, to scientists and development workers with university level qualifications. One organization which provides environmental training courses for the whole range of target groups is the Environment Training Programme, Senegal. They have conducted courses all over Africa - for village leaders in such aspects as primary health care and appropriate technology, and for varying groups of specialists and government officials in e.g. urban and rural planning, rural radio as an environmental training tool, and appropriate technology.

Of the four UNEP objectives under this heading (see Appendix II) NGO activity is most conspicuous in meeting the third objective: 'To work towards more environmental awareness among rural and urban populations.' NGOs whose activities are within local and national dimensions, particularly those working with groups of youths, have varieties of programmes which provide environmental training opportunities to a wide segment of the population.

The fourth of UNEP's objectives is less relevant to NGO activity in that the NGO movement is not a coordinated one except in respect to various NGOs which agree to work together on specific issues or which are branch members of an international, or national organisation. 'Creating and maintaining appropriate mechanisms for the effective coordination of environmental training' is an objective met within the Boy Scout Movement for example, but may not be met from the Boy Scout Movement to some other youth organisations. However, an example is mentioned in the descriptions which follow, of an NGO which serves to coordinate environmental training programmes for groups of NGOs (CoEnCo).

The dispersed nature of NGO activity as it relates to environmental training or any other subject areas is often its strength. Many approaches to seeing problems and solving them are tried and the NGOs which operate at a local level have a great capacity to use the resources of their members to throw light on the solution to environmental problems from a unique approach especially relevant to the community in which it operates. This applies to environmental training as well as to other activities.

Based on the objectives of UNEP, the environmental training activities of NGOs will be described for the following target groups:

1. Those with particular qualifications and/or fields of employment: such as decision makers, technicians, specialists and farmers, involved in various tasks associated with environmental assessment and environmental management.
2. The general public, both rural and urban.

## DESCRIPTIONS OF NGO ACTIVITIES IN RELATION TO ENVIRONMENTAL TRAINING.

The environmental training activities of NGOs are so varied that they have been placed

## ENVIRONMENTAL TRAINING

under eight headings to give an idea of their range.

The headings are as follows:

- i. Basic Needs
- ii. Agriculture and Animal Husbandry
- iii. Appropriate Technology; Building
- iv. Human Settlements; Energy
- v. Marine Resources
- vi. Primary Health Care
- vii. Wildlife and Protected areas; Ecology; Forests
- viii. Community Service

The descriptions of NGO activities in environmental training which are given here are in no sense exhaustive. There are, particularly, many training courses provided by institutions for formal education which receive the funds from sources other than governments, but which this survey has not been able to cover. The greatest proportion of NGOs this survey reached are those which involve participation of the general public and it is these NGOs which the greater part of our descriptions cover.

### i. Basic Needs

- . All areas of development for small scale farmers including leadership, nutrition, appropriate technology, village planning, building, health-care, are covered in training programmes by Lanka Jatika Sarvodaya Shramadana Sangamaya, Sri Lanka.
- . Air Pollution. Post-graduate courses in prevention of air pollution are provided by the Argentine Association Against Air Pollution, Argentina, for scientists.
- . Water Resources and Waste Water Disposal. The Austrian Water Resources and Water Management Association provides training for water resources specialists.

For the general public:

- . Village Development. An NGO which provides training is the Lanka Mahila Samiti, Sri Lanka. It provides leadership training for women in various aspects of village development.

### ii. Agriculture and Animal Husbandry

- . Animal Husbandry. An integrated project of stock raising, agriculture and water resources development is carried on for small farmers by Africare, Mali.
- . Fertilizer and pesticide use, in the environmental management of agricultural activities e.g. Mauritius Society for Environmental Conservation, Mauritius.
- . Soil management for small farmers e.g. the Agrarian Centre, India.

For the general public:

- . Desert reclamation activities which incorporate training are carried on by the Kweneng Agricultural Brigade, Botswana.
- . Organic Farming. An extension service is provided by the Bio-dynamic Agricultural Association of Australia, Australia.
- . Rabbit breeding e.g. Ghana Young Farmers Club, Ghana.
- . Rural development training courses for youth are provided by the Agricultural Christian Youth, Cameroun.

### iii. Appropriate technology; Building

- . Merchanisation for small farms e.g. Association for the Advancement of Agricultural Sciences in Africa, Ethiopia.

For the general public:

- . Appropriate Technology. Storage tanks for village water e.g. Kenya Girl Guides, Kenya.
- . Building materials - low cost, Pelegano Village Industries, Botswana.
- . Community building construction for village use e.g. Sri Lanka Girl Guides, Sri Lanka.
- . Equipment maintenance for domestic and farm use e.g. Greenpeace Experimental Farm, Canada.
- . Road construction with a wider framework of environment and development activities, e.g. Voluntary Workcamps Association of Nigeria, Nigeria.

### iv. Human Settlements; Energy

- . Marginal human settlements; rural settlements; housing technologies and policies e.g. Planning Institute of Lima, Peru.
- . Urban management e.g. International Union for Local Authorities, Netherlands.
- . Urban and regional planning. A training course for foreign academics is provided by the Town and Country Planning Engineering Institute, Italy.

For the general public:

- . Urban and rural development training for youth is provided by the Workers College, Cameroun.
- . Squatter resettlement e.g. the Christian Service Committee, Malawi.
- . Energy conservation and renewable energy resources, e.g. the Small Earth, Netherlands.

### v. Marine resources

- . Seabed mining training is provided to experts from developing countries by the International Ocean Institute, Malta.

## ENVIRONMENTAL TRAINING

For the general public:

- . Underwater exploration and skin diving e.g. New Zealand Underwater Association Inc., New Zealand.

### vi. Primary Health Care

- . Conscientization and organisation of peasants for improved health e.g. the Centre for Coordination and Development, Mexico.
- . Family Planning Service development. Training for family planning workers is provided by the Planned Parenthood Federation of Canada, Canada.

For the general public:

- . Nutrition e.g. Whole Earth Healing, Australia.



### vii. Wildlife and Protected Areas; Forestry; Ecology.

- . Conservation training for school teachers is provided through the Council for Environmental Education, England. This NGO also coordinates environmental education and training for many NGOs.
- . Environmental and Field Ecology Training is provided for pre-university students by the Forests Institute for Ocean and Mountain Studies, USA.
- . Speleology training for leaders which includes conservation is provided by the Quebec Society of Speleology, Canada.

For the general public:

- . Archeology training which includes conservation is provided by the Antigua Archeology Society, Antigua.
- . Bird identification training for primary school children is provided by the Gould League of New South Wales, Australia.

- . Fire management e.g. Central Arnhem Land Information Communication Office, Australia.

- . Mapping of wildlife distribution for endangered species e.g. the Austrian Ornithological Society, Austria.

- . Reforestation e.g. Girl Guides of New Zealand.

### viii. Community Service

- . Land acquisition for community needs e.g. Trust for Public Land, USA.

For the general public:

- . Environmental Impact assessment, e.g. Total Environment Centre, Australia.

- . Fieldwork training related to all aspects of conservation is provided in a wide variety of courses and for trainees of various qualifications by the Field Studies Council, England.

- . Field observation research e.g. Association for the Ecological Defence of Galicia, Spain.

- . Library and documentation services e.g. Planned Parenthood Association of Sierra Leone, Sierra Leone.

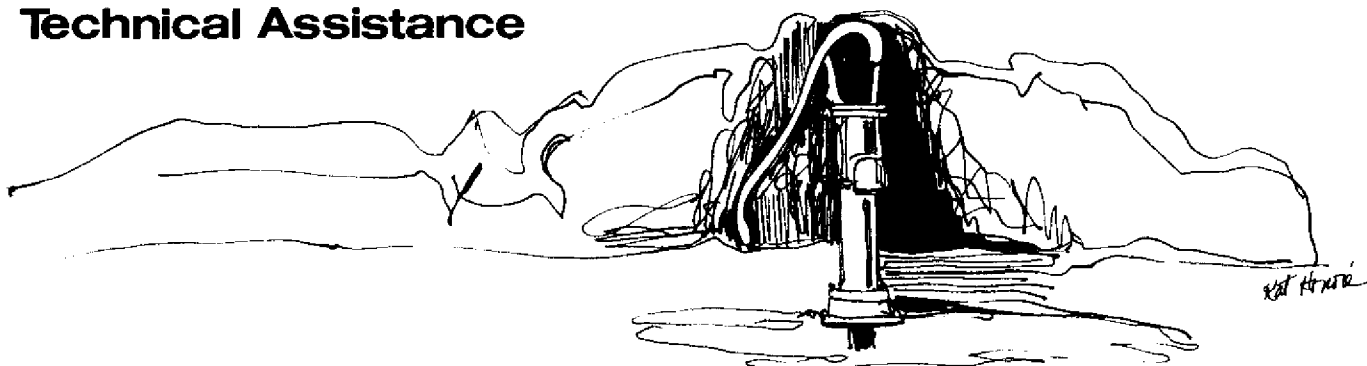
- . Traffic control, driver training, long-distance skiing, parachute jumping - all including conservation, are training aspects provided by the Royal Dutch Touring Club, the Netherlands.

- . Public speaking and radio programmes are training aspects provided by the Friends of Nature, Panama.

- . Writing on environmental matters including preparation of government submissions e.g. the Ecology Centre of Southern California, USA.

- . Youth Leadership training for greater environmental awareness e.g. CoEnCo, Committee for Environmental Conservation, England. CoEnCo is a coalition of United Kingdom NGOs which work together on major environmental problems.

# Technical Assistance



## INTRODUCTION

Taking UNEP's activities in this subject area as a guide (see Appendix II, UNEP's objectives), technical assistance (TA) has been defined for the purposes of this chapter as any assistance provided by an NGO to other people or organizations to support their achievement of environmental goals. TA includes the provision of the following:

- . expert consultants - in person, to answer correspondence, or to reply to phoned queries; lecturers.
- . publications such as manuals and handbooks.
- . workshops which provide opportunities for training or upgrading of skills.
- . research and development services for improvements in technology related to the needs and environmental constraints of the users.
- . funds for environmental projects.
- . library and documentation services; clearing-house services; exhibitions.
- . assistance with networking of organizations and/or individuals for improved communication on environmental actions.

TA is an area in which it is sometimes not clear which organizations can be properly regarded as environmental NGOs as opposed to charities - which sometimes assist environmentally related improvements, and businesses which provide researchers and experts. We have endeavoured to include examples of environmental NGOs only.

This subject area is dominated by more developed country NGOs, many of which provide assistance to less developed countries. That more developed country NGOs should be willing to provide TA to less developed countries is a measure of their good will and of their economic means. However, TA should be oriented to a self-reliant and participatory development process. The objectives and strategies of the New International Economic Order can constitute the basis for this new orientation so that less developed country NGOs can readily help themselves and others in similar circumstances. 'Expert' advice and 'appropriate' technology may no longer be 'expert' or 'appropriate' respectively, when provided across such wide economic, cultural and environmental disparities as those which exist between more developed and less developed countries.

## DESCRIPTION OF NGO ACTIVITIES IN RELATION TO TECHNICAL ASSISTANCE

The two areas of greatest NGO TA actively are appropriate technology and human settlements.

### 1. Appropriate Technology

Of the NGOs which provide TA nationally and regionally, most are concerned with rural development. They assist with improvement of agricultural practices and equipment, and often improvement of household practices and equipment also. Examples of such NGOs are given below:

- . A periodical on appropriate technology, nutrition and improvement of farming practices is provided by the Agricultural Development Agencies in Bangladesh, Bangladesh. Their periodical entitled 'Adab News' frequently includes information which indicates how to construct equipment and grow crops.
  - . In Latin America, two NGOs which develop and disseminate low-cost, energy saving devices for home and farm use, are the Association for Scientific Research of the Plateau, Guatemala, and the Lutheran Community and Evangelical Action, Panama.
  - . Research and advice is provided to farmers by the Agricultural Tools Research Centre, India, on agricultural hand-tools and implements.
  - . For home use, the National Centre for Appropriate Technology, USA, has a nationwide programme of TA, small grants, information and local support activities.
  - . A service in bibliographic tools and support concerning appropriate technologies is provided by the Alternative Technology Information Group, England, whose members are librarians and information workers who provide this service to libraries.
- The NGOs which provide assistance internationally also tend to be concerned mostly with the needs of small-scale farmers. All the NGOs below publish information and have some form of advisory service.
- . Volunteers in Technical Assistance (VITA), USA, has an advisory service which can handle questions and answers in English, French and Spanish and other national languages of less developed countries. Their volunteer staff of experts is located all over the world. Their publications include manuals and handbooks.

## TECHNICAL ASSISTANCE

- . The Group for Research and Exchange of Technology (GRET), France, publishes in French extensive information on the construction of equipment relevant to less developed country farmers.
- . Advice through an answering service from technicians, engineers and craftsmen in France is provided to less developed country small-scale business proprietors by the Centre for Exchange and the Promotion of Craftsmen in Zones to be Equipped (CEPAZE), France.
- . The Brace Research Institute, Canada, is mainly interested in making dry lands available and economically useful to agriculture. They provide manuals, handbooks and expert advice on appropriate technologies.
- . TRANET, USA, is an international networking organization for groups working in appropriate technology. It provides extensive information on NGOs through a newsletter 'Tranet', and correspondence.
- . Networking between less developed country appropriate technology organizations, (South-South), is being developed by the Marga Institute, Sri Lanka.
- . Information for appropriate technology selection for the future is given in a periodical 'Technology Tomorrow', by the World Future Society, USA.

### 2. Human Settlements

- . Examples of three NGOs which provide services nationally in the form of expert advice, research and publications, are the AHAS Housing Advisory Services, England; the Building Information Institute, Finland; and the Institute on Housing and Environment, Federal Republic of Germany.

Some NGOs which provide assistance internationally are given below:

- . Extensive services in the improvement of housing are provided by the International Cooperative Housing Development Association (ICHDA), USA. The International Council for Building Research Studies and Documentation (CIB), Netherlands, also has extensive activities which include research and study projects undertaken by competent specialists from member institutes.
- . The Development Workshop, Canada, specializes in research and dissemination of indigenous methods of planning and building and holds workshops to improve on existing skills and methods, provides publications, exhibitions and films.
- . Experts, lecturers, exchanges of experience between personnel of international institutions and publications are forms of assistance provided by the Institute for Building in the Tropics, Federal Republic of Germany.
- . Expertise and consultancy services in low-cost housing for developing countries is provided by the German Development Assistance Association for Social Housing, Federal Republic of Germany.

### 3. Community Development

- . New TransCentury Foundation, USA, is working to strengthen NGO activities in development in the less developed countries. To this end they provide management training and technical assistance, recruitment and staffing services, community development and support activities, and a secretariat for women in development. Their working language is English, but they can provide some forms of assistance in Spanish and other languages.
- . A clearing-house for research and information on development is a form of assistance provided by the European Association of Development Research and Training Institute, Austria.
- . A consultancy service in community work projects and training is provided by the International Federation of Settlement and Neighbourhood Centres, Netherlands.
- . A developing country NGO which provides expert advice and runs training programmes, is the Environment Training Programme, (ENDA), Senegal.
- . A community organization providing information on people willing to pass on skills, useful publications, courses, sites where skills can be practised, is the Skills Exchange Network for a Stable Economy, England.

### 4. Consumer Affairs

- . A clearing-house for information on consumer affairs is provided by the International Organisation of Consumer Unions, Netherlands.
- . The International Electrotechnical Commission, Switzerland, has originated a multilanguage vocabulary for technical terms and develops and propagates easily reproducible test methods for electrical consumer goods.

### 5. Industry and Environment

- . The Centre for Training and Documentation on the Industrial Environment, France, has a documentation service and gives expert advice to written and phoned enquiries.

### 6. Nature Conservation

- . Expert advice on various aspects of nature conservation is provided by all three NGOs - the Costa Rican Association for the Conservation of Nature (ASCONA), Costa Rica; the Team of Forest Botany and Nature Conservation, Poland; and the Tropical Science Center, Costa Rica. In addition, ASCONA also provides experts, organizes workshops, round-table discussions and lectures on nature conservation and a wide variety of other environmental topics.

## TECHNICAL ASSISTANCE

### 7. Peace and Disarmament

- . The activities of the League of Red Cross Societies, Switzerland, range widely but almost all of them can be said to contribute to peace in the world. Here we mention only one area of their activities, that of the development of national Red Cross Societies by providing the following assistance:

organization of training seminars and study visits; expert advice, equipment and funds; publication of guides and other documents; and production of teaching materials.

- . The International Youth and Student Movement for the United Nations (ISMUN), Switzerland, organizes workshops, student exchanges and study visits.
- . An international network of groups involved in non-violence and peace, is provided by Non-violent Alternatives, Belgium.

### 8. Rural Development

- . The International Federation of Agricultural Producers, France, provides advice and information services on sound agricultural practices and environmental management.
- . Expert advice, training and information for various aspects of rural development such as sound agricultural practices, village housing construction, and small-scale business, is provided by the Social and Economic Development Centre, Bolivia.
- . Technical and financial supports, and training are forms of assistance provided by the International Association for Rural Development, Belgium.

### 9. Environmental Information

There are many NGOs which serve as resource centres for the public and other NGOs. Examples of the kinds of assistance they offer are given below:

- . A clearing-house facility on all aspects of the European environment is provided by the European Environment Bureau, Belgium.

- . The Institution of Environmental Sciences, England, has a free advisory service to schools and the general public on a wide variety of environmental matters. They also conduct surveys on environmental matters.

- . The Environmental Information Service (EGIS), England, has an advisory service, produces information packs for secondary school use, has exhibitions for others to use on various environmental topics, and can provide lectures and slides for environmental education.

- . A library with resource personnel for environmental education is provided for the public by the Freedom from Hunger Campaign, Australia. They also have an advisory service to answer questions on environment and development by letter and phone.

### 10. Technical Assistance in various other environmental fields

- . The International Youth Federation for Environmental Studies and Conservation (IYF), Denmark, provides information and expert advice on the organization of conservation activities such as in relation to energy, acid rain, whales, and wetlands. They organize student exchanges and study camps for youth.

- . The Technical Assistance Information Clearing House (TAICH), USA, publishes directories on voluntary and non-profit agencies in development assistance. They also provide a library service and various other publications in their interest of serving as a clearing-house on socio-economic development programmes outside of the USA.

- . Energy, genetic resources, and community development are some of the areas of TA given by Inquiring Systems Inc., USA. They are a non-profit organisation with both salaried and volunteer staff which provides assistance with project planning, development, management, evaluation, and funding. A similar kind of organization in England, the Dartington Amenity Research Trust, has done research and advisory work in conservation of natural resources, agricultural change, tourism and recreation.



# **APPENDICES**



## directory of ngos

Non-government organisations (NGOs) in the directory are arranged according to the region of the world in which they are located, then alphabetically according to the country and NGO name in the English language. We sincerely regret that our limited resources do not permit the translation of the directory into French and Spanish.

Les Organisations Non Gouvernementales (ONG) sont classées dans l'annuaire selon les régions du monde où elles sont établies, ensuite alphabétiquement suivant le pays et le nom de l'ONG en Anglais. Nous regrettons sincèrement que, par manque de fonds, nous ne puissions pas traduire l'annuaire en français et en espagnol.

Las organizaciones no gubernamentales (ONG) han sido clasificadas en el directorio de acuerdo a la región donde se encuentran ubicadas y luego alfabéticamente por países y nombre de las ONG en inglés. Lamentamos sinceramente que debido a la falta de fondos no podamos traducir el directorio al francés y al español.

The code numbers from 1 to 7 shown below identify NGOs working in the seven subject areas of this report.

Le code de 1 a 7, ci-dessous, correspond aux activités des ONG dans les sept domaines étudiés dans ce rapport.

El código que se presenta a continuación corresponde a las actividades de las ONG en las 7 áreas estudiadas en este informe.

Code Code Codigo	English	Français	Español
1	Tropical woodlands and Forest Ecosystems	Ecosystèmes des bois et forêts tropicaux	Bosques tropicales y ecosistemas forestales
2	Mountains, islands, coastal and other ecosystems	Ecosystèmes montagneux, insulaires et autres	Montañas, islas, ecosistemas costeros y otros ecosistemas
3	Genetic resources	Ressources génétiques	Recursos genéticos
4	Wildlife and protected areas	Faune et flore sauvages et zone protégées	Vida salvaje y áreas protegidas
5	Oceans : marine pollution and living marine resources	Océans : la pollution des mers et les ressources biologiques	Océanos - contaminación marina y recursos marinos vivientes
6	Environmental training	Formation relative a l'environnement	Entrenamiento ambiental
7	Technical assistance	Assistance technique	Asistencia técnica

Under the heading 'Periodicals' in the tables which follow an 'X' indicates that no periodicals were mentioned.

Dans les tables suivantes, un x sous la rubrique "periodiques" signifie qu'aucun périodique n'a été mentionné.

En las siguientes tablas de materias, bajo el encabezamiento "Periódicos", la no mención de ellos se indica con una X.

DIRECTORY

REGION : AFRICA

Code Number(s) Name of NGO	Address and Telephone	Scope-Language(s)- Type of Activity Periodical(s)	Activities
<u>Country : Algeria</u>			
Code : 2,5 Research Centre on Terrestrial Biological Resources (Centre de recherches sur les ressources biologiques terrestres)	B.P. 812 Alger-Gare Tel: 64-61-22	National-French- Research/Education- X.	Classification of individual and collective terrestrial biological communities; research into ecological efficiency and conservation; mapping of ecosystems in arid zones.
<u>Country : Botswana</u>			
Code : 1,4,6 Kweneng Agricultural Brigade	Private Bag 7, Molepolole Tel: 58	National-English Setswana- Education/Training- X.	Tree planting projects for water conser- vation & soil eroison control; scrub en- richment & micro-irrigation in the Kalahari; wildlife conservation.
Code : 6,7 Pelegano Village Industries	P.O. Box 464 Gaborone	National-English, Setswana- Technical Assistance/ Training- X.	Development and promotion of village in- dustries : alternative energy sources, low-cost building materials, management of water resources for mixed farming.
<u>Country : Cameroun</u>			
Code : 6 Agricultural Christian Youth (Jeunesse agricole chrétienne)	B.P. 4272, Yaounde	National-French- Education- X	Programmes of seminars and training courses to help rural youth upgrade their agricultural education and skills.
Code : 6 Workers College (Collège des travailleurs)	B.P. 5285, Douala Tel: 42.68.09	National-French- Education/Youth- X.	Facilitates the integration of unemp- loyed/uneducated youth into the produc- tive sector; promotes further education/ specialised training of workers.
<u>Country : Ethiopia</u>			
Code : 3,6,7 Association for the Advancement Agricultural Sciences in Africa Addis Ababa (Association pour l'avancement en Afrique des sciences de l'agriculture)	P.O. Box 30087, Addis Ababa Tel: 44-35-36	Regional-English, French,Arabic- Professional/Techni- cal Assistance- 'AAASA Journal', 'AAASA Newsletter'	Workshops on appropriate technologies for the development of agriculture in Africa : agro-allied industries and products; mechanisation for small farms; utilisation agro-forestry and fisheries waste.
<u>Country : Ghana</u>			
Code : 4 Ghana Wildlife Society	P.O. Box 1695 Kumasi Tel: 2596	National-English-Citizen Action Group 'Bongo' 'Newsletter'	Wildlife conservation.
Code : 6,7 Ghana Young Farmers Clubs	Post Office Box 195, Cape Coast Tel: 042-2372/ 042-2226 Ext.10	National-English, Vernacular-Education/ Training- X.	Attempts to stem rural-urban migration by mobilising youth into meaningful co- operative employment in agriculture and self-help, small scale (cottage) indus- tries.
Code : 2 Institute of Aquatic Biology	P.O. Box 38, Achimota Tel: 75511	National-English- Scientific/research- X.	Monitoring of: discharge of industrial effluents into rivers; effect on non- target organisms in orchorencias and snail control programmes; studies of chemical & physical limnology; bacterio- logical & bacterial studies of waters in central Accra.
<u>Country : Ivory Coast</u>			
Code : 1,4 National Committee for the En- vironment (Commission nationale de l'environnement)	B.P. V 178 Abidjan Tel: 32-48-67	National-French- Education- X.	Forest and Wildlife Conservation : pollution control.
<u>Country : Kenya</u>			
Code : 6,7 African Medical and Research Foundation	P.O. Box 30125 Nairobi Tel: 501 301	International-English- Research/Training/ Health Care Services- 'AFYA', 'DEFENDER'	Research on preventive and curative health care; training of community health workers; development of communi- ty-based health system.
Code : 2 Department of Botany, Kenyatta University College	P.O. Box 43844, Nairobi Tel: (817) 356	National-English- Academic/Research/Edu- cation- X.	Research on : Fresh water and marine ecosystems; food additives and defoliants as environmental mutagens.
Code : 1,7 International Council for Re- search in Agroforestry (Con- seil international pour la re- cherche en agroforestière, Con- sejo internacional para inves- tigación en agrosilvicultura)	P.O. Box 30677 Nairobi Tel: 29867	International-English- Research/Publication/ Technical Assistance- X.	Agroforestry research especially for the tropics. Consultancy, documentation and technical assistance services in agroforestry.

DIRECTORY

REGION : AFRICA

Code Number(s) Name of NGO	Address and Telephone	Scope-Language(s)- Type of Activity- Periodical(s)	Activities
Code : 6 Kenya Girl Guides Association	P.O. Box 40004, Nairobi Tel: 23750	National-English- Education/Youth/Opera- tional Projects- Magazine.	Leadership and character training, includ- ing community development and environmen- tal activities.
Code : 1,4 National Council of Women of Kenya	P.O. Box 43741, Nairobi Tel: 24634	National-English,Ki- Swahili-Citizen Action Group- 'Kenya Woman/Wanawake wa Kenya'	Combating desertification, planning for firewood needs, preventing soil erosion and protecting watersheds through nation- wide tree planting programme.
Code : 4 Wildlife Clubs of Kenya Association	P.O. Box 40658 Nairobi Tel: 20142	National-English,Ki- swahili-Education- 'Komba'	Involvement of youth in education and con- servation activities concerning wildlife.
Code : 4 Wildlife Ranching and Re- search	Athi River	National-English- Research- X.	Research on indigenous game ranching as an alternative to cattle rearing for mainten- ance of the natural ecological balance.
<u>Country : Malawi</u>			
Code : 6,7 Christian Service Committee	P.O. Box 949 Blantyre Tel: 631033	National-English- Education/Religious- X.	Rehabilitation of urban slum dwellers, un- employed youth and refugees; integrated rural development for improved nutrition, health, sanitation, clean drinking water; tree planting & use of wind energy.
Code : 4,7 National Fauna Preservation Society of Malawi	P.O. Box 5135 Limbe Tel: Bvumbwe 271	National-English- Citizen Action Group/ Education/Research- "NYALA"	Integration of wildlife parks and game re- serves with agricultural land use; esta- blishment of Mwabvi national park; conser- vation education campaigns, especially among school children.
<u>Country : Mali</u>			
Code : 6 Africare	B.P. 1792 Bamako Tel: 64239	International-French, English- Operational Projects- X.	Water provision in rural Africa - well- building, irrigation projects for integra- ted rural development.
<u>Country : Mauritius</u>			
Code : 6 Mauritius Society for En- vironment and Conservation	c/o Young Far- mers Office, Youth House, Phoenix Tel: 64980	National-English,French- Education/Youth- X.	Discussions/demonstration on industrial pollution; rational use of chemical pesti- cides/fertilisers; anti-litter campaigns.
<u>Country : Namibia</u>			
Code : 2 Desert Ecological Research Unit	P.O. Box 953 Walvis Bay Tel: ZRR 226	National-English- Scientific/Research- 'Namib Bulletin'	Basic desert research : dune biology; ecophysiology of insects and reptiles; river ecosystem analysis.
<u>Country : Nigeria</u>			
Code : 1,4 Forestry Association of Nigeria	c/o Dept.of Forest Resour- ces Management, University of Ibadan	National-English- Professional/Influencing Policy/Provision of Information- Magazine.	Support of forest conservation and publi- cation of information on such.
Code : 3 International Institute of Tropical Agriculture	Oyo Rd.FMB 5320 Ibadan	International-English- Research- X.	Problem-oriented interdisciplinary re- search aimed at quantitatively and quali- tatively contributing to increased food production in developing countries.
Code : 6,7 Voluntary Workcamps Associa- tion of Nigeria	P.O. Box 2189 Lagos	National-English- Youth/Environmental Training- X.	Practical participation in self-help community and humanitarian projects (con- struction of roads, schools, hospitals, youth hostels).
<u>Country : Senegal</u>			
Code : 6,7 Environment Training Pro- gramme (Programme formation pour l'environnement) (ENDA)	B.P. 3370, Dakar Tel: 505-97 & 506-87	International-French, English-Scientific Research/Environmental Training- 'African Environment' (journal,French & Eng- lish) 'African Environ- ment : occasional pap- ers series'(French & English)	Organises training, seminars, workshops and provides consultative services and documentation in the area of environment and development.
Code : 3 Institute for Tropical Crop Research Senegal			(Contact : Association for the Advancement of Agriculture Sciences in Africa) P. O. Box 30087,Ethiopia.

DIRECTORY

REGION : AFRICA

Code Number(s) Name of NGO	Address and Telephone	Scope-Language(s)- Type of Activity- Periodical(s)	Activities
<u>Country : Sierra Leone</u>			
Code : 6,7 Planned Parenthood Association of Sierra Leone	P.O. Box 1094, Freetown Tel: 24488/ 22774/22235	National-English- Education/Technical Assistance/Training Quarterly Newsletter.	Participation in government's rural integrated maternal and childhealth programme, viz.: nutrition, hygiene, sanitation; family planning, generation of self-employment for peri-urban dwellers.
Code : 4 Sierra Leone Nature Conservation Association	P.M.B 376, Freetown	National-English- Education/Citizen Action Group- X.	Wildlife conservation.
<u>Country : Tanzania</u>			
Code : 3 Department of Soil Science	University of Dar es Salaam, Dar es Salaam	National-English, Swahili- Scientific Research- X	Research in intercropping for higher yields, including the use of isolates from local legumes.
Code : 5 East African Marine Fisheries Organisation	P.O. Box 668 Zanzibar Tel: 2702	Regional-English- Research- X.	Provision of information; assessment of marine resources and pollution.
<u>Country : Upper Volta</u>			
Code : 6 African Society for Research and Development (Société Africaine d'étude et de développement)	B.P. 593, Ouagadougou Tel: 330-52/53	Regional-French- Research/Consultancy- X.	Research into appropriate methods and techniques of improving agricultural production and enhancing rural development, providing training.
<u>Country : Zambia</u>			
Code : 1,4 Wildlife Conservation Society of Zambia	Box 255 Lusaka Tel: (01)72824	National-English 'Chongolo Magazine' 'Black Lechwe'.	Environmental education especially for school children; projects such as erection of game fencing, support for national parks improvements.

REGION : ASIA

Country : Bangladesh

Code : 7 Agricultural Development Agencies in Bangladesh	Box 5045, Dacca Tel: 313923	National-English, Bengali-Resources Clearinghouse/Publications- "ADAB Newsletter".	Publishes information on development activities including technical and scientific information for small-scale farmers on such subjects as appropriate technology, nutrition, growing food crops, rural mechanization.
---	-----------------------------------	---	--

Country : India

Code : 6 Across Uttarakhand on Foot	c/o Lecturer in History, D S B College, Nainital	Local-English,Hindi- Education/Recreation- X.	Appreciation of the rural environment; involvement of youth in the preservation of forests, soils and water resources.
Code : 7 Agricultural Tools Research Centre	Suruehi Vasahat Bardoli 394601 Tel: (95)394001	National-Gujarati,Hindi, English-Research/Tech- nical Assistance- 'Krishi Patsika'	Research and consultancy in use of agricultural hand tools as implements.
Code : 6,7 Agrarian Centre	2 Lal Bagh Rd Bangalore 560 027	Local-English- Education/Research- X.	Deployment of appropriate agro-techniques in soil management projects for small farming communities (embankments, contours); water sources management; agricultural educational camps, e.g. tree planting.
Code : 4 Assam Valley Wildlife Society	C/o J.G.Olliver, Pertabghur Tea Estate, Sootea Distr,Darrang 784175,Assam Tel:Charali 74	Regional-English,Hindi- Operational Projects- X.	Establish, develop and maintain nature/game reserves and national parks; protect and rehabilitate rare and threatened species, maintain sanctuaries.
Code : 1 Auroville	Aspiration- Auroville, Kittakuppam, 605104,India	Local-English,French- Rural development- "Auroville Review"	Agricultural activities including agro-forestry.
Code : 6,7 Bihar Association of Voluntary Agencies	Sadaquat Ashram, Patna,Bihar 800010,India Tel: 62235	Regional-English- Coordination of NGOs- X.	Coordinating efforts to improve methods of farming as well as rehabilitation and disaster relief work.
Code : 2 Central Arid Zone Research Institute	Jodhpur, Rajasthan Tel: 21934	National-English- Scientific/Research- X.	Desert resources evaluation & planning for optimum utilisation; research on desertification control.

DIRECTORY

REGION : ASIA

Code Number(s) Name of NGO	Address and Telephone	Scope-Language(s)- Type of Activity- Periodical(s)	Activities
<u>Country : India</u>			
Code : 3 Central Food Technological Research Institute.	Mysore 570013 Tel: 22666	International-English- Scientific/Research/ Technical Assistance/ Provision of Information- X.	Research on handling, transportation and storage of food materials. Development of non-toxic grain protectants.
Code : 2 Centre for Himalayan Re- sources Investigation and Survey	Old Post Office Bldg. Rishikesh, UP 249201	Regional-English,Hindi- Research/Education- X.	Research into the balance of the central Himalayan ecosystems; Conservation of soils, water and forest resources in central Himalayas.
Code : 2 Department of Geology	Kumaun Univer- sity, c/o Mainital Nainital	National-English- Academic- X.	Research project relating to hillside instability, silting of lakes.
Code : 2 Department of Zoology and Entomology	Gochar Maha- vidyalaya, Rampur Mani- haran, (Saha- anpur) U.P. Tel: 29 Saha- ranpur	National-English,Hindi- Research/Education- X.	Research on effect of industrial atmos- pheric and pesticidal pollution on fish and fisheries.
Code : 1 Gokhale Education Society's Agricultural Institute	P.O. Kosbad Hill, 401703	National-English- Education/Research- X.	Education of farmers on water conserva- tion, pasture utilization and afore- station.
Code : 1,2 Highlanders New Life Society	Village Silyara via Ghansali Tehri-Garhwal 249155 U.P.	Regional-Hindi, English- Operational Projects- X.	Rational exploitation and preservation of alpine forests, soil, and water-shed conservation; development for local people.
Code : 2 High Range Game Preservation Association	Nettigudi Es- tate,Munnar - Kerala,685612	Local-English- Provision of Inform- ation/Influencing Legislative Decisions/ Operational Projects- X.	Preservation of wildlife and their habi- tat; creation of game reserves and sanctuaries.
Code : 4,2 Himalayan Club	F. 10/12 Vasant Vihar, New Delhi 110057 Tel: 675948	International-English- Scientific/Sporting/ Recreational- X.	Encourage/assist Himalayan travel/ex- ploration and to extend knowledge of the Himalayas through science, art, litera- ture and sport.
Code : 1,2 Himalaya Seva Sangh	Rajghat New Delhi 110002	National-English,Hindi- Citizen Action Group/ Education- "Himalaya News Roundup"	Raising consciousness (via seminars) on on the development and preservation of alpine forests and reforestation; taking of action on these.
Code : 3 International Crop Research Institute for the Semi-arid Tropics (ICRISAT)	1-11-256 Bequ- mpet, Hyderabad 500016 Tel: (72091) 015-366	International-English- Research- X.	Improving genetic potential for grain yield and nutritional quality of crops in semi-arid tropics; improves cropping patterns and farming systems; training of scientists.
Code : 1 International Society for Tropical Ecology	Dept.of Botany Banares Hindu University Varanasi 221005	International-English- Research- X.	Promotion of tropical ecology through international forums
Code : 1,4 Millions of Trees Club	Sira Gate, Tumkur, Karnataka 572 101 Tel: Tumkur 8748	Local-English- Youth/Sporting/Educa- tion- X.	Preservation and propagation of trees via establishment of nurseries, tree-planting programmes in rural areas for firewood, enhancement of environment & for cultural values.
Code : 1,7 Mitraniketan	Velland, Nedu- mangad, Trivandrum, Kerala 695543 Tel: 45 Katta- kkada	Local-English, Malayalam- Technical Assistance/ Education- 'Mitraniketan News Bulletin'	Non-violent, positive, non-western appro- ach to integrated rural social-economic development, population control and land use practices.
Code : 4,6 National Institute of Ecology	Dept. of Botany University of Rajasthan, Jaipur 302004	National-English- Research/Education- Bulletin planned.	Organisation of, and participation in, forums for the study of ecology and environmental sciences; liaison between related discip- lines; consultancy to national government.

DIRECTORY

REGION : ASIA

Code Number(s) Name of NGO	Address and Telephone	Scope-Language(s) Type of Activity Periodical(s)	Activities
<u>Country : India</u>			
Code : 4 The Nilgiri Wild Life Association	Ootacamund, Tamil Nadu 643 001	Regional-English,Tamil- Education/Recreation- 'Newsletter'.	Preservation of : endangered species via improved wildlife management and control- led hunting; ecological balance via soil conservation and tree planting
Code : 1 North-East India Council for Social Science Research	B.T. Hostel, Shillong 793003 Meghalaya Tel: 4501	Regional-English- Research- 'Research Journal', 'Newsletter'.	Research into the social-economic aspects of tea plantations industry and shifting cultivation; occupational mobility in urban areas.
Code : 3 Punjab Agricultural Uni- versity	Dept.of Genetics Punjab Agric. University, Ludhiana 141004	National-English- Research- X.	Maintaining germplasm collection (both indigenous and exotic genotypes) of wheat, rice and maize. Collection and preserva- tion of the biotypes and races of patho- genic fungi particularly for rusts of wheat.
Code : 1,2 Society of Appeal for Vanishing Environments (SAVE)	'The Retreat" Bhimtal Dist. Nainital, U.P. 263136	Local-English,Hindi- Research/Citizen Action Group- X.	Research, operational conservation pro- jects and influencing policy for balanced man-environment development in the Himalayas; publications, rural environ- ment education campaign.
Code : 1 Van Shramik Sahakari Samiti	P.O. Manan District-Almora (Kumaon Hills)	Local-Hindi,English- Education/Trade Union- X.	Media oriented & educational campaign to effect change in forest management and exploitation policy.
Code : 1 Welfare Organisation for the Women of Lata Area	c/o Mr Govind Singh Rawat Post Joshimath Dist.Chamoli UP	Local-Hindi,English- Citizen Action Group- X.	Non-violent action group for the preser- vation of catchment areas against govern- ment intention to clear the forest
<u>Country : Indonesia</u>			
Code : 2 Centre for Natural Re- sources Management and En- vironmental Studies	Bogor Agric. University,Jalan Raya Pajajaran, Bogor Tel: Bogor 193 Extn. 65	Local-Indonesian, English- Scientific/Research- X.	Research on agro-ecosystem management; training in agricultural sciences; water quality studies in relation to land-use planning.
<u>Country : Israel</u>			
Code : 4,6 Life and Environment	3 Heftman St., Tel Aviv Tel: 03-267212	National-Nebrew, English- Coordination of NGOs- 'Itotiaetz', "Ma'ariv"	Coordinate environmental and ecological work of all Israeli NGOs; lobby elected government members.
<u>Country : Japan</u>			
Code : 4,5 Japan Centre for Human Environmental Problems	c/o Y.Nomura, Tokyo Metropoli- tan University, Yakumo,Meguro - ku, Tokyo 152 Tel: (03) 717- 0111 ext. 608	National-Japanese- Academic/Influencing Policy- "Environmental Law Journal' (in Japanese)	Develop environmental legislation and litigation; international cooperation.
Code : 5 Jishu-Koza Citizens Move- ment	Faculty of Eng- ineering,Dept.of Sanitary & Urban Engineering, University of Tokyo, 7-3-1 Hongo, Bunkyo ku, Tokyo Tel: 812-2111 ext. 7411	National-Japanese, English- Citizen Action Group/ Provision of informa- tion- 'Kogai' - newsletter 'Polluted Japan'	Drawing public attention to environmental deterioration through mass campaigns on such issues as health consequences of radiation and mercury.
<u>Country : Lebanon</u>			
Code : 6 Jarrah Scout Association in Lebanon	Tarik-El-Jadidah- Boustany Street Kobeisy Bldg., P.O.B. 3595 Beirut Tel: 309617	National-Arabic,English, French- Education/Youth- X.	Humanitarian relief projects; environmen- tal protection.
<u>Country : Malaysia</u>			
Code : 5 Consumers Association of Penang	21-C Codrington Ave, Penang	National-English, Chinese, Malay, Tamil- Education/Research/Pro- vision of information- 'Utusan Konsumer' (English)	Raising public consciousness and taking of action on environmental deterioration of all kinds.

DIRECTORY

REGION : ASIA

Code Number(s) Name of NGO	Address and Telephone	Scope-Language(s)- Type of Activity Periodical(s)	Activities
Code : 1,2,4 Environmental Protection Society Malaysia	P.O. Box 382 Jalan Sultan, Petaling Jaya Selangor Tel: 765779	National-English, Malay- Citizen Action Group- 'Alam Sekitar' (English)	Monitoring human impacts on the Malaysian environment and initiating measures for improvement.
Code : 5 Institute Masyarakat	1 Tingkat Mayang Pasir, Bandar Bayan Baru, Penang		For information from the organisation
Code : 2,4 Wallaceana Group	Dept.of Zoology University of Malaya, Kuala Lumpur	International-English- Information clearing house/publication- 'Wallaceana'.	Collection and dissemination of scienti- fic information on the ecology of the Asian Region.
<u>Country : Philippines</u>			
Code : 1 College of Forestry	Los Banos, Laguna	National-English Research / Agroforestry Newsletter 'Canopy'.	Forestry and agroforestry.
Code : 4,6,7 Institute for Small-Scale Industries	E.Virata Hall, UP Campus, Diliman, Quezon City Tel: 981034	National-English, Pilipino Education/Research- 'Small Industry Journal', 'ISSI Newsletter'.	Research, training and publication acti- vities to support development of small and medium scale industry personnel.
Code : 2, 5, 7 International Centre for Living Aquatic Resources Management (ICLARM)	MCC P.O.Box 1301, Makati, Metro Manila Tel: 86-3804, 88-2800 and 88-6398	International-English- Research/Publications/ Technical Assistance- 'ICLARM Newsletter'.	Aquaculture development and management projects in S.E. Asia; co-sponsored (Nov. 1978) Law of Sea Workshop on problems of conflict and management in the region; research on mangrove ecosystem resources management and conversion to other uses.
Code : 1,6 Philippine Association for Permanent Forests, Inc.	97-B. Dr. Lazcano Street, Quezon City, Diliman	National-English- Education/Forest Con- servation- X.	Coordination of research on silviculture, natural regeneration, afforestation; pro- gressive forestry management.
<u>Country : Sri Lanka</u>			
Code : 6,7 Lanka Jatika Sarvodaya Shramadana Sangamaya	Sarvodaya Cen- tral Office, 98 Damsak Man- divi, Rawatha- watta Road, Moratuwa	International-Sinhala, English- 'Sarvodaya Community Education Series'.	Self-help programmes for peasants to im- prove agriculture, nutrition, village organization and all other aspects of rural development.
Code : 6 Lanka Mahila Samiti	10 Olcott Mawatha, Colombo 1,	National-English, Sinhala-Education/ Training- 'Mahila'	Support economic and social development for village communities through the self- help and cooperative efforts of village women.
Code : 7 Marga Institute	P.O. Box 601 61, Isipathana Mawatha, Colombo - 5 Tel: 85186, 81514	International-Sinhala, English-Research/ Technical Aid/Opera- tional Projects- X.	Analytical studies and research programmes on socio-economic issues; operational pro- jects on small-scale rural enterprises.
Code : 6,7 Social and Economic Deve- lopment Centre	133 Kynsey Rd, Colombo 8, Tel: 91885	National-English, Sinhala,Tamil-Training/ Education.	Community development through action projects, training and assistance.
Code : 6, / Sri Lanka Girl Guides Association	10 Marcus Fernando Road, Colombo 7 Tel: 95720	National-Sinhala,English, Tamil-Educational/Youth- X.	Community development ; health, sanitation, nutrition, infant welfare, building roads and community centres.
Code : 1, 6 The Tree Society of Sri Lanka	378/6 Araliya Gardens, Nawa Rajaqiriya, Sri Lanka Tel: 074-2744	National-English, Sinhala, Tamil- Operational projects/ Influencing policy decisions- X.	Lobbying for preservation of indigenous forests; reforestation; landscaping.
Code : 1,4 Wildlife and Nature Protec- tion Society of Sri Lanka	Chaitya Road, Marine Drive, Colombo 1	National-English, Sinhala- Education/Recreation- 'Loris' (english) 'Warana' (Sinhalese language), Newsletter.	Conservation of natural flora and fauna and provision of facilities to enjoy the natural surroundings; alerting government and public to conservation needs; tree planting.
<u>Country : Taiwan</u>			
Code : 5 Institute of Oceanography	National Taiwan Univer- sity, Taipei Tel: 3510231	National-English, Chinese- Research- 'Acta Oceano- grapha Taiwanica'.	Research into marine ecosystems; monitor- ing marine pollution; publication.

DIRECTORY

REGION : ASIA

Code Number(s) Name of NGO	Address and Telephone	Scope-Language(s)- Type of Activity Periodical(s)	Activities
Code : 5, 6, 7 National Scientific Committee on Problems of Environment	Avademia, Sinica, Taipei Tel: 761-4170	National-English, Chinese- Research/Technical Assis- tance- X.	Study of effect of water pollution on living marine resources; environmental impact of nuclear power plant.
Country : Thailand			
Code : 6 Environment Conservation Club	Students' Union of Chula- longkorn Univ. Phyathai Road, Bankok 5 Tel: 252-7003	Local-English, Thai- Provision of Information/ Influencing policy- X.	Lobbying on petrochemical and nuclear power plant siting.

REGION : AUSTRALIA

Code : 1, 2, 4 Australian Conservation Foundation	672B Glenferrie Rd, Hawthorn Victoria 3122	National-English- Education /Operational Projects- 'Habitat Australia'.	Conservation of resources and encourag- ing public participation in decisions which affect use of resources.
Code : 2, 5 Australian Littoral Society	P.O. Box 82, St. Lucia Queensland 4067 Tel: (072) 78-6007	National-English- Scientific/Research/ Citizen Action Group/ Education- 'Operculum'	Research programmes and scientific advice on the conservation and rational use of aquatic life resources
Code : 5 Australian Marine Sciences Association	c/o Mrs. R.M. Allen, Trea- surer, 192 Ewos Parade Cronulla 2230 New South Wales	National-English- Scientific Research/ Information clearing house/Publication- X.	Research into management and conservation of estuarine resources.
Code : 2, 4, 5 Australian National Parks Council	P.O. Box 457 Canberra City 2601 Tel: (062) 486104 or 883763	National-English- Influencing policy/Oper- ational projects- X.	Instrumental in establishment of marine and terrestrial national parks; controls on fishing; pollution of wilderness areas.
Code : 2 Australian Society of <u>Limnology</u>	Dept. of Zoology Univ. of Adelaide Adelaide, S.A.	National-English- Professional/Research 'Newsletter'.	Research in fresh and brackish waters and related resources; liaison among academic, private and government limnologists.
Code : 5, 4 Australian Underwater Federation	24 Victoria St., New Lambton, New South Wales 2305 Tel: 049/574571	National-English- Research/Education/Re- creation- 'AUF News', 'Skindiving in Australia'.	Campaign for rational exploitation (bag limits on) endangered Australian fish species; establishment & improvement of aquatic habitats; protection against marine pollution.
Code : 6, 7 Bio-dynamic Agricultural Association of Australia	c/o P.O. Powelltown Victoria 3797 Tel: (03) 667220	National-English, German- Education/Research/Provi- sion of information- X.	Advice and extension services in organic farming as an alternative to use of chemical fertilizers and pesticides.
Code : 6, 7 Central Arnhem Land Informa- tion Communication Office	Camp Concern, c/o P.O. Humpty Doo, Via Darwin, N.T. 5791	National-English- Resources and informa- tion clearing house- X.	Fire ecology and fire management; uranium mining limitation, development and use of appropriate technologies.
Code : 1, 4, 6 Conservation Council of South Australia Inc.	G.P.O. Box 2403 Adelaide, S.A. Tel: (08) 2235155	Regional-English- Citizen Action Group/ Research- 'Newsletter'	Maintenance of quality of environment and preservation of integrity of ecosystems; promotion of research into all elements of environment and their ecological rela- tionships; investigations of threats to survival of any species or any natural communities; opposition to pollution or degradation of environment; education about the foregoing .



DIRECTORY

REGION : AUSTRALIA

Code Number(s) Name of NGO	Address and Telephone	Scope-Language(s)- Type of Activity- Periodical(s)	Activities
Code : 2 Environment Action Centre	118 Errol St., North Melbourne Victoria	National-English-Citizen Action Group- X.	Conservation of natural resources including conducting a campaign to have the Great Barrier Reef protected from oil drilling and establish a marine park including the whole area.
Code : 7 Freedom From Hunger Campaign	69 Clarence St., P.O. Box 3930 Sydney 2001	National-English- Campaigns/Resources and information clearing house- 'Bulletin'	Operates resources clearing house 'The Ideas Centre'
Code : 6 Gould League of New South Wales	Public School, Burton Street, Milson's Point, N.S.W. 2061 Tel:(02)927934	Local-English- Education/Research/Pro- vision of Information- 'The Gould Leaguer'.	Televised nature instruction; annual award (Cayley Memorial Scholarship) to promote wildlife management; collection and provision of information on birds.
Code : 2, 4 Newcastle Flora and Fauna Protection Society	P.O. Box 121 Wickham 2293 N.S.W. 2300 Tel:(049)25226	Local-English- Research/Provision of Information- 'Hunter Natural History'	Avifauna surveys; flora and fauna documentation; field studies; environmental impact policies.
Code : 1, 2, 6, 7 Total Environment Centre	18 Argyle St., Sydney N.S.W. 2000 Tel:02-27 4714	Local-English- Research/Provision of information/Technical aid- 'TEC Newsletter'.	Submissions to govt. enquiries; publications on uranium; solar energy consultancy; information clearing house.
Code : 6 Whole Earth Healing	13, Fairmont Rd. East Hawthorn Victoria 3123 Tel:03-82 2489	Local-English- Provision of Information- X.	Education for reduction of pollution and promoting natural growing of food without use of chemicals.
<u>Country : New Caledonia</u>			
Code 2, 4 New Caledonian Assoc. for Safeguarding of Nature (Association pour la sauvegarde de la nature néo calédonienne)	B.P. 1772 Noumea	National-French,English- CitizensAction Group- 'Nature Calédonienne'.	Establishment of several committees on nature conservancy; radio and t.v. programmes, advisers to government.
<u>Country : New Zealand</u>			
Code : 4, 6 Girl Guides Association of New Zealand (Inc)	217 Armagh St., Christchurch	National-English- Education/Youth- X.	Nature conservation and training.
Code : 1 Native Forests Action Council	P.O. Box 756 Nelson Tel: 31-922	National-English- Citizens Action Group- 'Beechleaves'.	Protection of forests from destructive commercial and energy activities; extension of national parks and protective legislation.
Code : 3, 4 New Zealand Deerstalkers Association	Box 6514, Wellington Tel: 727 706	National-English- Sporting/Recreation- 'New Zealand Wildlife'	Organisation and management of big game hunting; maintenance of high quality trophy herds of big game animals.
Code : 4, 5 New Zealand Marine Sciences Society	P.O. Box 19062 Wellington	National-English- Research/Education- 'New Zealand Marine Sciences Newsletter'.	Advancement of research and interest in the Marine Environment in New Zealand : reestablishment of marine reserves; protection of local pelagic fish species.
Code : 1 New Zealand Scenery Preser- vation Society, Inc.	P.O. Box 2051 Christchurch	National-English- Campaign/Education- X.	Media-oriented campaign for nature conservation, restoration of surroundings of public works.
Code : 4, 5 New Zealand Underwater Association	P.O. Box 875 Auckland Tel: 78-629	National-English- Research/Recreation- X.	A number of research projects, to study marine life in New Zealand.
Code : 1, 4 Royal Forest and Bird Pro- tection Society of New Zealand	P.O. Box 631 Wellington Tel: 726-254	National-English- Influencing Policy/ Research- 'Forest and Bird'.	Media-oriented campaigns to support preservation of nature forests; ornithological research.
<u>Country : Papua New Guinea</u>			
Code : 6, 7 South Pacific Appropriate Technology Foundation (SPATF)	P.O. Box 6937, Boroko Tel: 212499	Regional-English,Pidgin- Research/Technical Assis- tance/Training- X.	Encourage development of tools and techniques appropriate to the region: e.g. hydraulic ram pump, blacksmith's bellows, etc.
Code : 2, 6 Wau Ecology Institute	Box 77, Wau, Morobe, Tel: 44-6341	National-English,Pidgin- Education/Research- 'Newsletter'.	Education and research in tropical ecology & conservation. Provides environmental information on flora & fauna to the general public, and particularly to students of all levels, from schools & higher institutions.

DIRECTORY

REGION : EUROPE

Code Number(s) Name of NGO	Address and Telephone	Scope-Language(s)- Type of Activity- Periodical(s)	Activities
<u>Country : Austria</u>			
Code : 2, 4 Austrian Ornithological Society	c/o Naturhisto- risches Museum, Burgring 7, postf 417, A-7014 Vienna Tel:0222-2754	National-German- 'Egretta'.	Mapping of distribution of endangered species.
Code : 7, 6 Austrian Water Resources and Water Management Association	An der Huelben 4/6, A1010 Tel (0222)528494	National-German- Research/Training Osterreichische Wasser- wirtschaft', 'Wasser- wirtschaftliche Mitteilungen'	Training in water resources management, guidelines and legislation for waste-water and solid waste disposal.
Code : 6,7 European Association of Development Research and Training Institutes (Association européenne des instituts de recherche et de formation en matière de développement)	Kärntnerstrasse 25/6 Vienna A-1010 Tel:(222)521681	International-English, French-Professional/ Research- 'EADI Bulletin' (Eng- lish & French).	Dissemination of information on research on progress and innovations in training; main- tain rapport among trainers, researchers and institutions in Africa, Asia and Latin America.
Code : 1, 3, 5 International Union of For- estry Research Organisations (Union internationale des instituts de recherches forestiers)	IUFRO Secretariat A-1131 Vienna Tel:82-01-51	International-English, German, French- Research- 'IUFRO News'.	Coordination of research on forest environ- ments and silviculture; conservation tech- niques and forest products. Genetic re- sources-directory of geneticists and tree breeding.
<u>Country : Belgium</u>			
Code : 7 European Environment Bureau (Bureau européen de l'environnement)	31 Rue Vautier B-1040 Bruxelles Tel:02-6470199	International-French, English, German, Dutch- Provision of Informa- tion/Research- X.	Research and studies; information clearing house on environmental issues.
Code : 4 Tribal Life Fund	Avenue du Fort Jaco 80, 1180 Bruxelles Tel: 375 46 05	International-French- Operational Projects- 'Tribal'.	Assistance to indigenous peoples for main- tenance of their rights and protection of the land they live from.
Code : 7, 6 International Association for Rural Development (Association internationale de développement rural, Asociacion Internacional de Desarrollo Rural)	rue de Commerce 20 Bte 9, B1040 Bruxelles Tel: (02) 512.87.19/68, 512/87/92	International-French, English, Spanish- Operational Projects/ Technical Assistance- X.	Technical and financial support, training and operational rural projects in develop- ing countries.
Code : 7 Nonviolent Alternatives	Kerkstraat 150 B -2000 Antwerp	International-English- Networking- 'Peace Action News'.	International forum for groups working non-violently for peace.
<u>Country : Bulgaria</u>			
Code : 1, 3 Forest Research Institute	Guichet 15, Sofia - 1080	National-English, French, Russian, Ger- man-Research- X.	Establishment of hydrological and surveying index for the protection of forest eco- systems; terrain regulation; mountain ero- sion control; determination of forest-tree and shrub species resistant to industrial pollution.
<u>Country : Denmark</u>			
Code : 4,2 Danish Ornithological Society	Faelledvej 9, 2200 Copenhagen Tel:01-358663	National-Danish- Professional Society/ Research- 'Fugleaern', 'Feltor- nithologen'.	Protection of wetland birds; register of bird sites & localities; research on bird populations; atlas of Danish breeding birds; research on greenlandic sea eagle.
Code : 2, 6, 7 International Youth Fed. for Environmental Studies and Conservation	Klostermøllevej 46, DK-8660 Skanderborg Tel:05/782044	International-English- Campaign/Youth/Train- ing/Education- 'Taraxacum'.	Freshwater ecosystems, marine and coastal ecosystems; wildlife; protected areas; forest ecosystems; environmental training.
<u>Country : Finland</u>			
Code : 7 Building Information Institute	Lönnrotinkatu 20 B, 00120 Helsinki 12 Tel:90-645615	National-Finnish, Swedish,English- Information Clearing- house/Research Foundation- X.	Research, information service, standardisa- tion and publications on building industry.
Code : 2 Department of Biology	University of Jyväskylä, Jyväskylä SF40100 Tel:941-292446	National-Finnish- Academic/Research/ Education- X.	Teaching and research on ecology, nature man- agement, hydrobiology, cell biology and bio- chemistry.

DIRECTORY

REGION : EUROPE

Code Number(s) Name of NGO	Address and Telephone	Scope-Language(s) Type of Activity Periodical(s)	Activities
Code : 1 International Union of Soci- eties of Foresters (Union internationale des sociétés d'ingénieurs forestiers, Unión Internacional de So- ciedades de Profesionales Forestales)	Akavatalo, Rautatie-läise- nkatu 6, 00520 Helsinki 52, Tel:90-1502357	International-English, French, Spanish- Professional/Informa- tion Clearinghouse- X.	Forum for professional training for foresters.
Code : 1 International Union of Soci- eties of Foresters	Akavatalo , Rautatie-läisen- katu 6, Helsinki 00520 Tel:90-1502357	National-Finnish, Swedish, English- Professional- 'Metsänhoitaja', 'Suomen Metsänhoitajat'.	Forest policy and planning, silviculture.
<u>Country : France</u>			
Code : 2 Association for Information and Liaison on the Environ- ment (Association d'informa- tion et de liaison pour l'environnement)	89 rue Monceau 75008 Paris Tel: 387 32 62	National-French- 'P.i.a.f. environne- ment'.	Collect and disseminate information con- cerning : protection of the environment; the quality of life; management of natural reserves and energy.
Code : 7 Centre for Exchanges and the Promotion of Craftsmen in Zones to be Equipped (Centre d'échanges et promo- tion des artisans en zones à équiper) (CEPAZE)	2 rue d'Hauteville, 75010 Paris Tel: 16/1/824. 42.20 and /246.16.80	International-French- Technical Assistance- X.	Technical aid, advice and answer to en- quiries to assist artisans find solutions to problems.
Code : 6, 7 Centre for Training and Documentation on the Indus- trial Environment (Centre de formation et de documentation sur l'environnement indus- triel).	11 bis, rue Leon, Jouhaux, 75010 Paris Tel: 607.66.23	National-French, English- Dissemination of Information/Informa- clearinghouse- 'Courrier du Droit de l'environnement'.	Studies, documentation and short training courses on industrial pollution including noise abatement, anti-fire and explosion safety measures, waste recycling.
Code 24, Committee for the Protection of Natural Sites (Comité pour la défense des sites nature- les (COSINA)	33 Allée Leon Gambetta, 13009 Marseille	Regional-French- Citizen Action Group- X.	Protection of natural environs of Marseille; opposition to certain infrastructural and urbanization projects likely to damage natural sites; reforestation.
Code : 5 European Centre for Studies on Problems of the Marine Environment (Centre d'études européen pour les problèmes de l'environnement marin)	141 Boulevard Saint Germain, 75006 Paris Tel:01-6241076	International-French, English- Research/Influencing Policy/Operational Pro- jects/Provision of Information- X.	Combating of marine pollution; rational management and exploitation of marine re- sources; law of the sea and political-social implications for further utilisation of the marine environment.
Code : 2 French Water Protection Asso- ciation (Association française pour la protection des eaux)	195 rue St. Jacques 75005 Paris Tel:326 7053	National-French- Research/provision of information- 'Eau Pure'.	Water resources and water pollution study.
Code : 7 Group for Research and Ex- change of Technology (Groupe de recherches et d'échanges technologiques)	34, Rue Dumont d'Urville 75116 Paris Tel:260.36.80 p. 305	National-French, English, Spanish- Technical Assistance/ Provision of Informa- tion- 'Le Fichier Encyclope- dique du Développement'	Forum on alternative technology; collects and develops manual and other information on appropriate technology.
Code : 7 International Federation of Agricultural Producers (Féd- ération internationale des producteurs agricoles)	1 rue d'Hauteville 75010 Paris Tel:16.824.40. 35	International-English, French-Education/ Consultancy- 'World Agriculture', In- formation and Liaison Bulletin', 'IFAP News', 'Farming for Development'	Advice and information services on agri- cultural practices and environmental manage- ment.
Code : 4 International Foundation for the Conservation of Game (Fondation internationale pour la sauvegarde du gibier)	15, rue de Teheran, 75008 Paris Tel:292.20.76	International-French, English-Research/ Operational Projects- 'Bulletin'.	Identification of wild animals which are overhunted or whose habitat is destroyed. Research and financial support for the conservation of game animals.
Code : 4 Office for Eco-Entomological Information (Office pour l'information entomologique)	B.P. 121, 78003 Versailles Cedex Tel: 950.13.43	National-French, English- Research/Education- X.	Study of insects in their natural sur- roundings; protection of endangered insect species wetland; and dissemination of information.

DIRECTORY

REGION : EUROPE

Code Number(s) Name of NGO	Address and Telephone	Scope-Language(s)- Type of Activity Periodical(s)	Activities
Code : 2, 4, 5, 7 Paul-Emile Victor Group for the Defence of Man and His Environment (Groupe Paul- Emile Victor pour la défense de l'homme et de son envi- ronnement)	29, rue du Mont-Valerien 92210 Saint- Cloud Tel:602.96.57/ 602.9658	National-French, Eng- lish, Ferman, Spanish- Provision of Informa- tion- 'Pronatura'.	Protection and rehabilitation of indigen- ous plants and endangered species (seals, tortoises) in their natural habitat; research in oceanography, marine ecology and pollution.
Code : 5 Project Jonah	15 rue de Commerce 75015 Paris Tel:288-78-38	National-French, Eng- lish-Scientific/Media oriented campaign- 'Le Courier de la Baleine'.	Educational campaign for protection of cateceans; boycott of whale products.
Code : 4, 6 Regional Union for the Pro- tection of Life, Nature and the Environment (Union re- gionale pour le sauvegarde de la vie, de la nature et de l'environnement) Code : 1,2,3,4,5 Scientific Committee on Prob- lems of the Environment (SCOPE) (A Committee of ICSU, France) (Comité scientifique sur les problèmes de l'envi- ronnement)	Mouline des Serres, 83490 Le Muy  51, bd du Montmorency, 75016 Paris Tel:525 04 98	Regional-French- Education/Youth/Scientific 'La Côte D'Azur Assas- inée', 'SOS Vie Nature'.	Advice, guidance, coordination of activi- ties and sharing of resources among or- ganisations concerned with the preserva- tion of the environment and the quality of life.
<u>Country : Germany, Federal Republic</u>			
Code : 7 German Development Assist- ance Association for Social Housing	Bismarckstr 7 Cologne D-500 Tel:0221/523181	International-German, Spanish, French- Consultancy/Technical Assistance- 'DESWOS Brief'.	Offers expertise and consultancy in low cost housing for developing countries.
Code : 2 German Water Protection Union	Bennauer Str 60 Bonn D-5300 Tel:02221- 219297	National-German- Influencing Policy/ Campaigns/Provision of Information- X.	Participation in the European charter for Protection of Water; campaign for wetlands; sewage purification; standards for water protection.
Code : 7 Institute for Building in the Tropics	Waldschmiedstr 6A Starnberg 8130 Tel:08151/6687	International-German, English, Spanish- Research/Technical Assistance- X.	Research, collection and exchange of data and technical aid for all aspects of planning and building in the tropics.
Code : 7 Institute on Housing and Environment	Annastrasse 15 Darmstadt D 6100 Tel:06151-26911	National-German, Eng- lish, French-Research/ Consultancy- X.	Consultancy on housing for the disadvan- taged; research findings and publications for government officials, parliamentarians and citizen groups.
Code : 4, 7 International Council of Environmental Law (Conseil international du droit de l'environnement)	Adenauerallee 214 5300 Bonn Tel:02221-226678	International-English, French-Clearinghouse- 'Environmental Policy and Law'.	Compilation of environmental law materials, exchange of information, promotion of con- tacts.
Code : 4, 5 Society for the Protection of Marine Mammals	Adolfshausen 2, 3041 Hutzel Tel:05194/7715	International-German, English-Campaigns/ Information clearing- house- 'Tierwelt'.	Public education for preservation of marine mammals : boycott of whale products; national parks for endangered species.
<u>Country : Greece</u>			
Code : 4, 6 Athens Friends of the Trees Society	22 Anagnostop- culo Street, Athens 136 Tel:613-404- 0030-21	National-English- Citizen Action Group- 'Nature and Life'.	Protection of the cultural and natural heritage of Greece : reforestation; preservation of monuments.
<u>Country : Italy</u>			
Code : 4 International Anti-Hunting Committee (Comité interna- tional antichasse)	Corso De Gasperi 34, Torino 10129 Tel: 500894	International-Italian, English, French- Information provision/ Campaign- 'Animalie Civiltà'.	Campaigns against wanton killing of wild animals and trapping of migratory birds; establishment of sanctuaries.
Code : 3 International Federation of Beekeepers' Association (Fédération internationale des associations d'apiculture Federación Internacional de Asociaciones de Apicultura)	Corso Vittorio Emanuele 101, Rome 00136 Tel: 56241/ 657175	International-French, English, German, Russian, Spanish- Provision of Informa- tion- 'APIACTA'.	Scientific, technical and economic devel- opment of apiculture; its relationship to farm and food production and the total environment; bee selection genetics and reproduction.

DIRECTORY

REGION : EUROPE

Code Number(s) Name of NGO	Address and Telephone	Scope-Language(s) Type of Activity Periodical(s)	Activities
Code : 6, 7 Town and Country Planning Engineering Institute	Politecnico - Piazza Leonardo da Vinci 32 Milano 20133	Local-Italian- Education/Research/ Technical Assistance- X.	Research and teaching at graduate and post graduate levels on Urban and Regional development, and planning strategies; eco- development.
<u>Country : Malta</u>			
Code : 5, 6 International Ocean Insti- tute (Institut international de l'océan)	University of Malta, Masida Tel:36451 ext. 294	International-English, Research/Academic- 'Pacem in Maribus' Series.	Interdisciplinary research on: the regula- tion of the use of ocean resources; pollu- tion of the Mediterranean Sea and the Caribbean waters; law of the sea; train- ing of experts. Annual conventions in the 'Pacem in Maribus' Series.
<u>Country : Monaco</u>			
Code : 5 European Oceanic Association (Association européenne océanique) (EUROCEAN)	Villa Richard Rue de l'Abbage Monaco-ville Tel:93-304015 312154	International-French, English- Research- 'Eurocean Report'.	Development of ocean related projects on energy; effect of industrial wastes on the marine environment; minerals and metals.
<u>Country : Netherlands</u>			
Code : 5 CONCAWE	Van Hogenhouc- klaan 60, The Hague 2596	International-English- Research/Publication-	This is the oil companies' international study group for conservation of clean air and water. Carry out research, produce publications and films for information.
Code : 3 European Association for Research on Plant Breeding (EUCARPIA)	P.O. Box 128, Wageningen Tel:3370-19112	International-English, French, German- Scientific/Research- 'Eucarpia'.	Coordinates the work of the European Gene Banks; stimulates the evaluation of the available plant genetic material and the use of a standardized documentation system.
Code : 4, 7 Foundation for Nature Conser- vation and Protection of the Environment	Schaep en Burgh Noordereinde 60 's-Graveland 1323 Tel:02150-62004	National-Dutch, English, French, German- Citizen Action Group/ Education- 'Natuur en Milieuzorg'.	To influence both individual and govern- mental behaviour in the direction of the more environmental awareness and concerns about air pollution, atmosphere, climate, energy, food, agriculture, etc. Wildlife and technical assistance/training.
Code : 7 International Council for Building Research Studies and Documentation (CIB) (Conseil international du bâtiment pour la recherche, l'étude et la documentation)	P.O. Box 20704 3001 JA Rotterdam Tel:(01)11.61.81	International-French, English- Research/Professional- 'Building Research & Practice'.	Research and study projects by specialists from member institutes.
Code : 7 International Federation of Settlements and Neighbour- hood Centres (Fédération in- ternationale des centres so- ciaux et communautaires, Fed- eración Internacional de Centros Sociales)	P.O. Box 14029 Utrecht Tel:030-319648	International-English, French, Spanish- Consultancy/Technical Aid- 'IFS Newsletter'.	Clearinghouse for information on consumer affairs.
Code : 6 International Union of Local Authorities (Union interna- tionale des villes et pouv- oirs locaux, Unión Interna- cional de Gobiernos Locales)	45 Wassenaarse- weg, 2596 CG The Hague Tel:070-244032	International-English, French- Professional Training- 'Planning and Adminis- tration', 'IULA News- letter'.	Training courses for officers from deve- loping countries; publications and con- ferences on environmental concerns of cities.
Code : 6 Royal Dutch Touring Club	Wassenaarseweg 220 's-Gravenhage 2200 Tel:(070) 264426	National-Dutch, English, French, German- Recreation- X.	Supports the preservation of the rural environment; assists members to learn skills related to outdoor recreation ac- tivities.
Code : 6, 7 Small Earth	P.O. Box 151, Boxtel-4150 Tel:04116-4652	National-Dutch- Education/Training- "De Kleine Aarde".	Organic farming, energy-conservation ex- periments with alternatives sources of energy, courses on these subjects for young people. Courses on cooking with vegetable protein sources.
<u>Country : Norway</u>			
Code : 2, 5 Biological Station	Blomsterdalen N 5065	National-Norwegian- Research- X.	Post-graduate teaching and research on the ecology of Norwegian fjords in natural and polluted condition; effect of pollution on benthic fauna; impact of hydroelectric scheme on two fjords.

DIRECTORY

REGION : EUROPE

Code Number(s) Name of NGO	Address and Telephone	Scope-Language(s) Type of Activity Periodical(s)	Activities
Code : 2, 4 Norwegian Society for Conservation of Nature	Stenersgt 16 Oslo 1, Tel:02-337932	National-Norwegian, English, German- Influencing Policy/ Education- 'Nosrk Natur'.	Protection of lakes and rivers from pollution and over-exploitation for hydroelectricity; establish national parks and protect wild life.
<u>Country : Poland</u>			
Code : 3-6 Committee for Management and Protection of Human Environment of the Socialist Union of Polish Students	Ordynacka 9, Warsaw 00364 Tel:022-264058	National-Polish, English, Russian, French- Committee's bulletin', of information.	Coordination and consulting in all environmental subjects.
Code : 1, 5 Polish Forest Society	Wery Kostrzewy 3 Warsaw PL 02-362	National-Polish, English, Russian, German- Professional- 'Sylvan'.	Conferences on nature protection and role of forests in the environment; legislation on nature protection and organisation of national parks.
Code : 3 Polish Society of Microbiology	Warszawa 360L Chocimska 24 00-791 Tel: 45-37-56	Polish, English- Research- X.	Research on biodegradation of pesticides in the soil and water; interaction of micro-organisms and pesticides; transformation of sewage and sludge for farm use; pollution of soil and water from smelter industry; food preservation.
Code : 5 Sea Fisheries Institute	Al. zjednoczenia 1, Gdynia 81-345 Tel: 21-70-21	National-Polish- Research/Publications- X.	Fisheries research on: the biocenotic effects of eutrophication of the Baltic Sea; and estimation of resources and production of living stocks.
Code : 2, 7 Team of Forest Botany and Nature Conservation	Instituteon of Silviculture, Academy of Agriculture, Al 29 Listopada 48, P.O. Box 26, 31-425 Cracow	National-Polish, English-Research/ Technical Assistance- 'Drzewa i krzewy w strefac ochronnych'	Training on nature conservation problems at University level; technical assistance to government; scientific research on mountain and other ecosystems.
<u>Country : Spain</u>			
Code : 4, 6 Association for the Ecological Defence of Galicia (Asociación para la Defensa Ecológica de Galicia)	Gelmirez 15-2do Santiago de Compostela Tel:981-235135	Regional-Spanish, Galician- Campaign- X.	Protection of Galician environment and the correct utilisation of its natural resources. Carrying out the studies related to these themes.
Code : 4, 5, 6 Naturalist Association of South-East Spain (Asociación de Naturalistas del Sureste)	Tirso de Molina 1-4 A Cartagena Murcia Tel:968-506167	Local-Spanish- Education/Youth- 'ANSE'.	Studies of seals, turtles, aquatic birds, birds of prey; protection of threatened species; conservation of wetlands; educational campaigns.
Code : 1 Pyrenean Center of Experimental Biology (Centro Pirineáico de Biología Experimental)	Apartado 64, Jaca Provincia de Heusca Tel:974-36144	National-Spanish- Research X.	Research on the ecosystems and resources of the Pyrenees in collaboration with other groups.
Code : 4 Superior Council of the Colleges of Architecture of Spain (Consejo Superior de los Colegios de Arquitectos de España)	Paseo de la Castellana, 12 - 40 Dcha. Madrid 1 Tel: 225 3980	National-Spanish, French, English, Portuguese Professional/Technical assistance X.	Influencing legislative decisions and providing information on matters related to architecture and urban living. Promotes legislation oriented to the preservation of natural areas.
<u>Country ; Sweden</u>			
Code : 2, 4 River Conservation Co-operative Organisation	Box 111 06 S-100 61 Stockholm	National-Swedish- Citizen Action Group 'Varfor bevara vara älvar', "Alvraddaren".	Community participation in the prevention of excessive water-power exploitation in Sweden.
Code : Royal Swedish Academy of Sciences	Fack., S-104 05 Stockholm Tel:08-150430	National-Swedish, English- Scientific/Research/ Publications- 'Ambio'.	Research and publication on scientific topics related to the environment.
Code : 1, 2, 4 Swedish Forestry Association	Box 273 S-182 52 Djursholm Tel:08-7530390	National-Swedish- Professional- 'Skogen', 'Sv. Skogs- vardsförbunds Tidskrift'	Promotion of forest exploitation in relation to limits placed by ecological requirements.
Code : 5, 4 Swedish Society for the Conservation of Nature	Kungsholms Strand 125, 112 34 Sthlm Tel:08-541470	National-Swedish, English-Consultancy/ Education/Campaigns- 'Sveriges Natur".	Maintains active publication programme on state of Swedish environment; consultancy to government on environmental matters; active youth programme.

DIRECTORY

REGION : EUROPE

Code Number(s) Name of NGO	Address and Telephone	Scope-Language(s)- Type of Activity Periodical(s)	Activities
Code : 3 Weibullsholm Plant-Breeding Institute	Cytogenetic Labo- ratory, Box 520, S-261 24 Landskrona Tel:0418/780 00	National- Swedish, English-Scientific Research/Publication/ Information Clearing- house- X.	Maintenance of genebank of peas (pisum); fur- therance and dissemination of genetic know- ledge in <u>Pisum</u> .
<u>Country : Switzerland</u>			
Code : 2 Association Against Pollu- tion, (Association contre la pollution) (ARCADIE)	CP 103, 1211 Genève 20 (CICG)	National-French, Eng- lish-Campaigns- 'Feuille d'information'	Campaign against all forms of pollution and against wasteful exploitation of land-based resources.
Code : 2, 5 Foundation for the Study and the Preservation of Seas and Lakes (Fondation pour l'étude et la protection de la mer et des lacs)	Place d'Armes 18 1096 Cully, Tel: (021) 99 25 65	International-French, English-Scientific/ Research- X.	Underwater research; environmental protec- tion; monitoring long-term effects of marine pollution on ecosystems.
Code : 7 International Electrotechni- cal Commission (Commission électrotechnique interna- tionale)	3, rue de Varembé 1211 Genève 20 Tel: (022) 34 01 50	International-French, English- Technical Assistance- 'Bulletin de la CEI'.	Development and propagation of easily re- producible test methods for electrical con- sumer goods; standardisation of electrical equipment; information provision on ratio- nal use of electric power.
Code : 1, 2, 3, 4, 5 International Union for the Conservation of Nature and Natural Resources (Union internationale pour la con- servation de la nature et de ses ressources, Union Inter- nacional para la Conservación de la Naturaleza y sus Recursos)	1196 Gland Tel: (021) 71 44 01	International- English, French and Spanish-Scientific/ Influencing policy/ Provision of inform- ation- 'IUCN Bulletin'.	Monitors state of world's living and re- newable resources; develops conservation strategy via ecological guidelines; stimulates actions and operational projects for use and conservation of natural resources.
Code : 2 International Youth and Stu- dent Movement for the United Nations (Mouvement interna- tional des jeunes et des étudiants pour les nations unies, Movimiento Interna- cional de Jovenes y Estudi- antes sobre Asuntos de las Naciones Unidas)	5 Chemin des Iris, 1216 Cointrin, Geneva Tel: (022) 33 17 56	International-English, French, Spanish- Education/Training/ Information provision- 'ISMUN Newsletter'.	Fostering peace and disarmament; workshops, meetings, conferences.
Code : 7 League of Red Cross Societies (Ligue des sociétés de la Croix-Rouge, Liga de Sociedades de la Cruz Roja)	17 Chemin de Crets, Petit Saconnex, 1211 Geneva 19 Tel:022-345580	International-English, French, Spanish- Technical Assistance/ Operational projects/ Fund Raising- 'Panorama' Newsletter.	Training seminars for personnel, equipment and funds for national red cross societies; guidelines, teaching materials and exper- tise.
Code : 2 Swiss Foundation for Alpine Research	Binz str. 17, Zurich 8045	National-German, Eng- lish, French- Research/Publications.	Research and field exploration, and the publication of information.
Code : 4 World Federation for the Protection of Animals (Féd- ération mondiale pour la protection des animaux, Feder- ación Mundial Protectora de Animales)	Drekonistrasse 37, Zurich 8002 Tel: 01-362448	International-English, German, French- Education/Campaign- 'Animalia'; "Spotlight".	Protection of animals and advocacy of their humane treatment.
Code : 6, 7 World Scout Bureau (Bureau Mondial du Scoutisme)	c.p. 78, 1211 Geneva 4 Tel:022-204233	International-English, French-Education/Youth/ Technical Assistance/ Training- "Action" bulletin.	Conservation show-and-do projects; seminars; information and publication, training of youth in wide range of environmentally re- lated skills.
Code : 4,5,7 World Wildlife Fund (Inter- national)' (Fond mondial pour la nature, Fondo Mundial para la Naturaleza) (WWF)	1110 Morges Tel: (021) 71 96 11	International-English, French-Education/Fund- raising/Influencing policy- 'World Wildlife News'.	In close liaison with IUCN, spearheads fund raising activities for flora and fauna conservation projects all over the world; publicity/educational campaigns and tech- nical assistance for nature conservation.
Code : 4 World Wildlife Fund - Swiss National Appeal (Fondation WWF Suisse pour l'environne- ment naturel)	Postfach, 8037 Zurich Tel:01-36 00 45	National-German, French, English-Education/ Operational Projects/ Publications- "Panda nouvelles".	Natural resources conservation and protec- tion of endangered species; surveys and applied research on wildlife management; publishes educational material.

DIRECTORY

REGION : EUROPE

Code Number(s) Name of NGO	Address and Telephone	Scope-Language(s) Type of Activity Periodical(s)	Activities
<u>Country : Turkey</u>			
Code : 2-4 World Wildlife Fund	Cağla K.Sarıco- ban WWF-Turkey, Büyükdere Cad. 161/Levent Istanbul Tel: 642350x247	National-Turkish, French, English- Education/Operational projects- X.	Conservation of nature in all its forms - flora, fauna, soil, water.
<u>Country : United Kingdom</u>			
Code : 7 AHAS Housing and Advisory Services	5 Dryden Street London WC2 9NW England Tel: 01-240 2430	National-English- Consultancy/Technical Assistance- X.	Technical assistance to groups engaged in community housing and work improvement pro- jects.
Code : 7 Alternative Technology In- formation Group	Friends of the Earth, 9 Poland Street London W1V 3DG England	International-English Resources/Information Clearinghouse- 'ATIG Newsletter'.	Improving the standard and use of library literature on alternative technology.
Code : 2 British Ecological Society	Harvest House, 62 London Road, Reading, Berk- shire RG1 5AS England Tel: 0734- 86 1345	International-English- Professional/Scientific- 'The Journal of Ecology', 'The Journal of Animal Ecology', 'The Journal of Applied Ecology', 'The Bulletin of the British Ecological Society'.	Publication of research and annual symposia on ecological topics; education and teaching.
Code : 4 British Trust For Conserva- tion Volunteers	10-14 Duke St., Reading, Berkshire RG1 4RU England Tel: 596171	Regional- English- Citizen Action Group/ Youth/Education- 'The Conserver' News- letter.	Mobilise voluntary participation in short and long term practical environment con- servation and improvement programmes.
Code : 4 British Trust for Ornitho- logy	Beech Grove, Tring, Hertfor- shire, HP23 5NR England Tel: 044- 282 3461	Regional-English- Research- 'Bird Study' journal 'B.T.O. newsletter	Documentation, surveys and provision of statistical data for ornithological conser- vation; establishment, preservation and study of ornithological sites and habitats; use of fluctuations in bird population levels as environment bioprobes.
Code : 6, 7 Centre for Alternative In- dustrial & Technological Systems	NELP, Longbridge Road, Dagenham, Essex RM8 2AS England Tel: 01 597 4630	National-English- Research/Trade Union- X.	Initially further research into an alter- native plan for employment; subsequently research into industrial conversion, esp. arms conversion; aid to workers' efforts to make socially useful goods instead of arms.
Code : 6 Committee for Environmental Conservation, CoEnCo	29/31 Greville Street, London ECLN 8AX England	National-English- Provision of infor- mation/Influencing policy/Education- X.	Coordination of diverse NGO activities on major environmental issues, local and national; publications; consultancy to industry.
Code : 7 Dartington Amenity Research Trust	Shinners Bridge Dartington, Totnes, Devon, UK Tel: 0803-862271	National-English- Research/Consultancy- X.	Research and advisory work in conservation of natural resources; agricultural change tourism and recreation.
Code : 3, 6 Department of Plant Biology	University of Birmingham, P.O. Box 363, Birmingham England B15 2TT Tel: 021-4721301	International-English- Academic/Research/ Training- X.	International training course in conserva- tion and utilisation of plant genetic re- sources; documentation and information management; plant pathology; agricultural systems.
Code : 5 ECOLOOS	c/o IIED, 10 Percy St., London W1P 0DR England	International-English- Coordinating of NGOs/ Influencing Policy Decisions X.	An informal coalition of environmental NGOs having an interest in the law of the sea.
Code : 7 Environmental Information Service	North Lodge Elswick Road Cemetery, Newcastle-upon- Tyne NE4 8DL England Tel: (0632) 730074	Local-English- Resources/Information Clearinghouse/Techni- cal Assistance- 'Egis Magazine'.	Providing information packs, prepare envi- ronment exhibitions for use by others; slide shows.
Code : 6 Field Studies Council	Preston Montford Montford Bridge Shrewsbury, SALOP, SY4 1HW England Tel: 074371-674	National-English- Education/Training- 'Field Studies Journal', 'Newsletter'.	Short residential field courses at all levels including plant and animal ecology, environmental studies.



DIRECTORY

REGION : UNITED KINGDOM

Code Number(s) Name of NGO	Address and Telephone	Scope-Language(s) Type of Activity Periodical(s)	Activities
Code : 2 Freshwater Biological Association	The Ferry House, Ambleside, Cambria LA220LP England Tel:096-62 2468/9	National-English- Research/Provision of Information- X.	In-depth studies of natural freshwater ecosystems; publications.
Code : 4, 5 Friends of the Earth Ltd	9 Poland St., London W1V 3DG England Tel: 01-434 1684	National-English- Citizen Action Group- 'Newsletter'.	Preservation, restoration and rational use of the ecosphere, opposition to nuclear power, development of non-nuclear energy strategy for U.K. Ending of commercial whaling.
Code : 7 Institution of Environmen- tal Sciences	14 Princes Gate Hyde Park, London SW7 1PU Tel:01 402 1009	International-English Research- X.	Surveys and free advisory service on en- vironmental matters.
Code : 5 International Chamber of Shipping	30/32 St Mary Ave London EC3A 8ET England Tel:01-283-2922	International-English- Risk Reduction/Publi- cations. X.	Standardisation for cargo vessels and equipment; marine transport safety and monitoring pollution; technical publica- tions.
Code : 4, 5 International Council for Bird Preservation (Conseil international pour la présér- vation des oiseaux, Consejo Internacional para la Pro- tección de las Aves)	c/o British Museum, Natural History, Cromwell Rd., London SW7 England Tel:01-589-6323	International-English, French, German- Influencing Policy/ Information Provision- 'The President's Letter', 'Birds International'.	Stimulation of interest in more adequate protection of wild bird life.
Code : 4, 5 International Institute for Environment & Development (Institut international des problèmes pour l'environne- ment et le développement, Instituto Internacional para el Medio Ambiente y Desarrollo) (IIED)	10 Percy Street London W1P 0DR England Tel:01-585 5756/7	International-English, French, Spanish- Research/Influencing Policy Decisions- 'Earthscan bulletin'.	Through research, explore the complex re- lationships between the environment and development with a particular emphasis on Western policy as it affects developing countries. Major areas of research and publication include human settlements, marine environment, energy, water, inner city areas. Earthscan - an environmental information unit, provides a feature service for newspapers on environmental problems.
Code : 6, 7 International Planned Parenthood Federation (Féd- ération internationale du planning familial, Federa- ción Internacional de Plani- ficación de la Familia), (IPPF)	18-20 Lower Regent Street, London SW1Y 4PW England	English-Education/ Training/Information Provision/Research- 'People', 'IPPF News' 'Medical Bulletin', 'Research in Repro- duction', 'Library Bulletin'.	Encouraging family planning and responsi- ble parenthood in the interest of family welfare.
Code : 4, 7 International Society for the Protection of Animals (Société internationale pour la protection des ani- maux)	106 Jermyn St., London SW1Y 6EE England	International-English- Coordination of NGOs/ Influencing Policy decisions 'ISPA News'.	Promotes the protection of animals and provides information to support this.
Code : 4, 7 Irish Society for the Pre- vention of Cruelty to Animals	1 Grand Canal Quay, Dublin 2, Republic of Ireland, Tel:01/775922	National-English- Citizen Action Group/ Technical Assistance- X.	Public education and advice on the care of animals; promotion of related legis- lation.
Code : 5 Marine Biological Associa- tion of the United Kingdom	The Laboratory, Citadel Hill, Plymouth, Devon PL1 2PB England Tel:0752-21761	International-English- Research- X.	Research in marine biology, oceanography, fisheries.
Code : 4, 7 Royal Society for the Pro- tection of Birds (RSPB)	The Lodge, Sandy, Bedfordshire SG19 6L9 2DL, England Tel:Sandy 80551(0767)	National-English- Research/Influencing Legislative decision- 'Birdlife'.	Research on changing bird reserve manage- ment requirements; watchdog for environ- mental threats to bird populations; pro- motes legislation for and public educa- tion on bird protection.
Code : 3 School of Biological Sciences	University Park Nottingham NG7 2RD England Tel:0602-56101	National-English- Research/Education X.	Genetic manipulation of plants to create new genetic variability, then have devel- oped a new method of crossing plants (by fusion of plant protoplasm) called somatic hybridization: also developing other methods of plant genetic manipula- tion utilizing Agrobacterium plasmids to facilitate gene transfer.

DIRECTORY

REGION : UNITED KINGDOM

Code Number(s) Name of NGO	Address and Telephone	Scope-Language(s) Type of Activity Periodical(s)	Activities
Code : 2, 5, 7 Scientific Committee on Oceanic Research (an ICSU, France, Committee)	P.O. Box 3, Oban, Argyll Scotland Tel:0631 2244	International-English- Scientific/Research- X.	Coordination of international oceanographic research; standardisation of methodology and exchange of biological data, consultancy to UNESCO/IOC.
Code : 7 Skills Exchange Network for a Stable Economy	18 The Forum, Chidham Park, Havant, Hampshire England PO9 1DR	National-English- Networking/Resource and information clearing house- 'SENSE News-sheet'.	Clearinghouse for information on people willing to pass on skills, books, courses and sites where skills can be practised.
Code : 2, 4 Society for Promotion of Nature Conservation	The Green, Nettleham, Lincoln LN2 2NR England Tel:0522-52236	National-English- Scientific/Education - "Conservation Review".	Coordination at national level of activities for the conservation/protection of rare or fragile wildlife habitats; campaign for maintenance of ecological balance between wildlife requirements and agricultural/industrial developments.
Code : 7 Survival International	36 Craven St., London WC2N 5NG England	International-English Research/Technical Assistance- 'Newspaper planned'.	Financial, equipment, training and expertise aid to select projects (animal husbandry, agriculture, health etc.) in various developing countries for aboriginal peoples.
Code : 4 Wildlife Research Centre	Middle Garland, Chulmleigh, Devon EX18 7DU England Tel:07698-461	International-English- Professional/Research/ Consultancy- X.	Provision of professional services in wildlife management and research, with special reference to improving habitat quality, nutritional status and meat production of red deer farms.
Code : 7 World Association of Girl Guides and Girl Scouts	132 Ebury Street Westminster, London SW1W 9QQ England Tel:01-730 6226	International-English, French, Spanish- Education/training- 'The Council Fire'.	Bushcraft training, conservation; tree planting; anti-litter and anti-pollution campaigns; agricultural projects.
Code : 3, 4 World Pheasant Association	Daws Hall, Lamarsh,Bures, Suffolk CO8 5EX England Tel: Twinstead (078-729) 312	International-English- Scientific/Research/ Meetings- 'World Pheasant Association Newsletter', 'World Pheasant Association Journal'.	Game bird conservation via rational harvesting and artificial insemination of endangered species.

REGION : LATIN AMERICA AND THE CARIBBEAN

Code : 5, 6 Antigua Archeological Society	Box 103, Antigua Tel: 31060	Local-English- Research/Provision of Information- X.	Evaluation of historic sites; excavation of prehistoric sites; run museum; educational and training programmes.
Code : 6 Argentine Association Against Air Pollution (Asociación Argentina contra la Contaminación del Aire)	Alsina 1535, 1088 Buenos Aires Argentina Tel:49-6268	National-Spanish- Research/Education	Act against air pollution by means of research, sanitary education, promotion of interest by scientists and bringing about periodical meetings of scientists.
Code : 3, 6 Argentine Institute for Research on Arid Lands (Instituto Argentino de Investigación en las Zonas Aridas (IADIZA))	Casilla de Correo 507, 5500 Mendoza Argentina Tel: 251221	Regional-Spanish, English, French- Research/Education- 'Boletín Informativo'.	Studies of socio-economic structure of dry areas (decided mainly to life-stock raising); renewable natural resources in dry regions: inventories, collections, ecological behaviour of flora and fauna, germplasm bank, introduction of species, etc. Also studies about housing problems in dry areas, use of solar energy.
Code : 2, 4 Bahamas National Trust	P.O. Box N4105 Nassau Tel: 809-32- 28333	National-English- Education/Operational Projects- Bahamas Naturalist".	Conservation and preservation of endangered species, creation and management of protected areas and areas of beauty and historic interest.
Code : 1, 4 Caribbean Conservation Association	Savannah Lodge, The Garrison, St. Michael, Barbados Tel: 65373	Regional-English, Spanish, French- Coordination of NGOs/ Education- "Caribbean Conservation News".	Action for regional environmental and protection/conservation activities; financial and technical assistance for projects; environmental education.
Code : 2, 5 Bermuda Biological Station for Research Inc.	Bermuda Biological Station, St. George's West, 1-15 Bermuda Tel:809-2971880	International-English, German- Research/Education/ Training- "Bermuda Biological Station for Research".	Investigation of Bermuda's marine resources and near-shore environment; monitoring effects of paleoic petroleum residues and brewery waste; promotion of marine pollution legislation.

DIRECTORY

REGION : LATIN AMERICA AND THE CARIBBEAN

Code Number(s) Name Of NGO	Address and Telephone	Scope-Language(s) Type of Activity Periodical(s)	Activities
Code : 4, 6, 7 Bolivian Ecological Association (Asociación Ecológica Boliviana)	Apartado 4923 La Paz, Bolivia Tel: 51200	National-Spanish Education/Public Awareness- X.	Protection of wildlife (vicunga) and tropical areas north of La Paz; environmental education programmes.
Code : 6, 7 Social and Economic Development Centre (Centro para el Desarrollo Social y Económico)	Casilla 1420 Cochabamba Casilla 880, Santa Cruz Casilla 469, La Paz Bolivia Tel:2-1201 C Tel:2-6086 S.C. Tel:32-7445 L.P.	National-Spanish- Education/Technical Assistance/Research 'AYNI'.	Technical aid and training for rural development: sound agricultural practices, housing construction, and small-scale business.
Code : 1 Brazilian Society of Silviculture	Rua Conselheiro Crispiniano, 344-30 andar-con- junto 304, 01037- São Paulo Brazil Tel:223-7309/ 223-8206	National-Portuguese Research/Education- X.	Protection and conservation of natural flora and fauna, especially forest; alerting government and public to conservation needs; tree planting.
Code : 5, 2 Society for the Defense of the Brazilian Coast	Rua Bocaina 130-Perdizes, São Paulo 01311 Brazil Tel:65-5477	National-Spanish, Portuguese, English- Research/Citizen Action Group- X.	Information for public about devastation of environment of littoral zone and consequence. Land speculation, sale of beaches.
Code : 4, 1, 5 Colombian Society of Ecology (Sociedad Colombiana de Ecología)	Apartado Aereo 8674 Bogota, Colombia	National-Spanish- Research/Education- 'Boletín Informativo'.	Raising of public and government consciousness about ecological constraints on development.
Code : 1, 2, 4 Ecology Group of the Univer- sity of Tolima (Grupo Ecoló- gico de la Universidad del Tolima)	Apartado 1013 Ibague, Colombia Tel: 982 33864	National-Spanish- Education/Research/ Citizen Action Group- 'S.O.S. Ecológico'.	Human impact on mountains and forest eco- systems; environmental education and training; conservation activities con- cerning wildlife.
Code : 3, 6, 7 International Centre of Tropi- cal Agriculture (Centro Internacional de Agricultura Tropical) (CIAT)	Apartado Aereo 67-13, Cali, Colombia Tel:671411/671737	International-Spanish English-Research/ Technical Assistance- X.	Agronomic and breeding activities; re- search on germplasm of tropical food crops; improved beef and pork produc- tion; various levels of training.
Code : 1, 4, 7 Costa Rican Association for the Conservation of Nature (Asociación Costarricense para la Conservación de la Natural- eza) (ASCONA)	Apartado 8-39-70 San Jose Costa Rica Tel: 23-27-49	National-Spanish, English-Education/ Research/Citizen Action Group- "ASCONA" bulletin	Forum for environmental awareness and education; natural resources conserva- tion.
Code : 4 Friends of Nature : Interame- rican Association for the Study and Protection of the Human Environment (Amigos de la Naturaleza : Asociación Inter- americana de Estudio y Defensa del Medio Humano)	P.O. Box 162, Gaudalupe Costa Rica	International- Spanish, English- Education/Citizen Action Group- 'Bulletin'.	Promote awareness of importance of en- vironment for human survival; conserva- tion of flora and fauna and special eco- systems; compile and disseminate scien- tific knowledge on pollution and abuse of envt. Environmental Education (pri- mary and secondary school).
Code : 1, 3 Tropical Agronomic Centre for Research and Training (Centro Agronomico Tropical de Investi- gaciones Enseñanza) (CATE)	Natural Renewable Resources Pro- gramme, Turrialba, Costa Rica.	Regional-Spanish, English-Research- Newsletter.	Agroforestry research.
Code : 1, 7 Tropical Science Centre (Cen- tro Científico Tropical)	Apartado 8-3870 San José, Costa Rica Tel: 22-62-71	National and Re- gional-Spanish, English-Professional Consultancy/Research/ Technical Assistance- X.	Tropical ecological research; surveys; mapping on conservation requirements; policies and management; promulgation of World Life Zone system of ecological classification; technical aid.
Code : 1 Rio Palenque Science Centre (Centro Científico Rio Palen- que)	c/o Biología, Institute de Ciencias, Quito, Ecuador	National-Spanish- Academic/Research/ Education- 'Selbyana'.	Studies on the human impacts on mountain and tropical rainforest ecosystems.

DIRECTORY

REGION : LATIN AMERICA AND THE CARIBBEAN

Code Number(s) Name of NGO	Address and Telephone	Scope -Language(s) Type of Activity Periodical(s)	Activities
Code : 7 Association for Scientific Research of the Plateau (Inves- tigaciones Cientificas Associ- adas del Altiplano)	Apartado Postal 159, Quezaltenago, Guatemala	Regional-Spanish, English-Research/ Technical Assistance- X.	Appropriate Technology - low cost and simple energy saving devices; improving agricultural techniques for small farm- ers; technical service.
Code : 5 International Centre for Manatee Research	National Science Research Council, Georgetown, Guyana	International- Research/Consultancy X.	To sponsor, promote and coordinate acti- vities that will advance knowledge of manatee biology. Includes weed-control research, conservation of manatees.
Code : 6 Centre for Coordination and Development (Centro de Coordi- nación and Desarrollo)	Av. Jose Ma Morelos # 31 Tlepehuala, Guerrero, Mexico	National-Spanish, French-Education/ Training/Provision of Information- X.	Organising groups of peasants for im- proved management of production for rural commercial, health and educational progress.
Code : 4, 5, 7 Environment Foundation (Fundación Medio Ambiente)	Apartado Postal 6-1088 Mexico Z.P.6 Tel:905/549-1766	National-Spanish, English, French- Education/Technical Assistance- X.	Study and conservation of natural en- vironment and endangered species. Development of non-conventional techno- logies to support complete or partial self-sufficiency of rural communities.
Code : International Maize and Wheat Improvement Centre (Centro In- ternacional de Mejoramiento de Maiz y Trigo) (CIMMYT)	Londres 40, Mexico 6, D.I. Apartado Postal 6-641 Mexico Tel:514-46-30	International- Spanish-Scientific/ Research- X.	Research on germ plasm of maize and wheat for the improvement of their out- put as food crops.
Code : 5 Mexican Institute of Natural Renewable Resources (Instituto Mexicano de Recursos Naturales Renovables)	Av. Dr. Vertiz 724 Mexico 12 D.F. Mexico Tel: 519-16-33 & 519-45-05	National-Spanish- Research/ X.	Meetings, Research, publications and information clearinghouse on natural renewable resources.
Code : 4, 6 Friends of Nature (Amigos de la Naturaleza)	Apartado 286, David, Panama Tel:5-3617; 5-4727	National-Spanish- Education/Recrea- tion- X.	Create awareness about the pressing need to protect the environment; nature pro- motion among young people and people in general; support establishment of national parks; (Baru Volcano National Park); Rational use of natural resources.
Code : 6, 7 Lutheran Community and Evange- lical Action (Acción Luterana Comunitarian y de Evangeliza- ción)	Apartado Postal 445, Panama 9A, Panama Tel: 64-1528	National-Spanish- Technical Assistance/ Research- X.	Facilities development and dissemination of appropriate technologies for small- scale farmers.
Code : 3 International Potato Center (Centro Internacional de la Papa La Molina)	Apartado Postal 5969 Lima, Peru	International- Spanish, English- Scientific/Research/ Publications- X.	Collection, classification, maintenance and utilisation of potato germplasm; control of bacterial and insect pests of potato.
Code : 6 Planning Institute of Lima (Instituto de Planeamiento de Lima)	Universidad Nacional de In- genieria, Apartado 1301 Lima, Peru Tel: 811070	National-Spanish- Education/Consult- ancy/Research- X.	Support for and research on : national and regional policies for urban plann- ing and development; impact of indus- trial development on rural environment.
Code : 2, 4 Saint Lucia National Trust	P.O. Box 525, Castries, St. Lucia	National-English- Research/Operational Projects- X.	Protection and promotion of the aesthetical, historical and cultural heritage of St. Lucia.
Code : 5 Uruguayan Institute for the Preservation of the Human En- vironment (Instituto Uruguayo para la Preservación del Medio Humano)	18 ed Jukio 1516, piso 9, esc. 7, Montevideo, Uruguay	National-Spanish- Academic/Research- X.	Education of the public through radio and TV, take action on water pollu- tion, meetings.
Code : 2 Institute for the Preservation of Lake Valencia (Insitituto para la Conservación del Lago de Valencia)	Apartado 761 Valencia, Venezuela	National-Spanish- Scientific/Research- 'El Lago'.	Research on the pollution of lakes and its prevention.
Code : 2 Oceanographic Institute	Uni.de Oriente, Cumaná, Venezuela	National-Spanish- Academic/Research- X.	Research and academic activities on Marine sciences. Stimulates aquaculture activi- ties and influences the fishing school of Cumana. Education on marine conserva- tion at university & community level.

DIRECTORY

REGION : LATIN AMERICA AND THE CARIBBEAN

Code Number(s) Name of NGO	Address and Telephone	Scope-Language(s) Type of Activity Periodical(s)	Activities
Code : 5 Sucre State Conservation Society (Sociedad Conserva- cionista del Estado Sucre)	Apartado de Carreos 276, Cumana, Sucre Venezuela	Local-Spanish, English- Research/Campaigns- X.	Media-oriented campaign for conservation and maintenance of ecological balance.

REGION : NORTH AMERICA

Country : Canada

Code : 2, 4, 6 Amalgamated Conservation Society	P.O. Box 741 Victoria Br. Columbia V8W 2P9 Tel:604-598 2364	Local-English-Research/ Operational Projects- X.	Enhance salmon and steelhead trout breed- ing by provision of rearing water in dry season; increasing production of fry via use of gravel upwelling incubation boxes, spawning and rearing channels and fry feeding; research into effect of salinity, current velocity and the logging industry on salmonid resources.
Code : 7 Brace Research Institute	Macdonald College of McGill Uni., Ste. Anne de Bellevue, Quebec, HOA 1C0	National-English, French-Scientific/ Research/Publications- X.	Development of appropriate technology to convert dry lands for agricultural use; publication of instruction manuals and handbooks on appropriate technology, in- cluding solar energy utilisation.
Code : 4 Canadian Council on Rural Development (Conseil Cana- dien de l'aménagement rural)	161 Laurier Ave. W., Ottawa, Ontario K1A 0M4 Tel:613/992-0329	National-English, French-Influencing Policy/Information Provision X.	Provide a forum for the expression of views by organizations and persons con- cerned with rural development, and a vehicle for transmittal of these views to the minister; facilitating rural development, needs and programmes.
Code : 1 Canadian Forestry Associa- tion (Association Foresti- ère Canadienne)	185 rue Somer- set Ouest, Ottawa 4, K2P 0J2 Tel:232-1815	National-French, English-Education/ Professional- 'News-Le Courrier'; 'Ontario Forest'.	Promotion of wise use of Canada forests and related resources; national educa- tion campaign.
Code : 4 Canadian Nature Federation	75 Albert St., Ottawa, Ontario K1P 6G1	National-English, French-Citizen Action Group/Recreation/ Research- 'Nature Canada', 'Canadian Conservation Directory'.	Research on land-use and fragile eco- systems; protection and conservation of wildlife and natural habitats.
Code : 2, 5 Canadian Scientific Pollu- tion and Environmental Con- trol Society (SPEC)	1603 West 4th Avenue, Vancouver, B.C. V6J 1L6 Tel:736-5601	Regional-English- Education/Influencing Policy- 'Newsletter'.	Produce information kits about environ- ment issues; lobby decision makers for change; hold demonstrations, meetings and seminars; prepare material for media. The major issues of concern are: oil spills, nuclear power, dangerous chemi- cals, recycling wastes, and energy con- servation.
Code : 7 Development Workshop	15 Strathmore Rd St. Catherines, Ontario	International-English- Research/Development/ Technical Assistance-	Research and workshops to develop on existing planning and building methods and skills of third world artisans; pub- lications, exhibitions and films.
Code : 6 Greenpeace Experimental Farm	R.R. 1, Denman Island, Br.Columbia, VOR ITO	National-English- Education- X.	Training course covers ecology, manual skills and proper use of tools, organic gardening towards self-sufficiency, re- newable energy sources, microclimatology.
Code : 5 Greenpeace Foundation	2108 West 4th Avenue, Vancouver, B.C., V6K 1N7	International-English- Citizen Action Group.	Whale protection and conservation.
Code : 3, 5 International Atlantic Salmon Foundation	P.O. Box 429, St. Andrews, New Brunswick, E06 2X0 Tel:506-5293818	International-English- Research/Influencing Policy 'IASF Newsletter', 'IASF Special Publications Series'	Development, funding and assistance for a wide variety of research and manage- ment programmes to benefit the Atlantic salmon.
Code : 5 Kitimat Oil Coalition	c/o 'West Coast', 549 Howe St., Vancouver, Br. Columbia	(for more information please contact the address indicated)	
Code : 5 North American Salmon Research Center	P.O. Box 429, St. Andrews, New Brunswick, E0G 2X0	International-English- Research- X.	Research on salmon and selective breed- ing.

DIRECTORY

REGION : NORTH AMERICA

Code Number(s) Name of NGO	Address and Telephone	Scope-Language (s) Type of Activity Periodical(s)	Activities
<u>Country : Canada</u>			
Code : 6 Planned Parenthood Federa- tion of Canada (La fédéra- tion pour le planning des naissances du Canada)	1226 A Wellington Street, Ottawa, Ontario K1Y 3A1 Tel:613-722-3484	National-English, French-Training/ Education/Technical Assistance/Influencing Policy- 'NEWS' - Newsletter.	Preparation of population/health education display, briefs to government on popula- tion policy; establishment and maintenance of various family planning services.
Code : Quebec Society of Speleo- logy Inc. (Société Québe- coise de spéléologie inc.)	C.P. 336, Station de Lorimier, Montreal, Quebec, H2H 2N7	Local-French- Sporting/Recreation	Promotion of speleology and provision of services supporting this activity; deve- lopment of methods of protection for caving sites.
Code : Union of B.C. Indian Chiefs	George Manuel, 345 W 5th St., North Vancouver, Br. Columbia	(further information from the organisation)	
Code : United Fishermen and Allied Workers	138 E Cordova, Vancouver, Br. Columbia	(further information from the organisation)	
<u>Country : U.S.A.</u>			
Code : 4, 7 African Wildlife Leadership Foundation	1717 Massachus- setts Avenue, New York, Washington D.C. 20036 Tel:202-265-8394	International-English- Education/Training/ Research- 'Wildlife News'.	Technical aid for wildlife management training in Africa; development of national parks, game reserves; conservation pro- jects; ecological monitoring and game ranching.
Code : 3 Agricultural Experimental Station	Dept.of Agronomy and Range Science College of Agric. & Environment Sciences,Agricul- tural Experimen- tal Station,Uni- versity of California,Davis California 95616	National-English- Research- X.	Crop plant genetic resources.
Code : 1 Agri-Silviculture Institute	P.O. Box 4166, Palm Springs, California 92263	Local-English- Provision of inform- ation/agroforestry- 'Newsletter'.	Provision of information and practical application of agroforestry ideas, especially the growing of tree crops.
Code : 2, 6 Alaska Center for Environ- ment	913 W. 6th Ave., Anchorage, Alaska 99501 Tel:907-274-3621	Local-English- Education/Influencing Policy Decisions- 'Center News'.	Provide a communication centre for citi- zen environment groups. Concerned with wildlife, protection of endangered species, environmental impact assessment.
Code : 2 Alaska Conservation Society	Box 80192, College Branch, Fairbanks, Alaska 99708 Tel: 452-2240	Local-English- Provision of Inform- ation/Influencing Policy Decisions- 'Alaska Conservation Review'.	Lobbying against the destruction of the natural environment; creation of wildlife refuges.
Code : 1, 2 American Forestry Associa- tion	1319 18th St., N.W. Washington D.C. 20036 Tel:202-467810	National-English- Information Clearing- house/Education/In- fluencing Legislative Decisions- 'American Forests'.	Rapport between citizen conservationists and the forestry industry; conservation education.
Code : 4, 5, 7 Animal Protection Institute of America	5894 South Land Park Drive, P.O. Box 22505, Sacramento, California 95822 Tel:916/422-1921	National-English- Operational Projects/ Research/Technical Assistance/Education- 'Mainstream'.	Educational and publicity campaigns on the treatment of wild and domesticated animals; better wildlife management for maintenance of natural ecological balance.
Code : 4, 5 Animal Welfare Institute	P.O. Box 3650, Washington D.C. 20007 Tel:202/337-2332	International-English- Citizen Action Group/ Education- 'Newsletter'.	Campaigns for humane treatment of endan- gered species : whales, wolves, dolphins, seals.
code : 2, 4, 5 Antartic and Southern Ocean Coalition	1751 N Street,N.W. Washington D.C. 20036 Tel:202/872-0670	International-English- Scientific/Research/ Influencing Policy- X.	Mobilise NGO's for participation in pro- posals for research into the protection and preservation of the Antarctic environ- ment and its marine resources.

DIRECTORY

REGION : NORTH AMERICA

Code Number(s) Name of NGO	Address and Telephone	Scope-Language(s) Type of Activity Periodical(s)	Activities
Code : 2 California Committee of Two Million	P.O. Box 2046, San Francisco, California 94126 Tel:415/981-4134	Local-English- Citizen Action Group/ Influencing Policy- 'Wild Rivers Reporter'	Initiation of legislation and monitoring the protection, preservation and mainten- ance of rivers; establishment of rational water resources development policy.
Code : 5 Coast Alliance	c/o FOE, 124 Spear Street San Francisco California 94105	National-English- Citizen Action Group/ Media Oriented Camp- aign/Influence Legis- lative Decisions- X.	Campaign and legislative initiatives to protect the U.S. coastal habitat from further degradation.
Code : 4, 5 Connecticut Cetacea (Whale) Society	P.O. Box 145, Wetherfield, Connecticut 06109	Local-English- Citizen Action Group/ Education- 'The Connecticut Whale' (newsletter), "The Connecticut Whale Spouts"(Occasional).	Educational campaigns for the abolition of all whale killing.
Code : 2, 4 Conservation Foundation	1717 Massachus- etts Avenue,N.W, Washington D.C. 20036 Tel:202/797-4300	International-English- Citizen Action Group/ Research Environmental Management- X.	Long-standing involvement in land use issues: urban conservation; ecosystems and coastal zone management; lately comp- arative international policies, laws and practices on land use and conservation.
Code : 5, 7 The Coustamu Society Inc.	777 Third Ave., New York, 10017 Tel:212/826-2940	International-English- Scientific/Research/ Technical Assistance- 'Calypso Log'.	Nature conservation and research especi- ally related to oceans; publications, films.
Code : 5 Department of Oceanography	Texas A & M University, College Station, Texas 77843	National-English- Research- "Technical Reports".	Oceanographic research in estuarine, shelf waters and deep sea, including the composition and ecological relations of marine populations.
Code : 2, 6, 7 Eastern Caribbean Natural Area Management Programme	45 Estate Tipper- ary, Star Route 00864, Christiansted, St. Croix, U.S. Virgin Islands 00820	Regional-English- Education/Technical Assistance- X.	To assist local governments in the manage- ment of critical natural ecosystems, training in relevant management techni- ques, environmental education, and the utilization of local natural resources for development.
Code : 2 Ecological Society of America	University of Oklahoma,Norman, Oklahoma 73069	National-English- Scientific/Research 'Bulletin of Ecologi- cal Society of America'; 'Ecology', 'Ecological Monographs'.	Coordination of the study of organisms in relation to their environment.
Code : 5, 6 Ecology Center of Southern California	P.O. Box 35473, Los Angeles, California 90035 Tel:213/559-9160	Local-English- Citizen Action Group/ Education- "The Compendium News- letter".	Clearinghouse for environmental informa- tion and coordination of activities; assessment of environment impact reports.
Code : 5 Environmental Defense Fund Inc.	1525 18th St.,N.W. Washington D.C. 20036 Tel:202/833-1485	National-English- Environmental Legis- lation & Litigation- 'EDF Newsletter'.	Protection of environmental quality through legal action and litigation, administrative petitions, participation in regulatory agency hearings.
Code : 2, 6 Forests Institute for Ocean and Mountain Studies	6205 Franktown Rd Carson City, N.V. 89701 Tel:702/882-6361	International-English, Spanish-Education/ Provision of Informa- tion/Technical Assist- ance- 'Wildlife Newsletter'.	Research, Education and training in eco- logical and environment issues.
Code : 1, 2, 5 Friends of the Earth International	124 Spear St., San Francisco, California 94105	International-English- Citizen Action Group/ Influencing Policy- 'Not Man Apart', 'Soft Energy Notes'.	Wide range of activities in relation to the preservation, restoration and rational use of the earth such as campaigns, publications, and lobbying members of government.
Code : 3, 5 Greenpeace Foundation of America	240 Fort Mason, San Francisco, California 94123 Tel:415-474-6767	National-English- Citizen Action Group- 'Greenpeace'	Devise means to replace finite resources (whales) by other renewable resources (jojoba); information provision to the public.
Code : 3, 7 Inquiring Systems Inc.(ISI)	2532 Durant Ave. Suite 250, Berkeley, California 94704	National-English- Information Clearing- house/Technical Aid- 'The Inquiring Sys- tems Bulletin'.	Technical assistance with project planning, development, management, evaluation and funding.

DIRECTORY

REGION : NORTH AMERICA

Code Number(s) Name of NGO	Address and Telephone	Scope-Language(s) Type of Activity Periodical(s)	Activities
Code : 2, 5 Institute of Marine Sciences	University of Alaska, Fairbanks, Alaska 99701	National-English- Research/Academic- 'Technical reports'.	Research in planning for protection of the marine environment, for recovery of sea- floor mineral and energy deposits, for coastal-zone management, for selection of offshore engineering sites, for develop- ment of new fisheries, and regulating businesses which use marine waters for commerce.
Code : 5 International Associa- tion of Biology Oceano- graphy (Association in- ternationale d'océano- graphie biologique)	Duke University, Marine Laboratory, Beaufort, North Carolina 28516	International-Eng- lish-Scientific/ Provision of Informa- tion- X.	Advancement of knowledge of the biology of the sea through meetings, publications, networking between biological oceanogra- phers.
Code : 4, 5 International Associa- tion of Fish and Wild- life Agencies	1412 16th Street N.W., Washington D.C. 20036 Tel:202/232-1652	International- English- 'Newsletter'.	Promotes the rational management of fish and wildlife; coordinates the work of some conservation agencies in North America.
Code : 5 International Association for the Physical Sciences of the Ocean (Association internationale des scien- ces physiques de l'océan)	Naval Undersea Center, San Diego, California 92132 Tel:714/2256513	International- English, French- Scientific/Publica- tion- X.	Promotion of physical oceanography.
Code : 7 International Cooperative Housing Development Asso- ciation (Association in- ternationale du développe- ment coopératif de l'habitat)	1001 15th St.N.W. Washington D.C. 20005 Tel:202/737-3411	International- English-Consult- ancy/Technical Aid/ Operational Projects- 'ICHDA Profiles'.	Expertise and technical aid for the pro- motion of low-cost cooperative and self- help housing in developing countries.
Code : 4 International Game Fish Association (Association internationale pour la pêche sportive à la ligne)	3000 E. Las Olas Blvd., Ft. Lauderdale, FL 33316 Tel:305/467-0161	International-English Leisure/Recreation/ Research- "The International Marine Angler".	Maintains and promotes ethical inter- national angling regulations and scienti- fic data collection; clearinghouse for information on research, conservation and legislative developments.
Code : 1, 3 International Tree Crops Institute U.S.A., Inc.	Box 1272, Winters, California 95694	International- English-Publications/ Provision of Informa- tion- -A journal to be pub- lished-	Research and the provision of information on agroforestry.
Code : 2 Maine Coast Heritage Trust	105 Eden Street, Bar Harbour, Maine 04609 Tel:207/288-5019	Local-English- Provision of Informa- tion/Education- X.	Protection of islands and conservation of significant land areas.
Code : 1 National Academy of Sciences	2101 Constitu- tional Avenue, Washington D.C. 20418 Tel:203/393-8100	National-English- Scientific/Research Advisory- 'News Report'.	Use of scientific and technical informa- tion in environment management and regu- latory decision making; in industrial deve- lopment and agricultural production efficiency.
Code : 4 National Audubon Society, Inc.	950 Third Avenue, New York, New York 10022 Tel:212/832-3200	International-English- Scientific/Research/ Citizen Action Group- 'Audubon Leader', 'Audubon', 'American Birds', 'Centers'.	Conservation action and environmental edu- cation concerning all aspects of nature. Found and maintain sanctuaries; research and action on non-game wildlife endangered species.
Code : 7 National Center for Appropriate Technology	P.O. Box 3838 Butte Montana 59701 Tel:406/723-6533	National-English- Influencing policy/ Publications- X.	Technical research and financial support for community based appropriate techno- logy projects.
Code : 4 National Rifle Associ- ation of America	1600 Rhode Island Avenue, N.W., Washington D.C., 20036 Tel:202/783-6505	National-English- Sporting- 'The American Hunter' 'The American Rifle- man'.	Promotion of rifle shooting as a sport, hunting, wildlife management, environmental training, conservation and protection of wildlife and natural areas.
Code : 4, 7 National Trust for Historic Preservation	740-748 Jackson Pl. N.W., Washington, D.C. 20006	National-English- Technical Assistance/ Publications/Educa- tion- 'Historic Preserva- tion', 'Preservation News'.	Facilitation of public participation in preservation of sites, buildings and objects of local, regional and national significance or interest. Produce films, books, restore the built environment and landscape hold meetings.



DIRECTORY

REGION : NORTH AMERICA

Code Number(s) Name of NGO	Address and Telephone	Scope-Language(s) Type of Activity Periodical(s)	Activities
Code : 4, 5 National Whale Symposium	605 South Fess Ave., No.3, Bloomington, Indiana 47401 Tel:812/339 14 84	National-English Coordination of NGOs- X.	Support and bring together information and action on whales, through a conference, exhibits, publications.
Code : 4 National Wildlife Federation	1412 16th St.N.W., Washington D.C. 20036 Tel:202/797 6800	National-English- Education/Citizen Action Group- "National Wildlife", "International Wild- life", "Ranger Rick" (children), 'Conser- vation News', 'Conser- vation Report'.	With more than 3.5 million members it has extensive activities to arouse public awareness of the need for wise, proper management and conservation of natural resources. Their Land Heritage Program encourages gifts and bequests of undeveloped real estate.
Code : 1, 5 Natural Resources Defence Council Inc.	917 - 15th St.N.W. Washington D.C. 20005 Tel:202/737-5000	National-English- Influencing Legislative Decisions/Research/ Litigation- 'Tropical Moist For- ests Conservation Bulletin', 'NRDC World Environment Alert', 'NRDC Newsletter'.	Combines legal action, scientific research and citizen action education in an effective environment protection programme on resources conservation and management, energy, policy, pollution.
Code : 1, 4 Nature Conservancy	1800 N. Kent St., Arlington, Virginia 22209 Tel:703/524-3151	International-English- Research/Environmental Management- 'The Nature Conservancy News', 'Natural Assets'.	To preserve land on which live rare species of wildlife. Accept gifts of land, purchase land and acquiring land for governmental and other conservation agencies.
Code : 6, 7 New TransCentury Foundation	1789 Columbia Road N.W., Washington D.C. 20009 Tel:202/462 6661	International-English- Technical Assistance/ Provision of informa- tion- 'Bulletin of funding sources for women in development', 'Job'.	Provides management training and technical assistance, recruitment and staffing services; community development and support activities; secretariat on women in development.
Code : 5 New York Ocean Science Laboratory	Montauk, New York 11954 Tel:516-668-5800	National-English- Academic/Research/ Scientific- X.	Research in marine sciences under the aegis of a consortium of Affiliated Colleges and Universities. Establishment of a lobster hatchery; aquaculture of fin-fish and invertebrates.
Code : 3, 4 New York Zoological Society	The Zoological Park, Bronx, New York 10460 Tel:212/220-5100	International-English- Scientific/Research- X.	Establishment and protection of wildlife habitats globally; training of personnel; consultancy and operational conservation projects.
Code : 5 Ocean Education Project	245 Second Street N.E. Washington D.C. 20002 Tel:202-544-2312	International-English- Education/Influence Legislative Decisions- 'Neptune Soundings'.	Educate the public on the important issues of the UN Conference on the Law of the Sea.
Code : 2, 5, 6, 7 Oceanic Institute	2031 Waimanalo, Hawaii 96 795 Tel:808-259-7951	International-English- Research/Technical Assistance/Training- X.	Aquaculture integration to existing re-sources (waste water reclamation and re-source recovery; polyculture; balance of terrestrial and aquatic resource manage-ment.
Code : 5 Ocean Trust Foundation	312 Sutter St., San Francisco, California 94108, Tel:415/391 1712	National-English- Education/Research/ Influencing Policy Decisions- X.	Identify marine conservation strategies on which public action should be taken; educate and inform public through TV, publi-cations; support scientific research on the use of ocean space and natural resources.
Code : 5 Office of Arid Land Studies	University of Arizona, 845 N. Park Ave., Tucson, Arizona 85719	(for further information contact the organisation)	
Code : 2, 4, 5 Pacific Science Associ- ation	P.O. Box 6037, Honolulu, Hawaii 96818	Regional-English- 'Information Bulle- tin'.	Coordination of research on scientific problems of the Pacific region. At present places special emphasis on research into flora of islands and the protection plant species from harmful plant virus.
Code : 5 Project Jonah	Box 476, Bolinas, California 94924 Tel:415/868-0616	International-English, Spanish- Citizen Action Group- X.	Protection and study of whales, dolphins and porpoises.

DIRECTORY

REGION : NORTH AMERICA

Code Number (s) Name of NGO	Address and Telephone	Scope-Language (s) Type of Activity Periodical (s)	Activities
Code : 2 Resources and Ecology Projects, Inc.	P.O. Box 97, Mill Valley, California 94941 Tel:415/388-1340	National-English- Research- X.	Environmental impact analyses; limnological and estuarine ecological studies; monitor- ing pollution.
Code : 1, 5 Sierra Club International Office of inter- national Environment Affairs	800 Second Ave., New York, N.Y. 10017	International-Eng- lish-Research/In- formation Provision Influencing Policy Decisions- 'International Re- port'.	Work with other organisations worldwide in taking action on common environmental problems including tropical forests, and exploitation of Antarctic resources.
Code : 4, 5 Society for Animal Protec- tive Legislation	P.O. Box 3719, Georgetown Station, Washington, D.C., 20007	National-English- Influencing Legisla- ture Decisions- X.	Persue legislation for more humane methods of fishing, harvesting of dolphins etc.
Code : 7 Technical Assistance In- formation Clearing House (TAICH)	c/o ACVAFS, 200 Park Ave. South, New York, N.Y. 10003 Tel:212/777-8210	International-Eng- lish- Information Clear- inghouse- 'TAICH News'.	Clearing house for socio-economic develop- ment aid programmes; directories of devel- opment assistance agencies; library ser- vices.
Code : 7 TRANET	P.O. Box 567 Rangeley ME 04970 Tel:204/864-2252	International- English-Networking/ Information Clearing- house- 'Tranet Newsletter'.	Clearinghouse for information of appropri- ate technology; coordination of activities.
Code : 5 Trout Unlimited	P.O. Box 1944, Washington D.C. 20013	National-English- Research/Environmen- tal Management/ Publications- 'Trout'.	Preservation and enhancement of cold water fisheries through support of sound environ- mental management principles.
Code : 6, 7 Trust for Public Land	82 Second Street, San Francisco, California 94105 Tel:415/495-4014	National-English- Land Acquisition/ Training/Technical Assistance- X.	Acquisition and preservation of open space particularly in urban areas to serve the needs of the community. Training non- profit land acquisition specialists whose skills will enable communities and agencies to use their own resources in solving open space problems.
Code : 7 Volunteers in Technical Assistance (VITA)	3706 Rhode Island Avenue, Mt. Rainer, Maryland 20822	International- English-Technical Assistance/Resources and Information Clearinghouse/ Publications- 'VITA News'.	Supplies appropriate technical information (handbooks, manuals) and expert advice in response to enquiries from third world countries. Publications Programme.
Code : 4, 6, 7 Wildlife Management Institute	1000 Vermont Ave., N.W., 709 Wire Building, Washington D.C. 20005 Tel:202/3471774	National-English- Scientific/Research/ Education- "Outdoor News Bulletin".	Nation-wide studies of fish and wildlife agencies law enforcement, licensing struc- ture; seeking funds for non-game programs; protection of wetlands.
Code : 5 Woods Hole Oceanographic Institution	Woods Hole, Massachusetts, 02543 Tel:617/548-1400	National-English- Research- X.	Biological Oceanographic Research; chemis- try of the ocean environment; geologic and geophysics properties of the seafloor; ocean engineering; physical oceanography; Marine Policy and Ocean Management.
Code : 7 World Future Society (Société du monde futur)	4916 St.Elmo Ave., Washington D.C. 20014 Tel:301/656 8274	National-English, French- Scientific Research- 'The Futurist', 'The World Future Society Bulletin', 'Techno- logy Tomorrow'.	Research into how today's technology will shape the future.
Code : 1, 5 Worldwatch Institute	1776 Massachusetts Avenue, N.W., Washington D.C. 20036 Tel:202/452-199	International- English- Provision of Inform- ation/Publications- 'Worldwatch Paper Series'.	Interdisciplinary research on a wide range of emerging global issues and their solu- tions for publication.

# unep objectives

## UNEP OBJECTIVES RELEVANT TO NGO ACTIVITIES IN SEVEN SUBJECT AREAS

### 1. Tropical woodlands and forest ecosystems

- To identify the extent of world forest cover and to initiate assessment of trends of forestation and deforestation;
- To control the loss of productive soil through misuse of the forest cover;
- To evaluate the importance of tropical forest plants as a source of genetic material for plant and animal breeding;
- To support and encourage concerted research programmes on the effects of tropical forests on the atmosphere and the water regime, soil changes following their conversion to other uses, animal/plant relations, the minimum self-maintaining area, and suitable agricultural systems;
- To develop guidelines for management of tropical forest ecosystems with a view to regular and sustained production;
- To ensure the best utilization of natural forest ecosystems, applying appropriate technologies to accelerate and improve techniques for planting and regeneration;
- To improve the local processing and use of all forest products, including wood.

### 2. Mountains, islands and other ecosystems

- To initiate activities for improving knowledge of such ecosystems as temperate forests, mountains, islands, lakes and sea shores, with a view to their integrated management. Special attention will be given to arresting the processes of erosion, soil pollution and eutrophication of inland waters, along with efforts to rationalize activities relevant to the management of forests.

### 3. Genetic resources

- To search for knowledge about threatened species, and to evolve a strategy to conserve plants and animals and preserve germplasms;
- To undertake studies on micro-organisms which could enable man to use them in efficient and novel ways for his betterment and for the enhancement of the environment.

### 4. Wildlife and protected areas

- To create the basis for a world-wide network of protected areas of terrestrial, marine and inland waters, national parks and biological reserves;
- To identify, restore and conserve terrestrial and aquatic ecosystems of great biological and ecological significance as well as natural and cultural areas which constitute the heritage of all mankind;
- To identify representative samples of aquatic and terrestrial ecosystems and investigate the impacts of human activities on them. These protected areas would be used as far as possible for research, training and permanent monitoring of natural resources.
- To maintain the health of particular ecosystems, biomes or habitats, by preserving the minimum population size necessary for the survival of a given species;
- To help ensure that conservation and management measures for endangered species, and the legislation on which such measures are based, take full account of the foregoing paragraph;
- To support research activities designed to give adequate basis for the right strategy to achieve these objectives.

### 5. Oceans : global programme on living marine resources

- To maintain the productivity and health of marine ecosystems and their populations of plants and animals at, or restore them to, optimum levels.

### 6. Environmental training

- To ensure that decision-makers involved in areas which affect the environment, directly or indirectly, are provided with an appropriate level of understanding of the environmental dimension;
- To provide specialized training necessary for technicians and specialists involved in various tasks associated with environmental assessment and environmental management;
- To work towards more environmental awareness among rural and urban populations;
- To create and maintain appropriate mechanisms for the effective coordination of environmental training programmes.

### 7. Technical assistance

- To make it possible for all countries to :
  - Participate fully in regional, transnational and global environment-related programmes;
  - Manage their own environment in accordance with their own aspirations and needs, in harmony with their development objectives and any international agreements to which they are parties.

LES OBJECTIFS DU PNUE RELATIFS AUX ACTIVITÉS ENTREPRISES PAR LES ONG DANS LES SEPT  
DOMAINES D'ACTION

1. Ecosystèmes des bois et forêts tropicaux

- Identifier l'étendue du couvert forestier mondial et entreprendre une évaluation des tendances concernant le boisement et le déboisement;
- Lutter contre la perte de sols productifs due à la mauvaise utilisation du couvert forestier;
- Evaluer l'importance des plantes des forêts tropicales en tant que sources de matériel génétique pour la reproduction animale et végétale;
- Appuyer et encourager des programmes de recherche concertés sur les effets des forêts tropicales sur l'atmosphère et le régime hydrologique, les modifications du sol résultant de leur conversion à d'autres utilisations, les relations plantes/animaux, la superficie minimale nécessaire à leur maintien naturel, et les systèmes agricoles appropriés;
- Mettre au point des lignes directrices pour la gestion des écosystèmes des forêts tropicales en vue d'assurer une production régulière et soutenue;
- Assurer la meilleure utilisation possible des écosystèmes forestiers naturels, en appliquant des technologies appropriées pour accélérer et améliorer les techniques de plantation et de régénération;
- Améliorer le traitement et l'utilisation au niveau local de tous les produits forestiers, y compris le bois.

2. Ecosystèmes montagneux, insulaires et autres

- Commencer des activités en vue de l'amélioration du niveau des connaissances sur les écosystèmes constitués par les forêts tempérées, les montagnes, les îles, les lacs et les rivages marins, en vue de leur gestion intégrée. Une attention particulière sera consacrée à l'arrêt des processus d'érosion, de pollution des sols et d'eutrophication des eaux intérieures, ainsi qu'aux efforts visant à rationaliser les activités relatives à la gestion des forêts.

3. Ressources génétiques

- Approfondir les connaissances sur les espèces menacées et mettre au point une stratégie en vue de la conservation des plantes et des animaux et de la préservation des éléments généraux;
- Entreprendre des études sur les micro-organismes en vue de permettre à l'homme d'utiliser ces derniers de manière efficace et novatrice en vue de l'amélioration de sa condition et de celle de l'environnement.

4. Faune et flore sauvages et zones protégées

- Jeter les fondements d'un réseau mondial de régions protégées - sur terre, en mer et pour les eaux intérieures - de parcs nationaux et de réserves biologiques;
- Identifier, restaurer et conserver les écosystèmes terrestres et aquatiques d'une grande importance biologique et écologique ainsi que les domaines naturels et culturels qui constituent le patrimoine commun de l'humanité;
- Identifier des échantillons représentatifs d'écosystèmes naturels et étudier les incidences des activités humaines sur ces derniers. Ces régions protégées seraient utilisées autant que faire se peut à des fins de recherche, de formation et de surveillance continue des ressources naturelles;
- Assurer la santé d'écosystèmes, de biomes ou d'habitats particuliers, en préservant la population minimale nécessaire à la survie d'une espèce donnée;
- Aider à assurer que les mesures de conservation et de gestion à l'intention des espèces menacées et les textes juridiques sur lesquels ces mesures sont fondées tiennent dûment compte de ce qui précède;
- Appuyer les activités de recherche visant à fournir une base adéquate pour une stratégie d'action appropriée.

5. Océans : Programme mondial : ressources biologiques de la mer

- Maintenir la productivité et la santé des écosystèmes marins et de leurs peuplements végétaux et animaux, ou les porter à des niveaux optimaux.

6. Formation relative à l'environnement

- Veiller à ce que les responsables de la prise de décision s'occupant de domaines qui influent directement ou indirectement sur l'environnement acquièrent un niveau approprié de compréhension de la dimension environnementale;
- Fournir la formation spécialisée nécessaire aux techniciens et aux spécialistes chargés des diverses tâches liées à l'évaluation et à la gestion de l'environnement;
- S'employer à susciter parmi les populations rurales et urbaines une prise de conscience plus claire des problèmes d'environnement;
- Mettre en place et maintenir des mécanismes appropriés pour assurer la coordination efficace des programmes de formation en matière d'environnement.

7. Assistance technique

- Permettre à tous les pays de :
  - Participer pleinement aux programmes régionaux, transnationaux et mondiaux liés à l'environnement;
  - Gérer leur propre environnement conformément à leurs propres besoins et aspirations, en harmonie avec leurs objectifs de développement et les accords internationaux auxquels ils sont parties.

## UNEP OBJECTIVES

### OBJETIVOS DEL PNUMA EN RELACION A LAS ACTIVIDADES DE LAS ONG EN 7 AREAS SELECTAS

#### 1. Ecosistemas de bosques y selvas tropicales

- Establecer la magnitud de la cubierta forestal del mundo e iniciar una evaluación de las tendencias de forestación y de deforestación;
- Controlar la pérdida de suelos productivos por efecto del mal aprovechamiento de la cubierta forestal;
- Evaluar la importancia de la vegetación de los bosques tropicales como fuentes de material genético para la fito y la zoogenética;
- Apoyar y estimular programas de investigación concertados sobre el efecto de los bosques tropicales en la atmósfera y el régimen hidrológico, los cambios que ocurren en el suelo cuando los bosques se dedican a otros usos, las relaciones entre animales y plantas, el área mínima capaz de autopropagarse, y los sistemas agrícolas adecuados;
- Desarrollar orientaciones para la ordenación de los ecosistemas de bosques tropicales con vistas a lograr una producción regular y sostenida;
- Asegurar el mejor aprovechamiento de los ecosistemas de bosques naturales, aplicando tecnologías apropiadas para acelerar y mejorar las técnicas de plantación y regeneración.

#### 2. Montañas, islas y otros ecosistemas

- Iniciar actividades para mejorar los conocimientos sobre tales ecosistemas como los bosques de clima templado, las montañas, las islas, los lagos y las costas marinas, a fin de lograr su ordenación integral. Se prestará especial atención al proceso de detener la erosión, la contaminación de los suelos y la eutroficación de aguas interiores, y se desarrollarán también esfuerzos para racionalizar las actividades relacionadas con la ordenación de los bosques.

#### 3. Recursos genéticos

- Investigar las especies en peligro y desarrollar una estrategia para conservar plantas, animales y germoplasmas;
- Iniciar estudios sobre los microorganismos que permitirían al hombre emplearlos en forma eficiente y novedosa en su propio beneficio y para el mejoramiento del medio ambiente.

#### 4. Fauna y flora silvestres y zonas protegidas

- Crear la base para una red mundial de zonas protegidas tanto terrestres, marinas y de aguas interiores, como en parques nacionales y reservas biológicas;
- Identificar, restaurar y conservar los ecosistemas terrestres y acuáticos de gran importancia biológica y ecológica, así como las zonas naturales y culturales que constituyen el patrimonio de toda la humanidad;
- Establecer muestras representativas de ecosistemas acuáticos y terrestres e investigar el efecto de la actividad humana sobre ellas. Estas zonas protegidas se emplearían en la medida de lo posible para la investigación, la capacitación y la vigilancia permanente de los recursos naturales;
- Mantener la salud de ecosistemas, biomas o hábitat particulares, preservando la población mínima necesaria para la supervivencia de una especie determinada;
- Velar porque se tomen medidas de conservación y ordenación para las especies en peligro de extinción y que la legislación sobre la cual se basan estas medidas tome en cuenta lo indicado en el párrafo anterior;
- Apoyar las actividades de investigación destinadas a proporcionar una base adecuada para elaborar la estrategia correcta a fin de lograr estos objetivos.

#### 5. Océanos : Programa general : recursos biológicos marinos

- Mantener la productividad y salubridad de los ecosistemas marinos y de sus poblaciones de flora y fauna a niveles óptimos, o restablecer esos niveles.

#### 6. Capacitación ambiental

- Asegurar que las personas encargadas de adoptar decisiones relativas a esferas que afecten directa o indirectamente al medio tengan un grado de comprensión adecuado de la dimensión ambiental;
- Proporcionar la formación especializada necesaria para técnicos y especialistas que intervengan en las diversas tareas relacionadas con la evaluación del medio ambiente y la ordenación del mismo;
- Promover una mayor conciencia ambiental entre los habitantes de las zonas rurales y urbanas;
- Crear y mantener mecanismos adecuados para la eficaz coordinación de los programas de formación ambiental.

#### 7. Asistencia técnica

- Lograr que todos los países puedan participar plenamente en los programas regionales, transnacionales y mundiales relacionados con el medio ambiente;
- Lograr que todos los países puedan ordenar su propio medio ambiente de acuerdo con sus propias aspiraciones y necesidades, en armonía con sus objetivos de desarrollo y los acuerdos internacionales que hayan suscrito.