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The Effects of Human Activities on Amazon Rain Forest

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ABSTRACT

The huge diversity of tree species found in the Amazon rainforest presents both an opportunity and a problem for the exploitation of non-timber products. Overall, progress towards the sustainable forest management was mixed in South America. The diversity offers vast arrays of potential harvestable crops are sparsely distributed. There are some of the timbers three species (such as the Brazil nut and rubber) found in the Amazon rainforest, which are producing non-timber products that can be harvested while the timber is maturing. It is not the most species-diverse forests which have the most potential for non-timber products; in certain areas under adverse environments, such as swamp forests and transition forests where there is a dominance of one or a few species; there is considerable opportunity to use non-timber products. The single most important plant family for such products is the palms, which often dominate the species-poor habitats. However, there are many other plant species from the species-diverse forest with potential for domestication; a number of these are described in this paper. However, recent anthropological findings have suggested that the region was actually densely populated. Some 5 million people may have lived in the Amazon region in AD 1500, divided between dense coastal settlements, such as that at Marajo, and inland dwellers.[17] By 1900 the population had fallen to 1 million and by the early 1980s it was less than 200,000 The first European to travel the length of the Amazon River was Francisco de Orellana in 1542. The BBC's Unnatural Histories presents evidence that Orellana, rather than exaggerating his claims as previously thought, was correct in his observations that a complex civilization was flourishing along the Amazon in the 1540s. It is believed that the civilization was later devastated by the spread of diseases from Europe, such as smallpox.[19] Since the 1970s, numerous Geoglyphs have been discovered on deforested land dating between AD 0–1250, furthering claims about Pre-Columbian civilizations. Ondemar Dias is accredited with first discovering the Geoglyphs in 1977 and Alceu Ranzi with furthering their discovery after flying over Acre. The BBC's Unnatural Histories presented evidence that the Amazon rainforest, rather than being a pristine wilderness, has been shaped by man for at least.

Keywords : Amazon Rainforest, Tree Species, Species Diversity

I. INTRODUCTION

The Amazon (found in South America) is largest expanse of primary forest. The forest management was mixed in South America; it was also decreasing of the forest area at the alarming rate since the period of 2000-2010 (FAO.2010.).Forests are most often defined as ecosystems with a minimum of 10% crown cover of trees and/or bamboo, generally associated with wild flora, fauna and natural soil conditions and not subject to agricultural practices. The changing area of the world's forests, including natural forests and forest plantations, was estimated to be 3,454 million hectares in 1995, or about one fourth of the land area of the Earth. About 55% of these are located in developing countries. While tropical forests occupy

less than 7% of the earth's terrestrial surface, they are home to as many as 30 million species of plants and animals, or more than half of all life forms on our planet. 3 Their importance is thus undeniable. For example, of the roughly 3,000 plants identified as having cancer-fighting properties, 70% grow in the rainforest. In addition, a single acre of tropical rainforest supports between 60 and 80 tree species. 4 Of these forests, the Brazilian Amazon is the largest contiguous region of tropical forest in the world, making it an extremely important global resource, which is sensitive to land-use changes and Destruction. The rate and future course of these land-use changes, or forest clearing, in the Brazilian Amazon is closely linked to human-use systems that replace the vegetation. Deforestation often refers to a change in land-use with the depletion of tree crown cover to less than 10%. More specifically, deforestation is the complete destruction of forest cover through Clearing for agriculture, cattle ranching, small holder agriculture, large-scale commodity crop Production and logging. Further, forest degradation through less-than-destructive logging, forest Land farming and fuel wood gathering is estimated to amount to more than the area of Deforestation, working to lower forests' overall productive capacity, As global deforestation rates have continued to soar, causing rapid and potentially severe impacts, so have concerns of how this process effects other natural cycles. Forests are the single most important repository of Terrestrial biological diversity, as well as home to many animals and indigenous peoples. Deforestation causes a loss of this biodiversity and habitat, as well as disrupts the natural carbon Cycle. Most importantly, it is the release of CO2 into the atmosphere due to deforestation, which has in turn, led to an increase in climate change in regions distant from the perturbed area.

Amazonian deforestation rates are now used to determine human effects on the global carbon Cycle. Thus, climate change is becoming one of the most serious effects of large-scale Deforestation in the Amazon .The global carbon cycle is made up of many carbon flows and stocks, proving that the interactions between land surface and the atmosphere are significant and complex. Natural stocks include oceans, fossil fuel deposits, the atmosphere, and the Earth itself when the element is present in rocks and sediments, swamps, wetlands, forests and soils. Hundreds of billions of tons of carbon as CO2 is absorbed from, or emitted to, the atmosphere through natural processes. All in all the major causes of human activities that affect Amazon rain forest are deforestation, wild fire, drought and firewood fire wood collection. The usual perception that the term tropical forests refers to evergreen tropical rain or moist forests is inaccurate. The tropical forest biome is, in reality, a mosaic of different vegetation entities including, at mid elevations of the tropics, the patchy and biogeographically restricted tropical cloud forests and, in the lowlands, the rain forest per se and the seasonally dry tropical forests (SDTFs). At least part of the biased perception of the term tropical forest stems from the fact that, by far, tropical rain forests are the most studied and, indeed, most popularized among the general public. SDTFs, in contrast, have been seriously neglected. For example, only 14 percent of articles published on tropical environments between 1950 and 2005 focus on dry forests (Sanchez, et al. 2005). Such scientific bias, however ,determines that our understanding of the planet's biodiversity, the ecosystem services it provides, and the anthropogenic threats to it in general, and to the tropical forest biome in particular, is in turn biased and will remain grossly incomplete if we do not pay attention to the SDTFs still present in the different parts of the world. The present volume is an attempt to fill part of this lacuna in our knowledge on tropical ecology by analyzing the ecology and conservation of SDTFs in Latin America. This volume represents, also, a sequel to the first and only other global synthesis, (Bullock et al. 1995) and provides a complement to some

recent efforts conducted at a more local level (Ceballos et al. 2010). SDTFs are forests with a mean annual temperature typically greater than 17 degrees Celsius, rainfall ranging from 250 to 2000 millimeters annually, and an annual ratio of potential evapotranspiration to precipitation of less than 1.0. However, by far the most distinctive character of this forest type is its seasonality, with 4 to 6 dry months (rainfall less than 100 millimeters), which in turn determines the distinctive phonology of the plants and the forest as a whole: an alternating deciduousness during the dry season, followed by an evergreen physiognomy during the rainy season. Such environmental seasonality represents a unique combination of challenges for the living biota contained within SDTFs and, accordingly, results in a series of special morphological, physiological, and behavioural Introduction. (Rodolfo et, al). All in all the major causes of Amazon degradation are listed as deforestation ,illegal logging and climate change .

Deforestation

Deformation is complete or most complete removal of tree cover and conversion of the land be defined as the semi permanent deforestation may be defined as the semi permanent depletion of threes careworn covert to less than % in this respect destination needs table made between deforestation and forest degradation with is the significant damage to forest ecosystem bit without the total elimination of forest cover ? Deforestation is one of the major cause of Amazon rainforest degradation. Based on archaeological evidence from an excavation at Cavern a, human inhabitants first settled in the Amazon region at least 11,200 years ago.]Subsequent development led to late-prehistoric settlements along the periphery of the forest by AD 1250, which induced alterations in the forest cover. Deforestation is the conversion of forested areas to non-forested areas. The main sources of deforestation in the Amazon are human settlement and development of the land. Prior to the early 1960s, access to the forest's interior was highly restricted, and the forest remained basically intact. Farms established during the 1960s were based on crop cultivation and the slash and burn method. However, the colonists were unable to manage their fields and the crops because of the loss of soil fertility and weed invasion. The soils in the Amazon are productive for just a short period of time, so farmers are constantly moving to new areas and clearing more land. These farming practices led to deforestation and caused extensive environmental damage. Deforestation is considerable, and areas cleared of forest are visible to the naked eye from outer space. In the 1970s construction began on the Trans-Amazonian highway. This highway represented a major threat to the Amazon rainforest. Fortunately for the rainforest, the highway has not been completed, hereby reducing the environmental damage. Between 1991 and 2000, the total area of forest lost in the Amazon rose from 415,000 to 587,000 square kilometers (160,000 to 227,000 sq mi), with most of the lost forest becoming pasture for cattle.[42] Seventy percent of formerly forested land in the Amazon, and 91% of land deforested since 1970, is used for livestock pasture. Currently, Brazil is the second-largest global producer of soybeans after the United States. New research however, conducted by Leydimere Oliveira et al., has shown that the more rainforest is logged in the Amazon, the less precipitation reaches the area and so the lower the yield per hectare becomes. So despite the popular perception, there has been no economical advantage for Brazil from logging rainforest zones and converting these to pastoral fields. The needs of soy farmers have been used to justify many of the controversial transportation projects that are currently developing in the Amazon. The first two highways successfully opened up the rainforest and led to increased settlement and deforestation. The mean annual deforestation rate from 2000 to 2005 (22,392 km2 or 8,646 sq mi per year) was 18% higher than in the previous five years (19,018 km2 or 7,343

sq mi per year). Deforestation has declined significantly in the Brazilian Amazon since 2004. . For a long time, it was thought that the Amazon rainforest was only ever sparsely populated, as it was impossible to sustain a large population through agriculture given the poor soil. Archeologist Betty Mergers was a prominent proponent of this idea, as described in her book Amazonia: Man and Culture in a Counterfeit Paradise. She claimed that a population density of 0.2 inhabitants per square kilometer (0.52/sq mi) is the maximum that can be sustained in the rainforest through hunting, with agriculture needed to host a larger population. However, recent anthropological findings have suggested that the region was actually densely populated. Some 5 million people may have lived in the Amazon region in AD 1500, divided between dense coastal settlements, such as that at Marajo, and inland dwellers. By 1900 the population had fallen to 1 million and by the early 1980s it was less than 200,000. The first European to travel the length of the Amazon River was Francisco de Orellana in 1542. The BBC's Histories presents evidence that Orellana, rather than exaggerating his claims as previously thought, was correct in his observations that a complex civilization was flourishing along the Amazon in the 1540s. It is believed that the civilization was later devastated by the spread of diseases from Europe, such as smallpox.[19] Since the 1970s, numerous geoglyphs have been discovered on deforested land dating between AD 0–1250, furthering claims about Pre-Columbian civilizations. Ondemar Dias is accredited with first discovering the geoglyphs in 1977 and Alceu Ranzi with furthering their discovery after flying over Acre. The BBC's Unnatural Histories presented evidence that the Amazon rainforest, rather than being a pristine wilderness, has been shaped by man for at least 11,000 years through practices such as forest gardening . source from(FAO 2002).

Deforestation caused by Human activity However, recent anthropological findings have suggested that the region was actually densely populated. Some 5 million people may have lived in the Amazon region in AD 1500, divided between dense coastal settlements, such as that at Marajo, and inland dwellers. By 1900 the population had fallen to 1 million and by the early 1980s it was less than 200,000. The first European to travel the length of the Amazon River was Francisco de Orellana in 1542. The BBC's Unnatural Histories presents evidence that Orellana, rather than exaggerating his claims as previously thought, was correct in his observations that a complex civia isedlong the Amazon in the 1540s. It is believed that the civilization was later devastated by the spread of diseases from Europe, such as smallpox. Since the 1970s, numerous geoglyphs have been discovered on deforested land dating between AD 0–1250, furthering claims about Pre-Columbian civilizations. Ondemar Dias is accredited with first discovering the geoglyphs in 1977 and Alceu Ranzi with furthering their discovery after flying over Acre. The BBC's Unnatural Histories presented evidence that the Amazon rainforest, rather than being a pristine wilderness, has been shaped by man for at least 11,000 years through practices such as forest gardening and terra preta. Terra preta (black earth), which is distributed over large areas in the Amazon forest, is now widely accepted as a product of indigenous soil management. The development of this fertile soil allowed agriculture and silviculture in the previously hostile environment; meaning that large portions of the Amazon rainforest are probably the result of centuries of human management, rather than naturally occurring as has previously been supposed. In the region of the Xingu tribe, remains of some of these large settlements in the middle of the Amazon forest were found in 2003 by Michael Heckenberger and colleagues of the University of Florida. Among those were evidence of roads, bridges and large plazas.

Amazonian Droughts

In 2005, parts of the Amazon basin experienced the worst drought in one hundred years and there were

indications that 2006 could have been a second successive year of drought. A July 23, 2006 article in the UK newspaper The Independent reported Woods Hole Research Center results showing that the forest in its present form could survive only three years of drought. Scientists at the Brazilian National Institute of Amazonian Research argue in the article that this drought response, coupled with the effects of deforestation on regional climate, are pushing the rainforest towards a "tipping point" where it would irreversibly start to die. It concludes that the forest is on the brink of being turned into savanna or desert, with catastrophic consequences for the world's climate. According to the World Wide Fund for Nature, the combination of climate change and deforestation increases the drying effect of dead trees that fuels forest fires. In 2010 the Amazon rainforest experienced another severe drought, in some ways more extreme than the 2005 drought. The affected region was approximate 1,160,000 square miles (3,000,000 km2) of rainforest, compared to 734,000 square miles (1,900,000 km2) in 2005. The 2010 drought had three epicenters where vegetation died off, whereas in 2005 the drought was focused on the southwestern part. The findings were published in the journal Science. In a typical year the Amazon absorbs 1.5 gigatons of carbon dioxide; during 2005 instead 5 gigatons were released and in 2010 8 gigatons were released. Widely accepted as a product of indigenous soil management. The development of this fertile soil allowed agriculture and silviculture in the previously hostile environment; meaning that large portions of the Amazon rainforest are probably the result of centuries of human management, rather than naturally occurring as has previously been supposed. In the region of the Xingu tribe, remains of some of these large settlements in the middle of the Amazon forest were found in 2003 by Michael Heckenberger and colleagues of the University of Florida. Among those were evidence of roads, bridges and large plazas. (From Mickelheckenberg ,et.al;2003)

Climate Change

Environmentalists are concerned about loss of biodiversity that will result from destruction of the forest, and also about the release of the carbon contained within the vegetation, which could accelerate global warming. Amazonian evergreen forests account for about 10% of the world's terrestrial primary productivity and 10% of the carbon stores in ecosystems of the order of 1.1×1011 metric tones of carbon.[49] Amazonian forests are estimated to have accumulated 0.62 ± 0.37 tons of carbon per hectare per year between 1975 and 1996.[49]

One computer model of future climate change caused by greenhouse gas emissions shows that the Amazon rainforest could become unsustainable under conditions of severely reduced rainfall and increased temperatures, leading to an almost complete loss of rainforest cover in the basin by 2100 . However, simulations of Amazon basin climate change across many different models are not consistent in their estimation of any rainfall response, ranging from weak increases to strong decreases. The result indicates that the rainforest could be threatened though the 21st century by climate change in addition to deforestation.

In 1989, environmentalist C.M. Peters and two colleagues stated there is economic as well as biological incentive to protecting the rainforest. One hectare in the Peruvian Amazon has been calculated to have a value of $6820 if intact forest is sustainably harvested for fruits, latex, and timber; $1000 if clear-cut for commercial timber (not sustainably harvested); or $148 if used as cattle pasture.

As indigenous territories continue to be destroyed by deforestation and ecocide, such as in the Peruvian Amazon indigenous peoples' rainforest communities continue to disappear, while others, like the Urarina

continue to struggle to fight for their cultural survival and the fate of their forested territories. Meanwhile, the relationship between non-human primates in the subsistence and symbolism of indigenous lowland South American peoples has gained increased attention, as has ethno-biology and community-based conservation efforts.

From 2002 to 2006, the conserved land in the Amazon rainforest has almost tripled and deforestation rates have dropped up to 60%. About 1,000,000 square kilometres (250,000,000 acres) have been put onto some sort of conservation, which adds up to a current amount of 1,730,000 square kilometres (430,000,000 acres). Anthropogenic emission of greenhouse gases broken down by sector for the year 2000. Aerosols over the Amazon each September for four burning seasons (2005 through 2008). The aerosol scale (yellow to dark reddish-brown) indicates the relative amount of particles that absorb sunlight. From http://en.wikipedia.org/wiki/files

Source http://en.wikipedia.org/wiki/files

Illegal logging

The national laws can be violated in any number of ways, such as taking wood from protected areas, harvesting more than is permitted and harvesting protected species. Illegal logging occurs around the world, and in some places, illegal logging is more common than the legal variety. This destruction threatens some of the world's most famous and valuable forests, including rainforests in the Amazon, Congo Basin, Indonesia and the forests of the Russian Far East. Illegal logging also depresses the price of timber worldwide, disadvantaging law-abiding companies, and depriving governments of revenues normally generated by duties and taxes. Poor communities near forests are often vulnerable when outsiders try to gain control over the timber nearby, which can lead to repression and human rights violations.
(From : Amazon rain forest.illegal loggging .google .com)

Source amazon rain forest.illegal loggging google .com

Fires

Fires are a natural and beneficial element of many forest landscapes, but they are problematic when they occur in the wrong place, at the wrong frequency or at the wrong severity. Each year, millions of acres of forest around the world are destroyed or degraded by fire. The same amount is lost to logging and agriculture combined. Fire is often used as a way to clear land for other uses such as planting crops. These fires not only alter the structure and composition of forests, but they can open up forests to invasive species, threaten biological diversity, alter water cycles and soil fertility, and destroy the livelihoods of the people who live in and around the forests.

Source (from Fire generally has the following distribution in Amazon rain forest metoffice.gov.uk

Fire generally has the following distribution in Amazon rain forest

Fire-sensitive, fire-dependent, and fire-independent vegetation in South America, high¬lighting the Brazilian biomes (Amazon rainforest, Cerrado, Caatinga, Pantanal, Atlantic rainforest, Pampas) from (Hardesty et al. 2005).

Impacts Amazon rain forest degradation

Forests are more than just a collection of trees they are integrated ecosystems and home to some of the most diverse life on Earth. They are also major players in the carbon and water cycles that make life possible. When forests are lost or degraded, their destruction sets off a series of changes that affect lifbothlocally and around the world.

Reducd Biodiversity

About 80% of the world's documented species can be found in tropical rainforests—some of the forests most vulnerable to deforestation. When species lose their forest homes, they are often unable to subsist in the small fragments of forested land left behind. They become more accessible to hunters and poachers, their numbers begin to dwindle and some eventually go extinct. Even localized deforestation can result In extinctions as many unique species exist in small isolated geographic locations in the world. (FAO.2002) Increased Greenhouse Gas Emissions

Forests help to mitigate carbon dioxide and other greenhouse gas emissions, but they become carbon sources when they are cut, burned or otherwise removed. Tropical forests hold more than 210 gigatons of carbon, and deforestation represents around 15% of greenhouse gas emissions. These greenhouse gas emissions contribute to rising temperatures, changes in patterns of weather and water and an increased frequency of extreme weather events. For example, in Sumatra, rainforests on deep peat lands are being cleared, drained and converted to pulp plantations, contributing to Indonesia's high greenhouse gas emissions. Changes in climate can affect forest-dwelling creatures by altering their habitats and decreasing availability of food and water. Some will be able to adapt by moving to higher elevations or latitudes, but species losses may occur.

Disruption of Water Cycles

Trees play a key role in the local water cycle by helping to keep a balance between the water on land and water in the atmosphere. But when deforestation or degradation occurs, that balance can be thrown off, resulting in changes in precipitation and river flow.

Increased Soil Erosion in Amazon rain forest

Without trees to anchor fertile soil, erosion can occur and sweep the land into rivers. The agricultural plants that often replace the trees cannot hold onto the soil. Many of these plants—such as coffee, cotton, palm oil, soybean and wheat can actually exacerbate soil erosion. Scientists have estimated that a third of the world's arable land has been lost through soil erosion and other types of degradation since 1960. And as fertile soil washes away, agricultural producers move on, clearing more forest and continuing the cycle of soil loss.

Disrupted Livelihoods

Millions of people around the world depend on forests for hunting, gathering and medicine, forest products such as rubber and rattan, and small-scale agriculture. But deforestation disrupts the lives of these people, sometimes with devastating consequences. In the Greater Mekong in Southeast Asia, where land tenure systems are weak, deforestation has contributed to social conflict and migration. In Brazil, poor people have been lured from their villages to remote soy plantations where they may be abused and forced, at gunpoint, to work under inhumane conditions .(source : © WWF-Canon / Simon Rawles)

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