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Essential Task to Protect Rainforests

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ABSTRACT

Tropical rainforests are often considered to be the "cradles of biodiversity." Though they cover only about 6% of the Earth's land surface, they are home to over 50% of global biodiversity. Rain forests also take in massive amounts of carbon dioxide and release oxygen through photosynthesis, which has also given them the nickname "lungs of the planet." They also store very large amounts of carbon, and so cutting and burning their biomass contributes to global climate change. Many modern medicines are derived from rainforest plants, and several very important food crops originated in the rainforest, including bananas, mangos, chocolate, coffee, and sugar cane.

1. Introduction

A rainforest is an area of tall, mostly evergreen trees and a high amount of rainfall. Rainforests are Earth's oldest living ecosystems, with some surviving in their present form for at least 70 million years. They are incredibly diverse and complex, home to more than half of the world's plant and animal species even though they cover just 6% of Earth's surface.

Rainforests thrive on every continent except Antarctica. The largest rainforests on Earth surround the Amazon River in South America and the Congo River in Africa. The tropical islands of Southeast Asia and parts of Australia support dense rainforest habitats. Even the cool evergreen forests of North America's Pacific Northwest and Northern Europe are a type of rainforest. Rainforest's rich biodiversity is incredibly important to our well-being and the well-being of our planet. Rainforests help regulate our climate and provide us with everyday products. All rainforests have a canopy. A canopy is a layer of branches and formed at the tops of the tallest trees. The canopy can easily be 100 feet or more above the ground. In rainforests, most plants and animals live in the canopy rather than on the ground. And what a collection of plant and animal life it is! Scientists believe that around half of the plants and animals found on the Earth live in rainforests.

Rainforests are being cut mostly for economic reasons, though there are political and social motivations as well. A significant portion of deforestation is caused by poor farmers simply trying to eke out a living on marginal lands. Beyond conversion for subsistence agriculture, activities like logging, clearing for cattle pasture and commercial agriculture are sizable contributors to deforestation on a global scale. Agricultural fires typically used for land-clearing often spread outside cultivated areas and into degraded rainforest regions. Historic approaches to rainforest conservation have failed, as demonstrated by the accelerated rate of deforestation. In many regions, closing off forests as untouchable parks and reserves has neither improved the quality of living or economic opportunities for rural poor nor deterred forest clearing by illegal loggers and developers. Corruption has only worsened the situation. The problem with this traditional park approach to preserving wild lands in developing countries is that it fails to generate sufficient economic incentives for respecting and maintaining the forest. Rainforests will only continue to survive as functional ecosystems if they can be shown to provide tangible economic benefits. Local people and the government itself must see financial returns to justify the costs of maintaining parks and forgoing revenue from economic activities within the boundaries of the protected area.

In addressing environmental problems in rainforest countries, it is important that decision makers not only be concerned with the transformation of existing natural ecosystems, but also the more rational utilization of already cleared and degraded areas. To lessen future forest loss, we must increase and sustain the productivity of farms, pastures, plantations, and scrub land in addition to restoring species and ecosystems to degraded habitats. By reducing wasteful land-use practices, consolidating gains on existing cleared lands, and improving already developed lands, we can diminish the need to clear additional forest.

Countries with significant rainforest cover are generally not the world's richest. As such, rural people's day-to-day survival is dependent upon natural-resource use. Most local people living in and around forests never have an option to become a doctor, sports star, factory worker, or secretary; they must live off the land that surrounds them, making use of whatever resources they can find. Their poverty costs themselves, their country, and the world through the loss of biodiversity and ecosystem services like erosion prevention, flood control, water treatment, and fisheries protection.

Today tropical rainforests are disappearing from the face of the globe. Despite growing international concern, rainforests continue to be destroyed at a pace (32,000 hectares) per day. Tropical cover now stands at 2 billion hectares (7.7 million sq miles), an area about the size of the United States plus China and representing around 13 percent of the world's land surface. Much of this remaining area has been impacted by human activities and no longer retains its full original biodiversity.

2. Rainforest Structure

Most rainforests are structured in four layers: emergent, canopy, understory, and forest floor. Each layer has unique characteristics based on differing levels of water, sunlight, and air circulation. While each layer is distinct, they exist in an interdependent system: processes and species in one layer influence those in another.

Emergent Layer : The top layer of the rainforest is the emergent layer. Here, trees as tall as 60 meters (200 feet) dominate the skyline. Foliage is often sparse on tree trunks, but spreads wide as the trees reach the sunny upper layer, where they photosynthesize the sun's rays. Small, waxy leaves help trees in the emergent layer retain water during long droughts or dry seasons. Lightweight seeds are carried away from the parent plant by strong winds.

Canopy Layer: Beneath the emergent layer is the canopy, a deep layer of vegetation roughly 6 meters (20 feet) thick. The canopy's dense network of leaves and branches forms a roof over the two remaining layers.

The canopy blocks winds, rainfall, and sunlight, creating a humid, still, and dark environment below. Trees have adapted to this damp environment by producing glossy leaves with pointed tips that repel water. Thousands and thousands of insect species can also be found in the canopy, from bees to beetles, borers to butterflies. Many of these insects are the principal diet of the canopy's reptiles, including the "flying" draco lizards of Southeast Asia.

Understory Layer: Located several meters below the canopy, the understory is an even darker, stiller, and more humid environment. Plants here such as palms and philodendrons, are much shorter and have larger leaves than plants that dominate the canopy. Understory plants' large leaves catch the minimal sunlight reaching beyond the dense canopy.

Understory plants often produce flowers that are large and easy to see, such as Heliconia, native to the Americas and the South Pacific. Others have a strong smell, such as orchids. These features attract pollinators even in the understory's low-light conditions. The fruit and seeds of many understory shrubs in temperate rainforests are edible. The temperate rainforests of North America, for example, bloom with berries.

Forest Floor Layer: The forest floor is the darkest of all rainforest layers, making it extremely difficult for plants to grow. Leaves that fall to the forest floor decay quickly. Decomposers, such as termites, slugs, scorpions, worms, and fungi, thrive on the forest floor. Organic matter falls from trees and plants, and these organisms break down the decaying material into nutrients. The shallow roots of rainforest trees absorb these nutrients, and dozens of predators consume the decomposers! Animals such as wild pigs, armadillos, and anteaters forage in the decomposing brush for these tasty insects, roots and tubers of the South American rainforest. Even larger predators, including leopards, skulk in the darkness to surprise their prey. Smaller rodents such as rats and lowland pacas (a type of striped rodent indigenous to Central and South America) hide from predators beneath the shallow roots of trees that dominate the canopy and emergent layer.

3. Types of rainforests

Tropical Rainforests

Tropical rainforests are mainly located between the latitudes of 23.5°N (the Tropic of Cancer) and 23.5°S (the Tropic of Capricorn)—the tropics. Tropical rainforests are found in Central and South America, western and central Africa, western India, Southeast Asia, the island of New Guinea, and Australia.

Tropical rainforests are the most biologically diverse terrestrial ecosystems in the world. The Amazon rainforest is the world's largest tropical rainforest. It is home to around 40,000 plant species, nearly 1,300 bird species, 3,000 types of fish, 427 species of mammals, and 2.5 million different insects. Red-bellied piranhas and pink river dolphins swim its waters. Jewel-toned parrots squawk and fly through its trees. Poison dart frogs warn off predators with their bright colors. Capuchin and spider monkeys swing and scamper through the branches of the rainforest's estimated 400 billion trees. Millions of mushrooms and other fungi decompose dead and dying plant material, recycling nutrients to the soil and organisms in the understory. The Amazon rainforest is truly an ecological kaleidoscope, full of colorful sights and sounds.

Temperate Rainforests

Temperate rainforests are located in the mid-latitudes, where temperatures are much more mild than the tropics. Temperate rainforests are found mostly in coastal, mountainous areas. These geographic conditions help create areas of high rainfall. Temperate rainforests can be found on the coasts of the Pacific Northwest in North America, Chile, the United Kingdom, Norway, Japan, New Zealand, and southern Australia. As their name implies, temperate rainforests are much cooler than their tropical cousins, averaging between 10° and 21°C (50° and 70°F). They are also much less sunny and rainy, receiving anywhere between 150-500 centimeters (60-200 inches) of rain per year. Rainfall in these forests is produced by warm, moist air coming in from the coast and being trapped by nearby mountains.

Temperate rainforests are not as biologically diverse as tropical rainforests. They are, however, home to an incredible amount of biological productivity, storing up to 500-2000 metric tons of leaves, wood, and other organic matter per hectare (202-809 metric tons per acre). Cooler temperatures and a more stable climate slow down decomposition, allowing more material to accumulate. The old-growth forests of the Pacific Northwest, for example, produce three times the biomass (living or once-living material) of tropical rainforests.

This productivity allows many plant species to grow for incredibly long periods of time. Temperate rainforest trees such as the coast redwood in the U.S. state of California and the alerce in Chile are among the oldest and largest tree species in the world.

4. Benefits of rainforest

Ecological Well-Being: Rainforests are critically important to the well-being of our planet. Tropical rainforests encompass approximately 1.2 billion hectares (3 billion acres) of vegetation and are sometimes described as the Earth's thermostat.

Rainforests produce about 20% of our oxygen and store a huge amount of carbon dioxide, drastically reducing the impact of greenhouse gas emissions. Massive amounts of solar radiation are absorbed, helping regulate temperatures around the globe. Taken together, these processes help to stabilize Earth's climate.

Rainforests also help maintain the world's water cycle. More than 50% of precipitation striking a rainforest is returned to the atmosphere by evapotranspiration, helping regulate healthy rainfall around the planet. Rainforests also store a

considerable percentage of the world's freshwater, with the Amazon Basin alone storing one-fifth.

Human Well-Being: Rainforests provide us with many products that we use every day. Tropical woods such as teak, balsa, rosewood, and mahogany are used in flooring, doors, windows, boatbuilding, and cabinetry. Fibers such as raffia, bamboo, kapok, and rattan are used to make furniture, baskets, insulation, and cord. Cinnamon, vanilla, nutmeg, and ginger are just a few spices of the rainforest. The ecosystem supports fruits including bananas, papayas, mangos, cocoa and coffee beans.

Rainforests also provide us with many medicinal products. According to the U.S. National Cancer Institute, 70% of plants useful in the treatment of cancer are found only in rainforests. Rainforest plants are also used in the creation of muscle relaxants, steroids, and insecticides. They are used to treat asthma, arthritis, malaria, heart disease, and pneumonia. The importance of rainforest species in public health is even more incredible considering that less than one percent of rainforest species have been analyzed for their medicinal value.

5. Importance of rainforest

- Some of the most important trees in the world live in rainforests. Even though the nearest rainforest may be far away from you, they still help you every day.
- Scientists sometimes call rainforests the "lungs" of Earth. The millions and millions of trees in Earth's rainforests take in huge amounts of carbon dioxide from the atmosphere and produce much of the oxygen humans and animals depend on.
- Rainforests also help to maintain Earth's climate. Scientists believe carbon dioxide is a major factor in climate change. By taking in carbon dioxide, rainforests help to reduce the effects of worldwide climate change.
- Rainforests are also an important home to about half of the species of plants and wildlife on the planet. Many of the species found in rainforests are endangered and can only live in rainforests.
- In rainforests, most plants and animals live in the canopy rather than on the ground. And what a collection of plant and animal life it is! Scientists believe that around half of the plants and animals found on the Earth live in rainforests.
- Rainforests help maintain the water cycle through their large amounts of rainfall every year. Water produced in rainforests makes its way all over the world.
- Rainforests decrease in size, Earth's water cycle is affected, leading to droughts in different areas around the world.
- Tropical rainforests have a wide variety of tall trees, diverse plants and animals, warm climates, and lots and lots of rain
- The rainforests contain many useful products that can be found nowhere else in such great abundance. Some products simply do not exist in any other parts of the world.
- Some of the valued resources found in the tropical rainforests are special types of wood and paper products, oil and gas, land for the agriculture industry, room for building roads in very secluded areas, naturally-occurring minerals and precious metals, open land for raising cattle, and others.
- Rainforests are an important part of our life on planet. They provide us with many resources, from the oxygen we breathe to homes for many animals. Without rainforests, the Earth could run into major problems.

Here are some reasons why we should be protecting our rainforests:

1. Most of our foods come out of the Amazon like, bananas, pineapples, nuts, beans, coffee and many more. If deforestation continues at the current rate of 46-58 thousand square miles of forest each year—equivalent to 36 football fields every minute - then we could be in danger of cutting off a significant percentage of our food supply.
2. The rainforest helps to regulate the world's water cycle. Trees play an important part in the water cycle, grounding the water in their roots and releasing it into the atmosphere. In the Amazon, more than half the water in the ecosystem is held within the plants. Without the plants, the climate may become dryer and growing food could become impossible for many.
3. There are potentially millions of animal and plant species that are yet to even be discovered! If deforestation continues at the current rate, not even a quarter of these will be discovered before they are killed off! 137 rainforest species are exterminated completely every single day.
4. Over a quarter of the medicines we use today have their origins in the rainforests – and that's after only about 1% of rainforest plants have been examined for their medicinal properties! Imagine what else could be there? It's not crazy to think that our best chance of curing the diseases, such as Malaria and HIV, that plague our world, could lie within the rainforest.
5. The biggest reason to save the rainforest is the effect deforestation has on local economies. Increased flooding, lack of quality water, and inability to produce their own food causes many locals migrate to cities that lack the infrastructure for them. Or sadly, the only way they can make money is to work on plantations, worsening the deforestation problem and at times being subjected to inhumane dangerous working conditions.
6. Deforestation drives climate change. Removing trees deprives the forest of portions of its canopy, which blocks the sun's rays during the day and holds in heat at night. This disruption leads to more extreme temperatures swings that can be harmful to plants and animals.
7. Trees also play a critical role in absorbing the greenhouse gases that fuel global warming. Fewer forests mean larger amounts of greenhouse gases entering the atmosphere—and increased speed and severity of global warming.

6. Preserving the rainforests

The world's rainforests are currently disappearing at a rate of 6000 acres every hour (this is about 4000 football fields per hour). When these forests are cut down, the plants and animals that live in the forests are destroyed, and some species are at risk of being made extinct. Further, as the large-scale harvesting of lumber from the rain forests continues, the balance of the earth's eco-system is disrupted. We need the rain forests to produce oxygen and clean the atmosphere to help us breathe. We also know that the earth's climate can be affected, as well as the water cycle. Rainforests also provide us with many valuable medicinal plants, and may be a source of a cure from some deadly diseases.

Forests can be managed effectively without endangering rare species of plants and animals and without risking global environmental damage. Companies that harvest timber should not be allowed to "clear cut" large areas of forest and should be required to plant new trees after they cut old trees down. Governments should create large parks and reserves where hunting and logging are not allowed. As a world community, we must be careful not to destroy the resources that people will need in the future. Many animals from the rainforests are brought to our country illegally. Parrots and iguanas, for example, are often imported illegally. We should not buy these animals, since that encourages other people to bring in more animals.

To save endangered species, we must protect the world's tropical forests. Doing so will also help stabilize our climate. We're doing our part by urging companies to commit to stop cutting down these great forests—a commitment known as zero-deforestation. Many of the companies that harvest and use palm oil have already agreed to make this commitment. Now we're focusing on the beef and soybean supply chain.

7. Conclusion

Simply banning the timber trade or establishing reserves will not be enough to salvage the world's remaining tropical rainforests. In order for the forests to be preserved, the underlying social, economic, and political reasons for deforestation must be recognized and addressed. Once the issues are brought into the light, the decision can be made about what should be done. If it is decided that rainforests must be saved, then the creation of multi-use reserves that promote sustainable development and education of local peoples would be a good place to start. Currently about 6 percent of the world's remaining forests are protected, meaning that over 90 percent are still open for the taking. However, even this 6 percent is not safe if the proper steps towards sustainable development are not taken. Where possible, reforestation and restoration projects should be encouraged if we, humanity, hope to emerge from the current environmental situation without serious, long-term consequences.

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