

Ch. 24 - Sustaining Ecosystems: Deforestation, Biodiversity & Forest Management

I. Forests: Types and Importance

A) Major Types of Forests

- 1) Tropical
- 2) Temperate
- 3) Polar

Human activities have reduced Earth's forest cover - from 34% to 26% of world's land area. More than 1/2 of world's forests are located in the tropics. Forests are disappearing due to deforestation and degradation. Even though they are renewable resources, forests are disappearing mostly in the tropic countries.

Between 1990-1995 at least 2 million kilometers squared of forests were lost.

Old Growth Forests: uncut forest and regenerated forests that haven't been touched for thousands of years. e.g., Douglas Fir Forests

In the US, 95-98% of these forests are gone. These forests provide homes for much of the wildlife that live in the world today.

Second Growth Forests: stands of trees resulting from secondary-ecological succession after cutting.

about 40% of all tropical forests are second-growth forests.

Tree farms/Plantations: managed forests with old trees that are harvested.

B) Importance of Forests

a) Uses of Lumber

1. housing

2. biomass for fuel wood
3. pulp for paper
4. medicines

b) Forests - lands are used for :

1. mining
2. grazing livestock
3. recreation

Over 1/2 of timber cut is used by 20% of the people for domestic purposes.

55% of wood is used for fuel wood/charcoal for heating and cooking

The US has the highest per capita use of **paper**-about 7 times the average global use.

Also the US is the highest importer of wood products,

C) Ecological Importance of Forests

- 1) They act as sponges and work like dams to stop flooding in streams
- 2) Influence climate
- 3) Vital to carbon cycle
 - a) They take up 90% of carbon removed from atmosphere.
- 4) They absorb noise, air pollutants, and nourish the human spirit.

II. Old-Growth Deforestation in the US and Canada

A) How Fast are Forests are Being Cleared in the US

30% faster than 1950.

1. Why?

- a) reversion of marginal farmlands to forests
- b) planting of tree farms,
- c) efficient use of paper and wood products
- d) paper and wood recycling
- e) substitution of all other materials for construction lumber

Most of the remaining old-forests are in US public lands in Washington, Oregon and Northern California

Current rate of cutting the forests will be gone within the next 2-3 decades.

B) Ecology of Old-Growth Forest in the Northwest

350 years for an Old-Growth forest to make its prime.

1. Functions of forests

- a) recycle nutrients in the forests ecosystem
- b) unusually rich in wildlife species
- c) act as giant sponges that hold and slowly release moisture to help protect against fires and floods and recharge nearby streams and aquifers.

C) Remaining Old-Growth Forests on US Public Lands Be Cut or Preserved?

Pacific Northwest's old-growth forests are valuable resources that could provide biologists say that the forests provide ecological, scientific, aesthetic, and recreational values which exceed the reason for the cutting for short-term use. If they stop cutting, there will be thousands of jobs lost and millions of dollars lost. Also there will have to be a substitute for the use of wood.

Many endangered species like the Northern spotted owl live in the forests.

D) Destruction of Old-Growth Forest in Western Canada

holds 10% of worlds' forests Largest exporter of timber products--> value at more than \$30 billion per year.

They have lost 60% of its forests because of logging. (Old-Growth forests)

Enacted the Forest Practices Code in 1995 which is largely being ignored.

--In 1997 the Government eased the code.

But in response to this, many labor union members, environmentalists, and citizens formed the Canada's Future Forest Alliance. --They hoped to attract attention to this problem.

awarded the Goldman Environmental Prize, Colleen McCrory.

III. Tropical Deforestation and Loss of Biodiversity

A) How Fast are Tropical Forests Being Cleared and Degraded

Cover about 6% of earth's land area.

1. Four Countries that contain more than half of world's total:

- a) Brazil
- b) Indonesia
- c) Zaire
- d) Peru

2. Tropical forests are described as:

- a) dry and very dry deciduous forests
- b) forests on hills and mountains
- c) rain forests-->rainfall daily
- d) tropical deciduous forests-->1 or 2 receive rainfall almost daily

Between 1960-1990 about 1/5 of all tropical forest cover was lost.

With about 40% of deforestation is taking place in South America.

B) Madagascar: A Threatened Jewel of Biodiversity

1. Located on Indian Ocean off the east of African coast
2. estimated about 160,000 species that are unique to this island.
3. About 800 butterfly species, and all its reptiles and mammals are considered a crown jewel among the Earth's ecosystem.
4. Because of population growth, this country will have to be careful of its species in losing them. It will have to decrease.

C) Why Should We Care about Tropical Forests?

1. Home to 50-90% of earth's terrestrial species.
2. They supply 1/2 of world's annual harvest of hardwood and hundreds of food products
3. They supply the world with materials like oils, dyes, drugs and medicines, and resins.

D) Cultural Extinction in Tropical Forests

1. 250 million people belong to indigenous cultures found in about 70 countries

they obtain their food from hunting and gathering in these forests.

2. Many tribes are being forced to leave because of the loss of their homes in the forests and the loss of their food sources.
3. 1996 Brazilian president issued a decree allowing commercial interests to challenge the tribes for land rights.
4. Governments protect the rights of the people by:

- a) establishing a UN Declaration on the Rights of Indigenous Peoples enforceable by international law
- b) mapping their homelands and giving them full ownership of their land and all mineral rights
- c) protecting their lands from intrusion and illegal resource extraction
- d) giving legal control over drugs and other products derived from their lands
- e) international org. to fight for their legal rights.

E) What Causes Tropical Deforestation

1. Primary Causes of Deforestation

- a) poverty
- b) rapid population growth
- c) exploitive government policies
- d) exports to developed countries
- e) failure to include ecological services in evaluating forest resources

2. Secondary Causes

- a) roads
- b) logging
- c) unsustainable peasant farming
- d) Cash crops
- e) cattle ranching
- f) tree plantations
- g) flooding from dams

h) mining

i) oil drilling

F) Japan: Ecovillain or Ecosavior?

NEGATIVE SIDE

1. logged lots of its forests, destroyed reefs, and built nuclear power plants in earthquake zones
2. 53% of world's timber imports
3. bought logging rights to clear-cut 63% of forests in Alberta, Canada.
4. major illegal importer of endangered and threatened species and products from them.
5. wants international ban on commercial whaling lifted
6. finances large, harmful projects...ex. dams, and roads.
7. developed country without a strong environmental movement

POSITIVE SIDE

1. leader of industrial and urban air pollution.
2. high recycling rate using a resource recovery system
3. makes/sells most cost-effective incinerators and air pollution control scrubbers
4. world's most energy-efficient country 5. slashed birth rate during 1960's 6. Gives more than \$1 billion to environmental projects
7. assumed major leadership role in 1992 and helped developing countries.
8. plans to stabilize its carbon dioxide levels

9. plans to protect and restore the earth's natural functions.

G) How Serious is the Fuel Wood Crisis In Developing Countries?

1. Harmful effects:

- a) deforestation
- b) accelerated soil erosion
- c) burden on poor families which lead to poverty and malnutrition

IV. Managing and Sustaining Forests

A) Major Types of Forest Management

1. Systems

a) Even-aged management- trees in a given stand are maintained at about the same age and size.

 Begins with 1 or 2 cuttings of all or most trees form an area. Then the site is replanted with species the same age.

b) Uneven-aged management- a variety of tree species in a given stand are maintained at many ages and sizes to foster natural regeneration.

mature trees are cut only in small patches.

B) Trees are Harvested by:

1. Selective Cutting - mature trees are cut singly or in small groups.

 a) type of this is high grading or creaming: which removes the most valuable trees.

2. Shelterwood Cutting - removes all mature trees in 2 or 3 cuttings over a period of 10 yrs.

3. Seed-tree Cutting - harvest nearly all of a stand's trees in one cutting leaving a few uniformly distributed seed-producing trees to regenerate the stand.

4. Clear-Cutting- removal of all trees in the area.

5. Strip Cutting - A strip of trees is clear cut along the contour of the land with the corridor narrow enough to allow regeneration within a few yrs.

C) Forests need to be protected from Pathogens and Insects

Other countries have introduced diseases to the trees.

- a) Chestnut blight
- b) Dutch elm disease
- c) White-pine blister rust.
- d) Fires

1. Types of Fires:

- a) Surface fires-usually burn only undergrowth and leaf litter on forest floor.
- b) Crown fires-hot fires burn whole trees and leap from treetop to treetop.
- c) ground fires- burn underground

2. Prevention of forest fires

- a) prescribed burning - setting controlled ground fires
- b) presuppression - early detection
- c) Suppression - fighting fires once they have started

E) Forests Threatened by Air Pollution and Climate Change

Air pollutants and industrial centers are harming the trees and making it easier to cause drought, diseases and insects.

Reducing coal-burning and motor vehicles.

F) Sustainable Industrial Forestry

Biologists say to leave the forests alone, the forest cutters are messing up nature's way of dealing with itself.

New Forestry-cutting trees on public lands.

G) Solutions

1. recycle more paper to reduce the harvest of pulpwood trees
2. growing more timber on long rotations
3. practicing selective cutting of individual trees
4. using road building and logging methods
5. leaving most standing dead trees
6. have services of recreation explaining their value.

H) How are Forests Managed?

1. Sustained yield
2. Multiple use

V. Solutions: Reducing Tropical Deforestation and Fuel Wood Shortages

A) Reduce Tropical deforestation and degradation

Let people know about these problems

Debt-for-nature swap

conservation easements

programs

new logging contracts

cutting canopy vines before felling a tree can reduce damage to neighboring trees by 20-40%

reducing waste and pollution

VI. Solutions Individual Action

A) Change that I can Make?

Use as little as possible! Save and recycle everything. Don't think your help doesn't matter because it does.