

Chapter 1 : Vanishing Rainforests

Presents the rain forest with its exotic plant and animal life as a place of intrigue where valuable scientific discoveries wait to be made. Species potentially useful to medical discoveries, such as a cure for cancer, could be lost forever if steps are not taken to halt rain forest destruction.

Page Share Cite Suggested Citation: Vanishing Forests and Vanishing Species. One Earth, One Future: Our Changing Global Environment. The National Academies Press. Forest clearing for agricultural and industrial purposes had created the pastoral, managed landscapes of France, England, and Germany by the eighteenth and nineteenth centuries. While forest clearing still continues in some parts, Europe and North America have more forests overall than they did a century ago. As people migrated from rural areas to cities in the transformation from an agrarian to an industrial society, they are also concerned because as trees are cut and burned, or as they decompose, they release carbon back to the atmosphere, adding to the carbon released as humans burn fossil fuel to satisfy their energy needs. The most extensive assessment of the state of tropical forests was a 3-year investigation in the late 1980s by the U. S. Food and Agriculture Organization and the U. S. Environmental Protection Agency. The study focused on two basic forest types. The first, closed tropical rain forests, have a relatively tight canopy of mostly broad-leafed evergreen trees sustained by centimeters or more of annual rainfall. The second, open tropical forests, have a canopy that is not continuous but covers more than 10 percent of the ground. When both types are considered, Brazil, Peru, Angola, Bolivia, and India each have about 3 percent. The remainder is distributed among some 70 other tropical countries. The study concluded that about 10 percent of the world's tropical rain forests would disappear altogether within 25 years from four countries in the Americas, three countries in Africa, and two countries in Asia. Within 50 years, tropical rain forests would vanish from 13 additional countries. His analysis indicates that deforestation in the Brazilian Amazon is highly concentrated in areas where colonization and immigration are intense, such as Rondonia, and that rates of deforestation increased exponentially between 1970 and 1980. Eneas Salati, a hydrologist and climatologist at the University of Sao Paulo in Brazil, and his colleagues calculate that if current trends continue, forests will be completely cleared from most of the Amazonian states by the year 2000. In developed countries, the competing interests of loggers, developers, naturalists, hikers, and hunters pose a challenge for forest management, but these conflicts pale in comparison with the challenges in developing countries. Governments, too, look to forests to provide much-needed foreign exchange as demand grows in the richer developed countries for exotic tropical hardwoods. The reasons for deforestation in the tropics are many. Rapidly increasing populations need land on which to grow food. Land is concentrated in the hands of a few, leaving millions in search of unclaimed parcels. Roads and highways are built, making the forests accessible. One of the agents of deforestation is shifting cultivation, a practice in which subsistence farmers clear and burn a plot of land in the forest, grow crops for one or a few years, and then allow the land to remain fallow for several years before repeating the cycle. This age-old method of subsistence agriculture recycles nutrients to the soil and maintains productivity of the land without fertilizers, provided the fallow period is long enough to regenerate the forest growth. Eventually, the soil becomes unproductive, crops no longer flourish, and the trees do not grow back. The assessment by the U. S. Environment Programme in the late 1980s estimated that shifting cultivation causes 70 percent of deforestation in Africa, 50 percent in Asia, and 35 percent in the Americas. Food and Agriculture Organization estimated in a report that, worldwide, three quarters of the 2 billion people who rely mostly on wood for fuel are cutting wood faster than it is growing back. With less wood available, women, the traditional fuel wood gatherers, have no option but to collect cow dung, which once would have fertilized the soil, for cooking fuel. Deprived of nutrients, the ability of the land to regenerate forests is compromised further. In the Amazon, the opening of highways over the last 20 years promoted new and easy access to forested areas. The expanded access, combined with government incentives for development of the region, made it possible for the activities associated with rapid deforestation to take place: land speculation, cattle ranching, timber extraction, clearing for cash crops like rubber, cocoa, and sugar cane, and exploration for oil!

Government policies, too, have a large influence on how forests are used. Robert Repetto, an economist at the World Resources Institute, concluded in a report that tax and tracle regimes, land tenure laws, agricultural resettlement programs, and administration of timber concessions with loggers are but a few of the policies that aggravate deforestation. He finds that these policies can contribute significantly to the wasting of forest resources. In the Brazilian Amazon, for instance, generous tax credits created over 12 million hectares of large cattle ranches, even though most of the ranches would have been unprofitable without these subsidies. On a local scale, trees protect the soil from rain and wind that would otherwise wash or blow it away. Despite the image of luxuriant growth in tropical forests, most of the soils that support them are remarkably unproductive. High temperatures and rainfall throughout the year encourage leaching of nutrients from the soil, so that few nutrients remain except for those held by the plants themselves. Once forests are cleared for agriculture, grazing, or log- ging, there is no guarantee that the trees can grow back on the impoverished soil. Haiti, for example, deforested over the centuries, sports a landscape dominated by sparse grasses and bare mineral soil and bedrock. In Haiti and other areas where deforestation has been extensive, such as in the Atlantic coast of Brazil and the mountains of southern China, not only may the soil be damaged but there are few adult trees to provide seeds for new forests. Soil erosion is a natural process. Without it, deltas would not form as soil erodes from the land and travels as sediment through streams and rivers. But the soil exposed in a defor- ested site greatly accelerates this natural process, so much so that some dams have filled with sediment far more rapidly than expected. Salati explains that, although there are very few stud- ies of soil erosion and river sediment loads in tropical areas, the few existing data do show that erosion losses can be times greater in soils changed to agricultural use when compared to similar soil covered with forest. On a regional scale, forest ecosystems recycle the rainwa- ter back to the atmosphere through evaporation from the soil and leaf surfaces and through transpiration from plants, a pro- cess so efficient that ecologists refer to tropical forests as "rain machines. With deforestation, this vigorous recycling of water will weaken and couict react to lower rainfall in the region. The rapid runoff of rainfall from deforested areas has led some scientists to link the flood in Bangladesh to defor- estation in the Himalayas. The researchers hypothesize that deforestation has made the upland watersheds of the Himalayas less able to store water and moderate the flow of water into the streams, in turn accelerating the flow of water into the Brahmaputra River and exacerbating flooding as the river flows into the Bay of Bengal. Forests assume an essential role on the global scale. The forest cover absorbs energy that would reflect back to the at- mosphere if the soil were bare. Plants take up carbon from the atmosphere as they grow, and release carbon back to the atmosphere when they are burned or die and decompose. On balance, if the amount of forest cover were to remain constant, the uptake would equal the release of carbon over the long term. But as more trees are cut than are planted worldwide, more car- bon is released to the atmosphere than is stored, adding to the carbon dioxide being released from the burning of fossil fuels for energy. Salati, with colleagues Reynaldo Luiz Victoria, also of the University of Sao Paulo, Luiz Antonio Martinelli, of the Centro de Energia Nuclear na Agricultura of Brazil, and Jeffrey Richey, of the University of Washington, find, based on a large range of estimates about rates of deforestation and how much biomass the forests contain, that annual emissions of carbon dioxide from deforestation in the Amazon alone account for 4 to 25 percent of carbon dioxide emissions to the atmosphere worldwide. The difficult task of estimating how much carbon is entering the atmosphere because of deforestation is complicated further because plants themselves respond positively to increased con- centrations of atmospheric carbon dioxide. Like sunlight, wa- ter, and nutrients, carbon dioxide is required for plant growth. With an increase in atmospheric carbon dioxide, growth can proceed more rapidly, which in turn would theoretically in- crease the amount of carbon dioxide that trees could remove from the atmosphere. Researchers have observed that in green- houses growth rates do increase over the short term when plants are fumigated with carbon dioxide. But there have been very few long-term experiments on mature trees in their natural set- tings. Quite simply, the question of whether increased con- centrations of atmospheric carbon dioxide will stimulate plant growth enough to offset some of the carbon being released to the atmosphere from deforestation is an open one. Another open question is how global warming itself could alter the distribution of forests and consequently change the amount of carbon taken up from the atmosphere. Climate mod- elers generally agree that temperature increases from human-

induced global warming would be greatest in the high latitudes. The tropics would experience only modest temperature increases. So those forests in the high latitudes of Canada, Alaska, the Soviet Union, and Scandinavia might expand northward into areas previously covered by tundra vegetation. Areas now covered with grasses would store more carbon in their biomass if they became forests. But these possibilities are speculative and require a great deal of scientific investigation. Sedjo, a senior fellow at Resources for the Future, and colleagues calculate that new forest plantations covering an area of approximately million hectares would be required to remove 2. An area approximately equal to the million hectares of newly planted forest that would remove the 2. Reprinted, by permission, from Norman J. Abatement and Adaptation, Fig. Copyright A, Resources for the Future. In the course of history, people have exploited about species for food. But the species that we have used to support the human population are only a small fraction of the total number of species on earth. Until the 1980s, estimates of the total number of species on earth ranged between about 3 million and 10 million species. Scientists and the public worry that, with deforestation and the loss of natural habitat, many of these species will be gone before they are even known to exist. These rain forests are incredibly diverse and rich in species, particularly species of insects and flowering plants, though ironically the species that live in rain forests are the least well identified. Thomas Lovejoy, of the Smithsonian Institution, estimates that between 15 and 20 percent of all species will become extinct by the year 2000 because of the destruction of tropical forests. Ecologists have identified "hot spots" around the world where habitats rich in species are in imminent danger. Why does it matter if a lone, unidentified species should go extinct? After all, extinctions have occurred in the past. The history of life is punctuated by five massive extinction episodes, the last of which is most noted because it marked the end of the dinosaurs! Such extinctions changed the course of evolutionary history, and the extinctions caused by humans will be no exception. Wilson, a biologist at Harvard University, estimates that the rate of species loss from deforestation is about 100 times greater than the naturally occurring background extinction rate that existed prior to the appearance of human beings. From a human point of view, the loss of a species is the loss of a potentially valuable contribution to humanity. At least 75,000 plant species have edible parts, for instance. Some of these species are superior to those widely used today. The tropics have provided the world with most of its edible species by far. Few people realize, as Mark Plotkin, of Conservation International, points out, that a typical American breakfast of cornflakes, bananas, sugar, coffee, orange juice, hot chocolate, and hash brown potatoes is based entirely on plant species that originated in the tropics. Many currently underexploited tropical species could become familiar sights in the U.S. No one knows how many other species have the potential to provide similar benefits to society.

Chapter 2 : Vanishing rain forests | Open Library

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Rainforests are being destroyed because industries are taking over the land for companies and homes. Half of the world's animals, plants, and organisms will be destroyed because of rainforest deforestation. Deforestation means that humans will clear the forest of all its trees. Most rainforests are cleared with machinery like bulldozers, fires, and chainsaws. This wipes out all of the animals that live in the rainforest! Deforestation is not good for the air that we breathe. Deforestation causes smoke to fill the air with carbon dioxide. Water pollution is caused because of deforestation. If rainforests are destroyed there is less rain. If there is less rain then there is less oxygen for us to breathe. This can also effect global warming. In the rainforest there are over 3, fruits. If people destroy the rainforest the amount of fruit that the Western world uses will be gone. The Indians also use over 2, fruits. This means that destroying the rainforest would not only hurt the animals but also the people of this world. Over prescription drugs are made from the ingredients of the rainforest. This means that there could be many more plants that could be used in the making of medicines that help the people of this world survive. Rainforests have been made over millions of years to turn into the incredibly complex environments they are today. These resources have included basic food supplies, clothing, shelter, fuel, spices, industrial raw materials, and medicine for all those who have lived in the majesty of the forest. However, the inner make up of a tropical rainforest is a very fragile system. Everything is so dependent on one another that upsetting one part can lead to unknown damage or even destruction of the whole. Sadly, it has taken only a century of human intervention to destroy what nature designed to last forever. Ask your parents to buy foods -- like bananas and coffee -- that are grown in a sustainable way -- In a way that is safe for the environment, for wildlife, and for people. Ask your school to buy environmentally friendly paper. Have a bake sale or school fundraiser to raise money to donate to an organization that works to conserve rainforests. Read about other children who live in and near the rainforest -- See how they and their families depend on the plants and animals in the rainforest. Tell your friends and family about how important the rainforests are, or ask your teacher to teach your class more about rainforests. Use less paper -- re-use paper instead of throwing it out. Cut it up to use as a notepad, or recycle the paper you use. Ask your parents and teacher about how they recycle their paper. Do a class project to learn more about rainforests and the plants and animals that live there -- Create a skit, write a story, or decorate your classroom to look like a real rainforest. Look at a map of the world with your parents or teacher, and point out the places where rainforests exist. Look around your home for things you use or eat that originate in the rainforest -- Think about how many things that we use every day originate in the rainforest, and how it would affect you if they were no longer around.

About the Book. Discusses rain forest ecology and its worldwide destruction, using the Amazon Basin as a case study.

Each presentation is filmed in front of a live audience at National Geographic headquarters in Washington, D. In Sumatra, the Leuser Ecosystem is one of the largest and most intact tropical rainforests left in Southeast Asia. It is the only place in the world where you have Sumatran tigers, Sumatran rhinos, Sumatran elephants and orangutan living together in the same place at the same time. Unfortunately, the Leuser Ecosystem the forest is shrinking. For the last 15 years I have been dedicating my life to saving orangutans. These orangutans are living in the Leuser Ecosystem on the island of Sumatra, Indonesia. So, the forest of orangutan is really, really precious. And not just orangutans that depends on this forest for their survival but humans depend on this forest for many, many reasons. And I would say that the orangutan is actually the guardian of the forest because they actually keep regenerating, you know. They keep planting trees. They are the best gardener of the forest. And that means actually they are the symbol of our fight against global warming. Unfortunately, the Leuser Ecosystem, the forests in Sumatra and also in Borneo are shrinking because of the bad planning. And not just orangutan that is suffering because they are losing habitat but also many other animals become victims of human-wildlife conflict. And for orangutan, being stranded is a problem. They cannot find food and a picture like this showing you like, you cannot go anywhere, and you face starvation. And you can imagine that like, with this kind of situation, where orangutan just have no trees left to go back to the forest and people can get access to actually shoot the mother and get the baby for pet-trade. This is a big male orangutan, kept there for 20 years. You can see the small door there when he was actually taken, when he was very small. Now he is lucky because he is now in safety. And this gentleman, look at that handsome. And but-- unfortunately this guy is actually really, really in trouble because he is living in a very small forest patch and we try to bring him into safety. So, we come to the plantation area and we check every tiny forest patch left in the plantation that is surrounded by palm oil plantation. And sometimes we found these things, that is sad. Orangutan cannot survive in the plantation. And we have to rescue. But we have to do it anyway otherwise they are in trouble, being shot, you know, or captured or even die of starvation. And then we have to get the mother, check their health while the orangutan is still actually asleep because of the anesthetic because we actually tranquilize the orangutan. And not just young orangutan but also male orangutan that we have to rescue. And this massive animal, you know we have to really carry into safety. Sometimes we have to go find a very best place crossing the river, and we sometimes have to cross you know, peat swamp, and then we have to move them into safety in the Leuser forest. And, this is like a happy moment when I see actually orangutan being released. This is something that we want to do, we want to achieve. This is our final goal. Keep forest as forest. We want to secure the habitat so we chop down illegal palm oil trees. And then we plant them with forest trees. And that is actually my son planting trees with me. And then, this is just showing you how we plant trees for growing forest from beginning and we actually look at it from the top. And for five years, actually we got this. So, which is really, really promising and I believe that this is like bringing you a new hope that we can do something, we can help our nature. And not only that, but animals coming back. And then this actually this is also becoming playground for many, many animals. So not only that but also many, many people, local people coming to learn and join us to actually help with the project and this being-- this bring a good momentum for local people that we can still save our forest. So, please join me and save our rainforest and orangutans. However, their species is under severe threat. As forests are cleared to provide room for agriculture and palm oil plantations, many orangutans are left without a home. This makes them more vulnerable to poachers. Sumatran orangutans, classified as critically endangered, are estimated to only have 7, left. The first time Emerging Explorer Panut Hadisiswoyo locked eyes with an orangutan, he knew he wanted to help. He founded the Orangutan Information Centre in Sumatra, which is dedicated to conserving Sumatran orangutans and their forest homes. Hadisiswoyo takes the stage to talk about his passion for saving orangutans and the incredible work his organization has done to help protect this endearing species.

Chapter 4 : Why Are the Rain Forests Vanishing? by Isaac Asimov

Malaysia is one of the world's most biologically diverse regions, but in recent years vast tracts of its forests have been cleared or degraded, with serious human and environmental consequences.

Many experts blame the destruction of the Amazon rain forest on misguided policies and government incentives which make it profitable to clear trees. April 2, By Lansing R. Shepard Special to The Christian Science Monitor The Amazon, Brazil IN a forest clearing in the north-central part of the Brazilian state of Acre, a ranch hand steps back from the sudden flash of searing heat as a kerosene-soaked brush pile before him bursts into flame. Burned, cut, knocked down, scooped out -- bit by bit, acre by acre, the Amazon rain forest is falling, not only here in Brazil, but in the eight other countries the forest straddles: At risk ultimately are not only timber worth billions of dollars, but possibly as many as a million plant and animal species, many as yet undiscovered. While the consequences of massive deforestation are certain to be felt by the few million people who live in the Amazon, the long-term impact on plant and animal life could reach far beyond the basin. It is estimated that, through evaporation and transpiration, the forest produces half its own rainfall. As the trees have disappeared, so has the plentiful rain which characterizes the forest. Could you pass a US citizenship test? How much of the original forest is already gone is hard to say. Satellite photos have enabled scientists to chart recent annual changes in the vegetative cover over most of the basin. These pictures, together with corroborative studies carried out on the ground, tell a disturbing story: Colombia, which has about 1, square miles of rain forest, is currently losing it at an estimated rate of nearly square miles a year, mostly to cattle and rice production. Venezuela, with over 20, square miles of rain forest, has lost an estimated 6, square miles to cattle and subsistence farming. Brazil, which has over 1. Cattle ranching and farming have been the primary replacements for an estimated 1, square miles of rain forest. Not only has Brazil lost the most forest in absolute terms, it has the highest rate of destruction among the countries in the basin. What has scientists from many nations and some Brazilian government policymakers worried is that the rate of deforestation appears to be increasing. They are also concerned that what remains after the trees have been cleared is often soil leached of nutrients, compacted, eroded, and permanently useless to agriculture. This is a reality which, after many years, the government of Brazil is beginning to accept. Over the past 20 years an array of government incentives has fueled internationally financed, large-scale commercial projects in the Amazon basin: But the most frequent beneficiaries of these incentives, by far, have been large agricultural enterprises -- particularly cattle ranches. While large-scale corporate enterprises in the Amazon have generally flourished, colonization programs have often floundered. Typically located on poor land at the outset, settlement projects have often been further hindered by conflicting guidance from the underfunded, understaffed agencies created to run them, by corruption at numerous levels of bureaucracy, and by policy changes engineered by politically powerful financial interests with a stake in Amazonian land. The upshot has been a high failure rate among the settlements approaching 60 percent in southeastern regions of the Amazon, consolidation of land in fewer hands, and a marked acceleration in deforestation. As highways cut through the forest, settlements are established along their routes. Peasants, enticed by promises or rumors of free land, seed, and easy credit are the first to move in to clear their assigned plots of trees. Clearing is generally a matter of knocking or cutting down the trees and burning them where they lie. Generally upland rice or maize is then planted. Nutrients released into the soil from the ashes of the burned trees support marketable harvests for a year or so before pounding rains leach them out. Thereafter, falling production forces the farmer to either abandon the land to second-growth scrub, or to plant the cleared land in pasture grass. Given the skyrocketing value of pastureland, the latter is the usual choice. At this point, the land is often sold to large landholders, especially ranchers. The ranches are frequently subsidiaries of businesses and large corporations headquartered in Sao Paulo and Rio de Janeiro. In the chaos that characterizes land ownership on the Amazonian frontier, this pattern of land consolidation is vigorous and difficult to control. Midsize, noncorporate ranchers often get peasant plots by buying up old or lapsed titles. In some areas there is a brisk business in forged and fraudulently registered deeds. Often peasants are paid just to walk away from their

land. In many cases, however, the peasants are simply forced off. The most frequent victims of these harsher methods have been squatters -- unofficial colonists who swarm around any kind of development in the basin. Recognizing no official boundaries, the squatters invade Indian reservations, forest reserves, and government-established settlements. There are also, to, Indians living in scattered groups throughout the Amazon basin. Penetration of the region -- first by road crews, then by settlers, and then by ranchers -- is frequently attended by vigorous and sometimes armed Indian resistance. The Indians, outnumbered and outgunned, either flee further into the forest or are placed on official reserves which may or may not be invaded by later waves of settlement or development. Meanwhile, peasants dislocated by the advancing front of larger landowners either leave for the slums of big cities or stay on as employees of the corporations and ranchers who have bought them out. Many push on into the forest to begin anew the process of occupation, clearing, and abandonment. It is at this point that further development of cleared land slows. As the leached soil yields poorer crops and the conversion is made to pasture, smaller landowners can make a profit by reselling their land. Those with enough capital to amass large land holdings are able to make fortunes as a result of incentives offered by the government. These incentives have ranged from direct subsidies to negative interest rate loans to multi-year tax holidays. One important incentive has been a law allowing individuals earning income on enterprises outside the Amazon to avoid a portion of their taxes on those earnings by investing that amount in cattle and agricultural projects inside the Amazon. In , the Superintendency for the Development of the Amazon, a major conduit for government development funds, ceased granting further incentives for new ranching projects in areas of forest characterized by a closed canopy and mature trees. This appears to have slowed new ranching start ups. But incentives are still in place for projects launched before . Such government incentives have increased significantly the value of land planted in pasture grass. It is this growth in land value as well as the incentives which is fueling the push to convert forest to pasture. Where this will lead is uncertain. Another positive sign is the current debate over the proposed adoption of an Amazon-wide land-use plan. Forty-five percent of the land in Brazil is owned by only 10 percent of the population -- a situation which has left some . Unless a genuine effort is made to establish a more equitable balance in land ownership, no development or settlement scheme in the Amazon -- no matter how well-conceived -- is likely to control the subsequent flood of land-hungry peasants into the region.

Chapter 5 : Vanishing rain forests: the ecological transition in Malaysia.

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Vanishing Rain Forests explores four closely related themes: first it describes the country's forests and the remarkable abundance and diversity of their flora and fauna; secondly, it outlines the processes and policies by which human activity has altered these forests since the early nineteenth century; thirdly, it examines some of the.

Chapter 7 : Disappearing Rainforests

A decade ago, 43 percent of Liberia was covered by rain forests. Since the conclusion of a brutal seven-year civil war in , environmentalists say there has been a dramatic increase in timber.

Chapter 8 : Saving Orangutans in Sumatra's Disappearing Rain Forests

A Batek Negrito woman holds her newborn child in the million-year-old rain forest where he was born near Kuala Koh, Kelantan, Malaysia. This is a typical settlement for Batek Negritos who live.

Chapter 9 : The Vanishing Rainforest by Richard Platt

Rainforests have been made over millions of years to turn into the incredibly complex environments they are today. These resources have included basic food supplies, clothing, shelter, fuel, spices, industrial raw materials, and medicine for all those who have lived in the majesty of the forest.