# Forest Conservation

Did you know that forests are called the lungs of the environment? They are a factory of [oxygen](https://www.toppr.com/guides/science/air-around-us/oxygen-in-air/) and various other very important natural resources. [Can humans live without their lungs?](https://www.toppr.com/guides/science/respiration-in-organism/human-respiration/) Similarly, the [environment](https://www.toppr.com/guides/geography/environment/environment/) too would not survive without forests. Let us take a look at forest conservation.

## Forest Conservation



Forest conservation as the name suggests is the preservation and the protection of forests. It also involves the reversal of [deforestation](https://www.toppr.com/guides/science/forest-our-lifeline/deforestation/) and [environmental pollution](https://www.toppr.com/guides/biology/environmental-issues/). The preservation of all[natural resources](https://www.toppr.com/guides/biology/natural-resources/) is absolutely essential for the balance of our ecosystem.

## Importance of Forests

Let us take a look at why forests are so very important to us and our environment. We are basically dependent on forests for our survival. And so their conservation is of essential importance.

* The most important function of forests is that it produces mass amounts of oxygen as a by-product of [photosynthesis](https://www.toppr.com/guides/biology/photosynthesis-in-higher-plants/introduction-to-photosynthesis/). Oxygen is the main respiratory [gas](https://www.toppr.com/guides/chemistry/coal-and-petroleum/natural-gas/) for all animals, it ensures our survival.
* And while photosynthesis, trees also absorb[carbon dioxide](https://www.toppr.com/guides/chemistry/environmental-chemistry/hydrocarbons-and-oxides-of-carbon/) from the air. This is one of the main pollutants of air pollution. Hence forests also reduce [air pollution](http://toppr.com/guides/biology/natural-resources/air-and-air-pollution/).
* Forests also prevent soil erosion and keep [soil pollution](https://www.toppr.com/guides/chemistry/environmental-chemistry/soil-pollution/) in check. Deforestation, in fact, leads to soil erosion on a large scale since the topsoil comes loose.
* Forests also play an important part in the water cycle and control moisture levels of our ecosystem.
* And finally, forests are the natural home and habitat for millions of species of [animals](https://www.toppr.com/guides/biology/diversity-in-living-organisms/animal-kingdom/), [birds](https://www.toppr.com/guides/general-awareness/indian-culture/important-bird-sanctuaries/), and insects.

## Ways to Conserve the Forest

### Controlled Deforestation

While deforestation cannot be avoided completely, we must look to control it. Young and immature trees should not be felled as far as possible. We must look to avoid large-scale commercial deforestation as well. Adapting practices such as clear-cutting or selective cutting will be beneficial in the long run.

### Protect against Forest Fires

Forest fires are the most common and deadly cause of loss of forests. They can start due to natural causes or can be accidents caused by man or even intentional in some cases. Once a fire spreads in a forest it is very difficult to control. Precautions must be taken for such incidents. Making fire lanes, spreading chemicals to control fire, clearing out [dry leaves and trees](https://www.toppr.com/guides/science/forest-our-lifeline/structure-of-forest/) etc.

### Afforestation

This is the process by which we plant more trees in the area. We try to increase the forest cover by manual transplantation, or fresh plantation of trees. It is an attempt to balance our ecosystem to reduce the effects of deforestation and environmental pollutions of all types.

### Better Farming Practices

Slash and burn farming, overgrazing by cattle, shifting [agriculture](https://www.toppr.com/guides/geography/agriculture/introduction-to-agriculture/) are all farming practices that are harmful to the environment and particularly to forests. We must keep all these practices under control.

Jhoom farming is one such practice we can employ to combat forest pollution. In the North-east areas of India, where the land is kept barren after cutting the [crops](https://www.toppr.com/guides/biology/crop-production-and-management/types-of-crops/). Weeds and creepers and wild plants grow on this land and make it [fertile](https://www.toppr.com/guides/biology/human-reproduction/fertilization-and-post-fertilization-events-in-humans/) again in time. And then the [land](https://www.toppr.com/guides/geography/land-soil-water-natural-vegetation-and-wildlife-resources/land-soil-water-natural-vegetation-wildlife-resources/) is cultivated again

## Public input and awareness[[edit](https://en.wikipedia.org/w/index.php?title=Forest_management&action=edit&section=2" \o "Edit section: Public input and awareness)]

There has been increased public awareness of natural resource policy, including forest management.[[*citation needed*](https://en.wikipedia.org/wiki/Wikipedia%3ACitation_needed)] Public concern regarding forest management may have shifted from the extraction of timber for earning money for the economy, to the preservation of additional forest [resources](https://en.wikipedia.org/wiki/Natural_resources), including [wildlife](https://en.wikipedia.org/wiki/Wildlife) and [old growth forest](https://en.wikipedia.org/wiki/Old_growth_forest), protecting [biodiversity](https://en.wikipedia.org/wiki/Biodiversity), [watershed](https://en.wikipedia.org/wiki/Drainage_basin) management, and [recreation](https://en.wikipedia.org/wiki/Recreation). Increased environmental awareness may contribute to an increased public mistrust of forest management professionals.[[3]](https://en.wikipedia.org/wiki/Forest_management#cite_note-3) But it can also lead to greater understanding about what professionals do for forests for nature conservation and ecological services. The importance of taking care of the forests for ecological as well as economical sustainable reasons has been shown in the TV show [Ax Men](https://en.wikipedia.org/wiki/Ax_Men).

Many tools like [GIS](https://en.wikipedia.org/wiki/GIS) and [photogrammetry](https://en.wikipedia.org/wiki/Photogrammetry%22%20%5Co%20%22Photogrammetry)[[4]](https://en.wikipedia.org/wiki/Forest_management#cite_note-4)[[5]](https://en.wikipedia.org/wiki/Forest_management#cite_note-5) modelling have been developed to improve [forest inventory](https://en.wikipedia.org/wiki/Forest_inventory) and management planning.[[6]](https://en.wikipedia.org/wiki/Forest_management#cite_note-6) Since 1953, the volume of standing trees in the United States has increased by 90% due to sustainable forest management.[[7]](https://en.wikipedia.org/wiki/Forest_management#cite_note-7)


[](https://enb.iisd.org/forestry/iwgf.html)[](https://enb.iisd.org/)

# FOREST CONSERVATION AS WELL AS THE ENHANCEMENT OF FOREST COVER AND THE ROLES OF FORESTS IN MEETING BASIC HUMAN NEEDS

## 1. INTRODUCTION

The June 1992 United Nations Conference on Environment and Development (UNCED), underlined the necessity for all countries to develop harmonised approaches in the management, conservation and sustainable development of global forests is essential to meet the socio-economic and environmental needs of the present and future generations. To achieve this goal, the UNCED also realised, among others, the need to sustain the multiple roles and functions of all types of forests, as well as the need to enhance forest conservation, management, and global forest cover as outlined in Programmes A and B of Chapter 11 under Agenda 21, respectively. In addition, the need to ensure the conservation and sustainable utilisation of biological diversity is also emphasised under Chapter 15 of Agenda 21.

While all these are now being recognised, the priority is to operationalise and implement the UNCED programmes, bearing in mind that the full implementation of the adopted Statement of Forest Principles and the various forestry programme areas under Agenda 21 is feasible only on the basis of international efforts towards attaining concrete goals. Hence, this paper is intended to provide a basis for discussion on the implementation of specific aspects of these programmes, particularly that on forest conservation, enhancement of forest cover and the roles of forests, as well as to suggest possible areas of collaboration for national and international actions.

## 2. FOREST CONSERVATION

Forests are influenced by climate, landform and soil composition and they exist in a wide variety of forms in the tropical, temperate and boreal zones of the world. Each forest type, evergreen and deciduous, coniferous and broadleaved, wet and dry, as well as closed and open canopy forests, has its own uniqueness and together these forests complement one another and perform the various socio-economic, ecological, environmental, cultural and spiritual functions.

Recent surveys on a global basis suggest that there are about 1.4 million documented species, and the general consensus is that this is an underestimate - perhaps 5 - 50 million species exist in the natural ecosystems of forests, savannas, pastures and rangelands, deserts, tundra, lakes and seas. Farmers' fields and gardens are also importance repositories of biological resources.

In this context, it has been acknowledged that forests are rich in biological resources. Though covering only 13.4 per cent of the Earth's land surface, these forests contain half of all vertebrates, 60 per cent of all known plant species, and possibly 90 per cent of the world's total species. However, recent studies have shown that temperate and boreal forests with their extremely varied ecosystems, especially those in climatic and geographical areas where old-growth forests still occur, may be even more diverse than tropical forests in terms of variation within some species. Eventhough temperate and boreal forests generally have far fewer tree species than tropical forests, often having a tenth or less in total, certain temperate and boreal forests are now thought to be as diverse, or even more diverse, than their tropical counterparts. For example, old-growth forests in Oregon, U.S.A. are found to have arthropods in leaf litter approaching 250 different species per square meter; with 90 genera being found in the H.J. Andrews Memorial Forest research area alone (Lattin, 1990). It has been suggested that a network of 500 protected and managed areas, with an average size of 200,000 hectares, covering 10 per cent of the remaining old-growth/primary forests be the minimum acceptable target (Anon, 1991 & IUCN/UNEP/WWF, 1991).

To enhance this networking and to optimise the global representativeness of these biogeographic areas for the conservation of biological diversity, a list of these areas based on mutually agreed terms by national governments should be formulated. It should also include the identification of these biogeographic areas and the development of joint mechanisms, as well as the quantification of the costs involved and the identification of sources of fund needed to manage and conserve these areas. Joint mechanisms for possible international cooperation to establish transboundary biogeographic areas should also be implemented.

However, it has been recognized that totally protected areas can never be sufficiently extensive to provide for the conservation of all ecological processes and for all species. Nonetheless, there is a need to establish a minimum acceptable national target to be designated as forest conservation areas in each country. This effort could be further enhanced by establishing buffer zones of natural forests around the protected area where an inner buffer zone is devoted to basic and applied research, environmental monitoring, traditional land use, recreation and tourism or environmental education and training; and an outer buffer zone where research is applied to meet the needs of the local communities. Such management practices are in consonance with Principle 8(e) of the Forest Principles.

Besides the need to set aside conservation areas, it is now being increasingly realised that sustainable production of wood, through environmentally sound selective harvesting practices is one of the most effective ways in ensuring *in-situ* conservation of the biological diversity of forest ecosystems. Such selectively harvested and managed forests will retain most of the diversity of the old-growth/primary forests both in terms of numbers and population of species. The economic value of the wood and the environmental benefits produced would fully justify investments made in maintaining the forest cover as exemplified in such practices in ensuring its sustainability. The implementation of environmentally sound selective harvesting practices would go a long way in promoting *in-situ* conservation of biological diversity and the sustainable utilisation of the forest resources. In this regard, the establishment of tree plantations would alleviate the pressure on over-harvesting the natural forests in view of the increasing demand of wood from the forests.

The sustainable production of forest goods and services and the conservation of biological diversity in forest ecosystems, as well as the equitable sharing of benefits arising from the utilisation of the genetic resources would require concrete actions at both the national and international levels. In this context, it is imperative that national policy and strategies, among others, should set target on the optimum forest area for forest conservation and for the sustainable production of goods and services, as well as outline relevant measures to enhance both *ex-situ* and *in-situ* forest conservation during forest harvesting. In some cases, long term measures may include the rehabilitation and re-creation of old-growth/primary forests.

In this connection, it is imperative that countries having a high proportion of their land areas under forest cover, especially the developing countries, have access to new and additional financial resources and the "transfer of environmentally sound technologies and corresponding know-how on favourable terms, including on concessional and preferential terms", as reflected in Principles 10 and 11 respectively, of the Forest Principles; in order to ensure the sustainable management, conservation and development of their forest resources. Moreover, "trade in forest products should be based on non-discriminatory and multilaterally agreed rules and procedures consistent with international trade law and practices" and "unilateral measures,incompatible with international obligations or agreements, to restrict and/or ban international trade in timber or other forest products should be removed or avoided" as called for in Principles 13 (a) and 14 respectively, of the Forest Principles should be respected by the international community, in order to attain long-term sustainable forest conservation and management.

## 3. ENHANCEMENT OF FOREST COVER

Enhancement of forest cover is to be viewed as a proactive measure taken to arrest and reverse the current trend of forest decline and degradation. In this context, the world's forests have been under threat and are declining. It is estimated that forests covered four-fifths of the existing area at the beginning of the Eighteenth century. Of this total, approximately half were in tropical regions and half in temperate and boreal regions. However, these forests are declining as a result of deforestation. By the mid-Nineteenth century, it was estimated that global forest cover had decreased to 3,900 million hectares or 30 per cent of the world's land area. The latest figure by the Food and Agriculture Organisation of the United Nations as reflected in the Forest Resources Assessment 1990 had estimated that global forest cover as at the end of 1990 had further decreased to 3,188 million hectares or about 24.4 per cent of the world's land area. Processes of reduction and degradation of forest cover have led to an average annual loss of 0.6 per cent.

Although the annual loss of temperate and boreal forests is said to be negligible in recent time, historically, large- scale deforestration had taken place in Europe during the Industrial Revolution to cater for the needs of agricultural expansion, building materials and industrial development (Hinde, 1985). In fact, it is estimated that almost 200 million hectares or more than 50 per cent of the original forest cover had been lost (UN, 1991).

On the other hand, deforestation in the developing world is a rather recent phenomenon due to poverty, indebtedness and the increasing need for food, shelter and energy to cater for the growing population. In this regard, the four main causes of deforestation in developing countries are shifting cultivation, conversion to agriculture and pasture, wood removals for fuelwood and inappropriate timber utilisation, and the need for infrastructural development. For example, 39.5 per cent of the 1.54 million hectares of closed forest deforested between 1981 and 1990 in Africa was due to agriculture fallow and shifting cultivation, 35.1 per cent due to conversion to mainly permanent agriculture, and the balance 25.4 per cent due to over-exploitation and over-grazing (FAO, 1993a). However, as a result of improved socio-economic development in Africa, the rate of deforestation due to agriculture fallow and shifting cultivation had in fact decreased by 27.2 per cent when compared to 66.7 per cent which was recorded during the period 1976- 1980 (UN, 1991).

Besides the loss of forest cover through deforestation, there has been a general degradation in the quality and health of global forests due to acid rain and other atmospheric pollutants, especially in developed countries, as well as through forest fires, unsustainable use as a result of inappropriate logging and fuelwood exploitation.

The depletion of global forests and their degradation are causes for concern as they involve not only the loss of forest areas, but also the ultimate quality of the forests. If this trend is unchecked, the implications on the world would be catastrophic. Not only would the existence of all forest types be threatened, but the capability of these forests to perform their various roles and functions in perpetuity would also be seriously undermined. Hence, the need to address the decline in global forest areas and its degradation through enhancing forest cover is immediate.

In this context, is the current global forest cover of 24.4 per cent sufficient? If not, what level of forest cover should we aim for in order to ensure that forest resources and forest lands are sustainably managed to meet the needs of the present and future generations?

At the Ministerial Conference on Atmospheric Pollution and Climate Change held in the Netherlands in November, 1989, the Noordwijk Declaration on Climate Change advocated a world net forest growth of 12 million hectares per year by the turn of the century while a global forest cover of 30 per cent by the year 2000 was proposed at the second Ministerial Conference of Developing Countries on Environment and Development held in Malaysia in April, 1992.

There is every indication that the existing global forest cover should be enhanced through greening of the world. In this connection, restoration of all deforested lands in the industrialised world to close to the original levels of forest coverage is improbable, but this does not mean significant reforestation and afforestation are impossible. All countries which aim for a sound environmental future should set themselves a target of a minimum level of forest cover to be maintained in perpetuity. Countries having more than 30 per cent of their land areas under forest cover after taking into account their socio-economic development needs, particularly the developing countries, should be given incentives to improve the quality of their forests, as well as assistance given to reduce their dependence on wood especially as fuel. On the other hand, countries having less than 30 per cent of their land areas under forest cover, but have the means must increase and enhance their forest cover through rehabilitation and afforestation, which may include, in some cases, the conversion of heavily subsidised farms back to forests. As for those countries which are rich but are constrained by physical and climatic conditions to grow trees because of their geographic locations, they could play their roles by assisting the poorer countries in increasing and enhancing their forest cover.

As the future of forests are not only dependent on their quantity, but their quality as well, it is pertinent that all forests, especially those temperate and boreal forests of the developed countries should be protected against air-borne pollutants, particularly that of acid deposition, which are harmful to the health of the forest ecosystems. Appropriate measures should also be taken to protect forests from fire.

## 4. ROLES OF FORESTS

A well-managed forest is a constantly self-renewing resource and provides a wide range of benefits at local, national and global levels. Some of these benefits depend on the forest being left untouched or subject to minimal interference while others can only be realised by harvesting the forest. Among the most important roles of forests are sustainable production of wood and timber products, provision of food, shelter and energy, mitigation of climate change, conservation of water and soil, as well as for recreation and ecotourism. Forests are also important repositories of biological diversity.

In this regard, wood is of major economic importance as in 1990 the world's production of industrial timber was about 1,600 million cubic metres, of which about 75 per cent came from the developed countries, while international trade in wood and wood products, as well as paper and pulp is estimated to worth US$96,000 million a year, of which about US$12,500 million comes from developing country exports (FAO, 1993b). Besides, currently fuelwood comprises about 85 per cent of the wood consumed in the developing countries and accounts for more than 75 per cent of total energy consumption in the poorest countries and that over 2,000 million people use fuelwood as the primary source of fuel (UN, 1991).

In recent years, attention has also been focused on the importance of non-wood forest products which include plants for food and medicinal purposes, fibres, dyes, animal fodder and other necessities. Indonesia, for example, earns an estimated US$120 million a year from rattans, resins, sandalwood, honey, natural silk and pharmaceutical and cosmetic compounds (FAO 1990), while the local production of bidi cigarette from the tendu leaf *(Diospyros melanoxylon)* in India provides part-time employment for up to half a million women (FAO, 1993b). In this connection, it has been estimated that more than 200 million people in the tropics live in the forests (FAO, 1993b) and in some parts of Africa as much as 70 per cent of animal protein comes from forest games such as birds and rodents (FAO, 1990).

The economic value of forests in relation to floods and soil conservation is that they may allow for agricultural and even industrial development on floodplains because they contribute to the mitigation of the effects of floods and in minimizing soil erosion especially in mountainous and hilly areas. In fact a well- managed forest would provide a number of goods and services to meet basic human needs as outlined in Annex I.

## 5. RECOMMENDATIONS

### 5.1 Forest Conservation

(a) To strengthen efforts in forest conservation and the sustainable management of forest resources, it is imperative to ensure the participation of local community and that all national policy and strategies must indicate the forest area set aside for forest conservation and in the sustainable production of forest goods and services. In this context, developing countries must have access to new and additional financial resources and the transfer of environmentally sound technologies.

(b) To further ensure sustainable forest conservation and sustainable forest management, the prices of timber and timber products at the market place must fully reflect both their replacement and environmental costs, and that trade in forest products should be non-discriminatory and any unilateral measures to restrict and/or ban their trade should be removed or avoided. Moreover, expenses needed for sustainable forest management, including reforestation and afforestation must be included into the cost of all kinds of production obtained from the forest resources.

(c) A global network of well-managed and adequately funded protected areas be established. In this regard, a list of biogeographic areas that is mutually agreed by national governments should be prepared to ensure global representativeness of forest conservation areas.

(d) In order to ensure the sharing on mutually agreed terms of benefits and profits, including biotech- nology products derived from the utilisation of biological diversity, efficient and cost-effective methodologies should be developed to assess the biological resources of forests at the genetic, species and ecosystem levels, including the development of techniques to ascribe economic values to these resources.

(e) In the light of the agreement at UNCED and in accordance with the requirements of the Convention on Biological Diversity, existing forest harvesting practices should be critically reviewed to ensure effective *in-situ* conservation of biological diversity during forest utilisation. Countries should also endeavour to identify forest ecosystems or even landscapes that are threatened with irreversible changes, as well as their causes so as to enable prompt actions to be taken to arrest them.

### 5.2 Enhancement of Forest Cover

(a) Maintaining and enhancing forest cover, reforestation or afforestation will incur costs, either from opportunities foregone for alternative uses, or from benefits lost from existing land uses. Policy responses must take this into account. The legitimate rights of countries over their natural resources must be upheld. An equitable framework must be found to provide adequate compensation to those countries who undertake action to sustainably manage their forests in the wider interests of global environmental enhancement.

(b) All countries should work towards increasing their level of forest cover to be achieved over a speci- fied time-frame and actions be taken to prepare and implement national forestry action programmes and/or plans for the management, conservation and sustainable development of forests as called for in para 11.12(b) of Chapter 11 under Agenda 21. Countries having less than 30 per cent of their land areas under forest cover, but have the means must undertake concerted efforts to increase their forest cover while rich countries which are constrained by physical and climatic factors to increase their forest cover could assist the poorer nations in increasing and enhancing their forest cover. Countries having more than 30 per cent of their land areas under forest cover after taking into account their socio-economic development needs should be recognised and appropriate incentives should be given to encourage them to improve the quality of their forests.

### 5.3 Roles of Forests

(a) To effectively enhance the roles of forests in meeting basic human needs, it is extremely important that the underlying causes of deforestation such as poverty, population pressures, the need for food, shelter and fuel, as well as indebtedness, particularly in the developing countries, must be critically addressed. A consultative and participatory approach should be adopted involving all stakeholders.

(b) For the development of management measures to be effective, full knowledge on the distribution and values of non-wood forest resources should be made available at the level compatible to those currently available for the wood resources.

(c) At the landscape level, each territory should set a minimum area of forest land to safeguard the climate-and-water characteristics of the forest and that the integrity of the forest ecosystem is protected.

(d) Public awareness of the roles of forests should be strengthened at the level of social and professional groups, as well as at the family level so as to ensure that the important ecological and environmental functions of forests are further enhanced for both the present and future generations.

## 6. CONCLUSION

The above recommendations are some of the possible options that could be considered for the effective implementation of specific UNCED programmes, particularly that on forest conservation, enhancement of forest cover and roles of forsts in meeting basic human needs. Concrete actions both at the national and international levels are imperative for their effective implementation.

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## Annex I

**FORESTS' GOODS AND SERVICES**

(i)**Sustainable production of wood and timber products** for domestic use and in the generation of export earnings;

(ii)**Water and soil conservation** to ensure an adequate supply of quality freshwater and in the control of erosion and sedimentation which are of significant importance when these affect downstream investment that depend on water for transportation, irrigation, agriculture and fisheries, and recreation;

(iii)**Ecological and biological diversity** where a comprehensive system of natural forest areas are maintained as examples of the different types of natural community, landscape, and land form, and protect the full range of flora and fauna and their genetic variability;

(iv)**Mitigate climate change** both locally and globally as forests influence the composition and heat retaining capacity of the atmosphere and the heat exchange char- acteristics of the Earth's surface;

(v)**Wildlife** which are vital food sources for local communities and provide the basis for industry, sport and recreation;

(vi)**Integrated rural development** of rural lands as trees can be used to rehabilitate degraded lands and to diversify production systems such as agro-forestry;

(vii)**Recreation and ecotourism** as forests provide opportunities for healthy and constructive outdoor recreation for local residents and foreign visitors, and serve as focal points for ecotourism development;

(viii)**Education and research** for both formal and informal study and in the monitoring of the environment in natural areas; and

(ix)**Aesthetic beauty** as forests enhance the quality of the environment around towns and cities, highways and rivers, and provide areas for recreation and relaxation.