GUEST EDITORIAL

The Vital Importance of Maintaining Forests

Forest vegetation, together with its accompanying soil organisms, probably makes up as much as 90% of Earth's total biomass on land, consequently representing a physically immense foundation for ecological stability. However, human beings have already drastically weakened this asset by deforestation, so that the stability of many ecological systems has been greatly disturbed.

In temperate, industrialized countries very few natural forests remain. But a large variety of forest products are recognized as being of such value to Man that very extensive areas of land are now allocated to managed forestry. Indeed in Europe much more land is under forests now than at the beginning of the 20th century, the forestry profession is well developed, and forestry is widely recognized by national governments as being a key to economic and ecological stability and progress. That relatively satisfactory situation is, however, now being threatened to some extent by the impact of acidic deposition resulting from industrial atmospheric pollutants. This threat to the forests has latterly aroused enormous concern amongst governments and individuals, such that large amounts of money are being devoted to the search for solutions.

Whereas the widespread death of forest trees in northern Europe as a result of atmospheric pollution is a cause of very great concern, on a global scale there can be no doubt that the threats which are facing the forests of the tropics are of even greater significance. Indeed many people now believe that the destruction of tropical forests is one of the greatest problems facing Mankind in the remaining fourteen years of the 20th century.

Efforts to Stem Widespread Clearance

The International Union for Conservation of Nature and Natural Resources (IUCN) sees the stemming of tropical forest destruction as one of its highest priorities. We are now launching a major effort to influence the expenditure of international development aid and the efforts of investment agencies in such a way that they will promote forest management and conservation rather than risk exacerbating the problem. In addition, IUCN with its collaborating organizations, including the World Wildlife Fund and the governments of many developed and developing nations, is coordinating a programme of some hundred or so field projects which are tackling the problems of conserving the biological diversity and ecological processes contained in those forests.

The tropical forests of the Americas, Africa, and Asia, in 1980 still covered about 1,935 million hectares of which some 1,200 million hectares were occupied by closed forests and the rest by open-tree formations. In addition, fallow forest land amounted to about 410 million hectares. It is estimated by FAO that 7.5 million hectares of closed forests and 3.8 million more of open woodland are currently being cleared each year. Most of this clearance is for agricultural use, but the tragedy is that much of the land which is cleared is not suitable for permanent agriculture, and is likely to become rapidly degraded or eroded. Such land serves a much more useful productive function under forest cover, which maintains soil and water values.

We must recognize that despite current surpluses in some fortunate areas, there are enormous food shortages quite widely in the world, and that the increase of food production globally is one of the crucial problems facing Mankind. It is therefore encouraging that FAO has estimated that the increased food needs for human consumption to the end of this century can largely be met by an improvement in the productivity of existing agricultural land. They estimate that only a quarter of the needed increase in crop production will probably have to come from increasing the *area* of arable land.

Forestry Often More Productive than Agriculture

In very many respects, increased needs for food etc. can be met better by improving the management of forests than by clearing them. The agricultural productivity of the fertile plains of southern Asia is being held to ransom by events occurring in the Himalayan watersheds from which they derive their water. Deforestation in these watersheds leads to increased variability in river-flow and consequent erosion, flooding, and drought. The mountain forests are at present being cleared to meet subsistence needs of a small population of hill farmers. The activities of this small number of people threaten the livelihood of hundreds of millions of people in the plains of India, Bangladesh, and Pakistan.

Similarly in the arid and semi-arid lands of Africa, tree cover plays a vital role. It not only protects watersheds but also improves the agricultural microclimate by protecting crops against wind and erosion. The leguminous trees fix nitrogen and enrich the often impoverished soils, thus improving the yields of crops.

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These trees also produce forage of high nutritive value which is essential for the maintenance of livestock during periods of food scarcity.

Forests lands are vital sources of energy for a large proportion of the world's population. There are now 26 tropical countries in which over two-thirds of the national energy consumption is met by fuelwood. For most of the poorer people on the planet, wood is the main or only source of fuel. The destruction of forests around inhabited areas means that those people are increasingly forced to travel longer and longer distances to gather fuel, and devote more and more time and energy to the search for it. The problem is reaching crisis proportions in many countries, and in the Sahelian region the World Bank has estimated that whereas food needs could be met by relatively modest increases in agricultural productivity, the need for fuelwood is so great that it can no longer be adequately met. If the food problems are solved, then the people will still have no means of cooking their food!

Conservationists' Viewpoint and Concern

One could go on at great length listing the enormous values of forest lands and the great urgency of ensuring that those which remain are conserved for the future. I will, however, conclude this point by emphasizing those areas which are of particular concern to IUCN. These are the vastly complex and diverse forests which occur in areas of high year-around rainfall in the tropics. More than half of all the animal and plant species on Earth are thought to exist in these moist tropical forests. They represent the highest point of evolution of life, and some features of their complexity are only now beginning to be understood.

The intense competition for mineral nutrients that exists in those forests has led to the most remarkable adaptations and interrelations of different life-forms. Many plant and animal species have co-evolved to the extent that the extinction of any one of them would lead inevitably to other extinctions—such that it is predicted that tens of thousands of tropical rain-forest species may become extinct in the coming decades.

Species from the moist tropical forests already contribute a huge range of benefits to Mankind. In the future they may provide us with entirely new food and industrial crops, and they can certainly be extensively used to improve the genetic make-up of existing crops. Arguments for conserving those uniquely wonderful ecosystems nearly always emphasize the material benefits that Man can derive from them, but some of us feel strongly that we should also give some attention to the scientific interest and beauty of those forests. One has the impression that, even now, resources are more easily mobilized to protect historic buildings and works of art than to protect those fantastic products of evolution. Few people in the world understand the processes occurring in tropical forests, or have had the opportunity to see for themselves the beautiful adaptations of plant and animal life that they exhibit in innumerable ways. If only more people could have the opportunity to experience the wonders of the tropical forests, then surely demand for their conservation would be greatly increased.

It is a cause of very great concern that, even today, only about 1% of all official aid from OECD countries to the less-developed world goes towards forestry or forest conservation. In most developing countries the budgets allocated to forest departments are only 1% of those allocated to agriculture. There is now increasing realization amongst the aid-donor community that this is an unsatisfactory state of affairs, and consequently a willingness amongst many developed-country governments and intergovernmental organizations to put vastly greater resources than hitherto into forest management and conservation. One of the obstacles to improvement is that decisions on development planning which are made by the planning ministries of developing countries do not give enough prominence to forestry. It is here that there is the greatest need to increase awareness of these problems, and IUCN is contributing to this process by developing national conservation strategies in some 20 tropical countries. The idea is to ensure that fundamental environmental issues are adequately represented on the political agendas of those countries.

Some Telling Examples

A case in point should be Madagascar, where only 10% of the original moist-forest cover still survives, yet 85% of the flowering plant species of Madagascar are endemic, as are 48% of the genera. Levels of endemism are even higher in many other groups: possibly as many as 99% of the reptiles and amphibians are endemic to the island. Clearly, problems of this magnitude cannot be solved by simply establishing a small number of national parks; IUCN has therefore concentrated its effort on developing a national conservation strategy for Madagascar, and promoting it amongst the highest decision-makers in the Government. We hope by this means to ensure that all decisions concerning the allocation of the resources of the Government, and of the aid agencies which are active in Madagascar, will take account of the fact that the way in which their money is spent will determine the future of large numbers of unique species of plants and animals.

The nature and extent of the problem varies enormously from country to country. In Papua New Guinea, some 82% of the original forest cover still remains, so that considerable areas could and probably should be converted to other uses for the benefit of the population. In Sierra Leone only about 1% or 2% of the original forest is still intact, and even this is seriously degraded. Clearly here, it is essential that those fragments of forest which remain should be given total protection. And it must surely be in the overall interest of Mankind that resources are transferred from the rich countries to the poor countries, to preserve those remaining fragments in such countries as Sierra Leone. The value of those forests and the species that they contain must be of far wider than mere national concern.

Shortly before his death in 1982, the eminent conservationist and founder of the Club of Rome, Dr Aurelio Peccei, commented that: '... we lack the vision... to comprehend fully the damage that we are perpetrating by removing the tropical rain-forests, the very basis of our future welfare.' The message is clear and urgent: it is imperative that the attention, money, and resources, applied to tropical forest conservation, be vastly increased forthwith.

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GUEST COMMENT

What Next in Climatic Analysis?

The rise of carbon dioxide concentration in the atmosphere is a well-measured and understood phenomenon; CO_2 is rising world-wide at an exponential rate not far from 4% per decade, with curious year-to-year irregularities. Less well-established are probable increases in nitrous oxide, methane, and various synthetic gases, notably the chlorofluoromethanes. All these gases are active absorbers of terrestrial infrared radiation, so that their increasing presence tends to raise surface temperatures (and cool the stratosphere). Recent observed temperature changes have been in this sense.

Anyone who has spent his or her life in trying to comprehend the cause and future course of climatic variation will nevertheless be cautious about the outcome. One can indeed see the record of the past century (post-Krakatoa) as one of slowly-rising surface temperatures, complicated by very large aperiodic fluctuations that obfuscate the record. And one can estimate that the magnitude of the trend is reasonably in line with expectations from the effects of the infrared absorbers. So the facts are not discordant, as far as we know them.

But we lack what is essential to assurance—a good picture of changes in the world ocean, which is enormously more effective in storing heat than is the atmosphere. There are no equivalent long time-series of the main observed variables, and insufficient understandings of surface to deep- and intermediate-level exchanges of heat and carbonaceous 'species'. We rely extensively on specific experiments, often involving tracers, e.g. of tritium. We are forced to lean on mostly qualitative notions of the vertical exchange processes within the ocean, and of the nature of air–ocean interaction.

Paradoxically it has been from the priceless record, contained in ocean-bottom sediments, of ancient climates that we have derived much of our improved understanding of long-term climatic variation. The isotope composition of the sediments has been interpreted with brilliant consistency by a small army of specialists who have, within two decades, remade the science of palaeoclimatology.

A major challenge in the coming years will be to bind together oceanography and climatology far more closely than has yet been done in the context of contemporary processes. The means are increasingly there—satellite technology, improved observational techniques on the ocean surface and within its various layers, and a great deal of zeal among the scientists concerned. What will be needed, and what is not yet guaranteed, is long-term support by governments for the elaborate international experiments and monitoring programmes that are already in place or are being planned. Here, as in practically all other aspects of environmental work, governments are the laggards.

The year 1982 introduced several new factors into the debate about climatic change, giving it new dimensions. In March, *El Chichón* erupted, lifting into the stratosphere an immense load of particulate material that encircled the globe and noticeably dimmed the solar radiation received at observatories in Hawaii, Colorado, and elsewhere. So far, research has not demonstrated dramatic climatic consequences; but the event reawakened interest in the possibility that explosive vulcanism may offset the warming effect of carbon dioxide and its fellow absorbers.

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