

LIBERIA: AN ENVIRONMENTAL APPRAISAL**Kofi Johnson Ph.D. And Adegoke Ademiluyi, Ph.D**

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ABSTRACT

Among the leading causes and effects of environment degradation is deforestation. It is very alarming at the rate of which forest of the world are disappearing, which are the greatest sustaining elements on earth. Forests accounts for almost 60% of the plants and are homes to many living organisms on our planet. If the rate of which forest are disappearing are not stopped the consequences will be catastrophic. Deforestation has contributed to depletion of the ozone layer which poses harmful solar radiation that leads to global warming. African experiences uncontrolled erosion that tropical forests are disappearing through logging, mineral extractions, and wood fuels for household energy. This study uses Liberia as a case study to illustrate the impacts of deforestation and their causes. The paper concludes by recommending measures to be adopted for forest conservations through government agencies.

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KEYWORDS: deforestation, logging, agriculture, fuel wood, mineral extraction**INTRODUCTION**

Deforestation is a two edge knife which has become a major concern in the developing countries. Many studies on the subject have conveyed the impression that many developing countries are on the verge of being transformed into vast deserts and Barren Mountain of watersheds (Allen and Barnes, 1985). See also Barney 1980; Eckholm 1975; Daniel and Kulasingan 1974. In another breathe other studies dismiss the extensive pessimism surrounding the topic on deforestation and concluded that there will be abundant forest resources in both near future (Allen and Barnes, 1985).

The term deforestation connotes many different changes in ecosystems. Wherever it occurs, deforestation affects a particular geographic area. For this reason, it is a cause for serious concern in the affected regions of the world. It takes the shape of loss of forest cover which has adverse effects on the supply of wood fuels for household energy, soil and water resources and quality of rural life. Experts maintain that if deforestation is widespread, it can have global repercussions (ibid.).

Experts disagree on the magnitude and causes and consequences of deforestation (Allen and Barnes 1985; Fearnside 1982; Lugo and Brown 1982). This is attributed to generalization regarding the causes of deforestation.

This paper is an examination of the causes of deforestation in Liberia. The paper demonstrates that forest conservation should be most desirable policy. Furthermore, the paper concludes by recommending

measures to be adopted for forest conversation in the country.

The study uses Liberia as a case study to illustrate the impact of deforestation and their causes. Deforestation has been attributed as the ecological degradation in Europe, the Middle East and Asia (see Allen and Barnes 1985; Myers 1980, 1982, 1983). It was not until 1970 that awareness of deforestation shifted to Africa.

Why Concerns for Deforestation:

In recent years, deforestation has been a rising concern among scientists especially with the recognition that it may exacerbate climate change globally. In many studies conducted in the 20th century, they show that half of humankind lived in urban areas because large areas have taken over rural areas and expanded into remaining forests in order to supply both domestic and urban populations (Science Daily, 2010).

In addition, the rate at which forests is been cut down for timbers are alarming. For example: Large companies clear vast areas (a glaring example Firestone in Liberia). The outcome of these activities is that plants and animals are gradually diminishing as the habitats are degraded.

The major concerns to scientists are that forests serve as sources of wood, food, drugs and species. If forests are being degraded, the end result would be extinction of species which depended on the forests for their livelihood.

Forest acts as a major storage of carbon dioxide. Trees and plants take in carbon dioxide from the atmosphere and releases oxygen to the atmosphere through the process of photosynthesis. Consequently, the forest serves as a “carbon sink” removing the harmful carbon dioxide and releasing oxygen which supports life on our planet. Therefore, the consequences when forests are cleared and the trees are either burnt it leaves the atmosphere with concentration of Carbon dioxide which scientists believe as the source of greenhouse effect. It is believed that deforestation contributes one-third all carbon dioxide releases. (see Enviro facts “Biodiversity)

A BRIEF GEOGRAPHICAL ASPECT OF LIBERIA

African continent loses about 1.3 hectares of land annually. Fifty-five percent of this occurs in West Africa of which Liberia is included. According to Food and Agriculture Organization (FAO) report in 2003, it was estimated that a total area covered by forests was 4,456,000 hectares (about 11 million acres of land area of 92,240,000 hectares). In the same year, the same report estimated that, only 325,000 represents planted forests. It is estimated that 484 plant species in 112 families including medicinal herbs and fruits are threatened with extinction due to habitat destruction and forestation (Terra Daily, 2007) Worldwide, forests account for 55% of plants and are homes to two thirds of living organisms on earth (Akinyeye 1997 ,p. 86). If the trends of deforestation continues worldwide, the consequences would be the disappearance of forests on the surface of the planet.

The Republic Liberia is a small West African state with an area slightly larger than Tennessee and has a population less than 3.4 million (CIA Fact book 2005). Liberia has tropical climate. It is bounded by Sierra Leone to the North West, Guinea to the North, Cot d’ Ivory to the east and the Atlantic Ocean to the South West. It has a total land area of: 37,189 sq mi (96,320 sq km); total area: 43,000 sq mi (111,370 sq km). Liberia is can be divided into four major geographic terrains and vegetation distributions. They are: the coastal plain, the belt rolling hills, mountain ranges, plateaus and the northern highland. (Somah 1995).

THEORETICAL FRAMEWORKS AND LITERATURE REVIEW

The following section delineates the pertinent theory and literature review as a framework in understanding deforestation.

Malthusian Perspective: The first argument propounded by scholars regarding effects of society on the environment focused on population-based change (Erhardt-Martinez 1998). This is rooted in

Malthusian perspective which states that expanding populations eliminate gains in productivity, consequently require the clearing of vast areas of land. This school of thought is championed by Erlich and Ehrlich (1991) and Commoner (1994). According to this school the primary cause of environmental degradation is population growth (discussed by Hardin, 1993).

Technological Change

Most studies have found that technology influences deforestation rates that socio-environmentalists have begun to focus on impact of technology on deforestation. One of such works is Arild Angelen’s (editor), *Technological Change and Deforestation: A Theoretical Overview*. The book argues that “when technological changes make agriculture as the frontier more profitable, deforestation increases p. 24.” The consequence it leads farmers to expand their activities into the forests, thereby increasing the rate of deforestation.

Economic Development

Another school of thought argues that economic growth increases deforestation by expanding availability of capital for productive ventures such as mining, logging and plantation agriculture (see Inman, 1992; and Rudel1989). On the other hand, Barnes in his research found no significant correlation between economic growth and deforestation.

But, Geist and Lambin (2002) disagree, and suggest that causal factors of deforestation are driven by economic factors, institution, national policies. They suggest that overland transportation followed by commercial wood extraction; permanent cultivation and cattle ranching are the leading cause of deforestation.

Erosion Connection

Patz, Graczyk, Geller, and Vittor (2000) argue that deforestation is one of the most disruptive changes affecting parasitic vector of population. They wrote that when the forest is cleared and erosion of the soil strips away the thin layer of nutrients may take up to 50 years or more before the area resembles its former state, if indeed, it is permitted to regenerate. With this in mind, it is safe to say that deforestation has become the permanent destruction of indigenous forest as well as the woodland which tend to support the populace and forestation is slowly becoming the most destructive changes affecting developing nations population

Other Voices on Deforestation

The parliamentary Conference on population in Africa contends that the rate of urbanization is a major cause pressing demographic problems and recommended on dispersing population. The report

suggests that there is an apparent need to manage and conserve forests in Liberia and keep the environment conducive to human habitation. Thus avoiding deforestation to reduce and conserve carbon pools is the ultimate part of a diverse resource in forest. (Watson, et al. 2000). And according to Lund (1999) deforestation is the rate at which tropical forests are deforested as determined by the willingness of groups and or services derived from forestation as well as the cost and value of inputs needed to deforest.

The World Bank estimates that well over 1.6 billion people depend to some extent on forests for their livelihoods. It further explains that about 60 million indigenous are completely dependent on forests; some 350 million people live in or in direct vicinity of the dense forests for their livelihoods. Thus in developing countries about 1.2 billion people rely solely on agriculture and extensive farming that brings sustainable agricultural productivity which also generates income (World Bank, 2002).

While these are fairly broad descriptors, Fry (2008) suggests that the issue of deforestation is complex and that durable solutions are required to address deforestation and forest degradation.

Deforestation in Liberia

Among the problem facing Liberia after a prolonged civil war are tropical rainforest deforestation, soil erosion, loss of biodiversity, pollution of coastal water from oil residue and raw sewage. Deforestation is said to have caused by wood energy, fuel wood, charcoal, agricultural expansion, and population growth in developing countries.

Researchers and environmentalists noted that Western part of Africa is populated with well over 8, 500 types of plants. The fate of these plants is in jeopardy by the amount of trade in woods on the tropical rain forest as well as its environmental impact. In addition, there is a plethora of plants and animals as well as insects in danger of regional extinction if the rate at which tree are cut down and used for domestic is not checked. Thus deforestation continues to have devastating effects on other environments adding to the global warming and further bio-diversity problems.

The drivers of deforestation vary from country to country. In Liberia, subsistence agriculture often using slash-and burn/ fallow techniques is the most important cause of forest loss. For example, since 1990 deforestation has increased by 17% and the primary forest has fallen by 1.3 % of the total land (Mongabay.com). By 2005, Liberia lost 22.3 of its forest cover or around 904,000 hectares (Ibid.)

Pressure on Liberian forest has intensified in the last few years due to the upsurge of logging and agricultural expansion. Logging operations have

reached an unprecedented proportion with 60% of the country's land severely degraded (WRM's bulletin). Not only log extraction and agricultural practices are disturbing the forest, roads constructed by the logging companies into the forests make movements of hunters easier thus exposing endangered species to further threat.

Another agent of deforestation in Liberia is mining. According to Hofstatter (2001), the method of production for small diamond mining ranges from basic methods of digging, washing and sifting to the use of equipment as water pumps and excavators. The most common method is highly intensive process whereby large group of people dig the earth and wash and sift the ore for diamonds. The environmental impact of the small scale mining is severe. The areas suspected of containing diamond become exposed and unsuitable for farming. Miners remove vegetations and economically valued trees. Their activities expose the soil, consequently increase erosion. Additionally, it exposes communities to wide range of health hazards such as malaria and typhoid (ibid).

THE CAUSES OF DEFORESTATIONS IN LIBERIA:

Economic and Social Development

Rubber, coffee, cocoa, rice, cassava, sugarcane, bananas, Sheep, goats, and timber form the core of the main crops in Liberia. All these crops are grown every year through shifting cultivation considered a major cause of deforestation. Liberians see deforestation in terms of economic and social development as a result; they are quick to cultivate new land year after year for agricultural purposes, neglecting the farmland used the previous year. They cut trees to make way for community development with no sense of replacing trees lost to these activities. Furthermore, those displaced as a result of the long years of wars and degradation are now back and looking for new places to cultivate and build new communities. The end result as in every other African country where new developments are erected constantly is loss of oxygen in all forms and reduction in carbon pools. Thus, there is tremendous increase in health related issues especially in the high amount of pollution that continues to pose health hazards to Liberians.

The impact of deforestation is directly related to Liberian economy and individual's welfare. Deforestation devoid the land of its main nutrients of soil hence loses the ability to retain water. The perception among farmers is that old farm is no longer productive, and as such, not receptive to effective production yield. Furthermore, trees are not planned to supplant the old ones that have either been destroyed or otherwise cut down.

Over the years, many studies have focused on observable drivers of deforestation, which include activities such as commercial logging that ultimately opened the forest to exploitation by those who have little or no regard for forestation. This is further compounded by lack of enforcement by the government to see that trees are replaced when they are cut. Other factors include population pressure and migration, economic incentives to convert forestlands into other uses. All of these factors according to Pearce and Brown (1994; Kaimowitz and Angelsen, 1997; van Kooten, et al, 1990; Foster and Rosenzweig (2002) contributes enormously to deforestation

Logging

There is a limited amount of data available on Liberian timber export figures which show that connection between the logging industry and President Charles Taylor makes it almost impossible to access records that reflect actual logging activity and revenue despite the existence of a Liberian regulatory body.

According to the Liberian Forestry Development Authority (FDA), which is a government body assigned to monitor and document forest practices and exports; the export value in 1999 was valued at USD 21 million. This is unlikely to be the genuine export figure. In contrast the known import value for Liberian timber gives an approximate value of USD 29 million – a difference of some USD 8 million. However this differential can be partially accounted for in the costs of transportation and is therefore not an indicator of missing revenue.

There are four ports in Liberia: Monrovia, Buchanan, Greenville and Cape Palmas also commonly known as Harper port. These are used to export timber and other commodities. According to several sources, extensive illegal activity is conducted from these ports, particularly Buchanan port. However, a source in the Liberian timber industry has also stated that a new method of loading cargo from beaches exists without the need for port facilities.

Illegal logging was at its peak during the civil war in Liberia and especially in the rebel controlled area of the war. This illegal logging allowed them to pay in part for the war effort and in essence destroying the ecological and deforesting the forests. This is further compounded by the inability to replace the trees that fell victims to the warring factions during the war.

Currently there is no reliable data or estimate as to the amount of revenue that President Charles Taylor gained as a result of the Liberian timber industry because to date very limited research has been carried out on the subject. For this reason it is not possible to give figures and it is clear that there is an urgent need

for reliable research to be carried out. However, a wide number of observers have noted that the forestry sector provides the bulk of President Charles Taylor's funds. According to sources, he uses this income to provide the RUF with funding, arms, training and logistical support.

Logging is a major industry in Liberia and its economic impact is beyond question. It was among the resources that financed the civil war that ravaged the country for several years. (Global policy, 2001). According to the Liberian FDA, there is no reliable data or rather estimate to approximate the amount of revenue during Charles Taylor administration and through the war. Estimates ranges from observers noted that the forestry sector contributed enormously to the funding the war effort. As a result, keen observers agreed that revenue from logging provided the RUF with funding for arms, training, and logistical support. (Global policy, 2001)

Logging accounts for a major deforestation problem in Liberia. Industrial logging destroys livelihoods of forest and forest-dependent people who, deprived of the resources they depend on, become poor. Thus, contrary to official discourse, logging does not lead to development; it results impoverishment and social disintegration. Women are disproportionately affected by logging activities, which provide them with no employment opportunities while depending on the resources they traditionally use and manage. (WRM Bulletin, 2001).

Because Liberia has a great deal of rainforest, logging has been enormous especially for economic and construction purposes. Logging in Liberia brings revenue to the local people; almost every area of the country is engaged in one form of logging or the other. This is further compounded by the long war that ravaged the country and poverty that contributes greatly to deforestation where local people are short of money, they result into serious and illegal logging for plywood and as a result depletes the trees in the forest in order to raise sash with little or no government regulation

The problem in Liberia is that when people cut down trees, they tend to cut the tree from the very bottom creating what the (Waste. Org.1994) called full harvesting. The idea here is that people harvest the whole tree rather than the trunk alone. The organization noted that this method of cutting the tree from the trunk removes the nutrients that are otherwise stored in the rainforest trees. Thus, when the whole tree is down, all nutrients are removed, leaving the land barren, unable to reproduce and ultimately no replacement.

The organization concluded that when the trees are removed from the forest, it creates a vacuum, this

vacuum can take hundreds of years to regenerate thereby compounding the problem of deforestation as it allows sun ray to penetrate the dry soil. The soil dries concluded valuable nitrogen is lost and drier soils allow soil erosion multiplying the problem of deforestation. (Waste.Org, 1994)

From 2000 to 2002, forestry represented the country's most important economic activity. Between 50–60 per cent of the nation's foreign exchange and accounted for 26 per cent of GDP. In March 2003, the International Monetary Fund (IMF) stated that the near term growth prospects of the Liberian economy would rely primarily on timber products from the regions unaffected by the conflict and warned that without effective control mechanisms the viability and long-term sustainability of the forests would be endangered. (IMF, 2005)

Agriculture

The main source of livelihood of most Liberians is agriculture. (Ejigu, 2006) Farming techniques in Liberia are somewhat primitive like in any African country. Cultivation is done in the dry season in anticipation of the planting season that allows the rain to fall and thus germinate food crops. As in every area of Africa, the rain forests drenches the soils with appropriately drained soils, and strongly leached to make Liberia well suited for tree crop agriculture than to annual field-crop production. In 2004 according to (IMF 2005) agriculture and fisheries sector accounted for 51.9 percent of Liberia's gross domestic product. Rice and cassava dominate the food production; in 2004 they accounted for 18.8 percent of the total agricultural value added, respectively (IMF 2005) Before the war, rubber accounted for much of the value added in agriculture, generating well over 100 million dollars export earnings annually (FAO, 2005) Six foreign-owned concessions produced over two-thirds of the rubber crop; with Firestone's Harbel plantation Firestone ended its long association with Liberian rubber production with the sale of its interests to the Japanese-owned Bridgestone in 1988. (FAO, 2005)

Fuel Wood (for cooking)

The habit of gathering woods for domestic use and especially for cooking in Liberia is a detriment to forestation and if something is not done to combat and curtail this excessive fuel wood gathering, it will be catastrophic to future generations. Thus if trees are cut down concerted efforts must be made to grow and plant trees to ensure continue carbon dioxide continues to be captured and supply (IPCC 2000) Thus the problem here then manifests itself into two fold, one is the need to cook especially in the rural areas where the only means of cooking is fuel wood; and the second fold concern centers around those in the urban centers who cannot afford to buy gas or the

fuel needed to prepare food will result into going to the bush to fetch woods.

Burning of fuel wood for cooking and charcoals in Africa is done at an alarming rate, it is estimated that that the entire population of Liberia is dependent on charcoal and fuel wood as a means of satisfying their basic need for cooking and as well as heating. It is also considered an important source of employment for women, young men, and children. It is used to supplement family incomes in most cases. Charcoal production in Liberia is said to contribute to devastating of the forest because trees are chopped for charcoal. This in turn exposes the surface of the soil. Consequently, removes the soil nutrients according to the World Health Report (2004)

In their survey of both urban and rural communities in five Local Government Areas (LGA) of Oyo State in Nigeria A. T. J. Ogunkunle and F. A. Oladele **showed** that 76% of households depend on fuel wood for cooking. These observation is similar to Liberia where kerosene and gas are the major cooking fuels, majority of people rely on them for cooking. Inability to afford them result to felling trees to fuel woods that lead to massive deforestation. Consequently, the total annual wood consumption for fuelling by bread bakers, food sellers and domestic cooking was estimated to thousands of metric tons in Liberia.

Liberia lost an average of 60,300 hectares of forest per year. This amounts to an average of annual deforestation rate of 1.49%. Between 2000 and 2005, the rate of forest change increased by 17.3% to 1.74% per annum. In total, between 1990 and 2005, Liberia lost 22.3% of its forest cover, or around 904,000 hectares. Measuring the total rate of habitat conversion (defined as change in forest area plus change in woodland area minus net plantation expansion) for the 1990-2005 intervals, Liberia lost 22.3% of its forest and woodland habitat. Severe deforestation that is driven by uncontrolled demand for fuel wood coupled with export has reduced the forest cover to a dangerous level if not checked.

Impact of War

The impact of a prolonged war is another factor attributed to deforestation in Liberia. The 1992 Rio Declaration states that, "Warfare is inherently destructive of sustainable development. States shall therefore respect international law providing protection for the environment in times of armed conflict and cooperate in its further development, as necessary."

In Africa most of the armed conflicts between nations or within nations occurred during the 20th century with some lingering into the 21st century. Countries such as Nigeria, Namibia, Angola, Uganda, Sierra Leone, Ethiopia, Eritrea, South Africa, Zimbabwe,

Somalia, Sudan and Liberia had their own share of warfare and the devastation of its environment as a result of prolonged wars. It must be noted that some of these wars were wars of liberation such as in South Africa, Zimbabwe, Eritrea Angola and Mozambique. While others were hopeless wars between warring factions that created enormous environmental problems years after the war ended.

The Liberian environmental situation is seen through the nine year war that displaced many civilians who are now coming back to rebuild their lives. In the process cultivates forestlands for temporary sites. The World Bank study through the United Nations Environmental Program noted that there are 350 000 Liberians in asylum in countries across West Africa including 147 300 in Guinea, 68 000 in Sierra Leone, 67 000 in Cote d'Ivoire, Ghana has 42 500, Gambia, 900, Nigeria, 6 000, and some 20 000 in other countries.

Regardless of what brought about the war, it is usually fought in densely populated regions, over the division of scarce resources such as fertile farmland and natural minerals. In all, it might be extremely difficult to come about the impact of environmental destruction in these wars; nevertheless, there will be loss of biodiversity,

Famine, sanitation problems at refugee camps, fuel woods would be considered some of the effects and after effects of environmental dilemma facing African countries of which Liberia is no exception. During the Liberian conflicts, many areas populated by trees were destroyed. This also caused massive deforestation.

War is a destructive agent. It leaves its impact on the environment. In Liberia, the 14 years of armed struggles left the country with the destruction of ecosystem which include loss of wildlife as animals were hunted for bush meat. Many buildings were destroyed by bombing raids. The release of deadly pollutants affected rivers, flora and fauna. As people fled from rural areas into the urban centers, a basic necessity of sanitation became non-existence. Tones of woods were destroyed daily and wild lives killed for food and rapid deforested became order of the day... (see Mannion 2003)

Impact of road construction

Developmental projects such as road construction and building of dam usually lead to deforestation. During the development phase of the ---- so many hectares of land were used for road, and building construction. Roads have been constructed to serve local communities. These roads open forest areas to logging and agricultural activities. New roads will either favor forest clearing for commercial crops or

further stimulate the continue practice of shifting cultivation.

Thus, as loggers continue their quest looking to cut down trees, they build roads far into the forests; they clear the forest, cut their trees and never reseed (Walker, 1987). Loggers cut down matured trees, thereby leaving the soil bare. After the loggers abandoned the forest, they had already discarded and leave, farmers would then move in to use the lands. Farmers will now occupy the land and begin to use it for agricultural purposes (ibid.) this puts the land at a disadvantage of regenerating.

It must be noted that the war in Liberia created enormous damage to environmental infrastructure. There was extensive destruction of basic infrastructure, as a result of which the transport infrastructure base is greatly diminished and needs to be rebuilt. Most of the 10 000 kilometers of existing roads are in an extreme state of disrepair, and they are often completely impassable during the rainy season.

Beside the implications of large scale, the direct result in Liberia is that forest cover is removed enhancing run -off and erosion. Loss of forestation can also make rainfall more erratic thus lengthening dry period which countries are experiencing recently (Forestmonitor.org). In addition, logging destroys natural habitats resulting in the loss of bio-diversity possible leading to extinction of certain species (ibid). Consequently, the use heavy machinery for logging seriously reduces the forest ability to carry out its environmental and ecological functions.

Adolphus G. McCritty is Architect/Construction Engineer for Design Builders D'Christell, Inc. lamented the condition of roads in Liberia. The Desk Study on the Environment in Liberia (UNEP, 2004) called attention to the poor conditions of road in Liberia, noting that only 6.2 percent of the total network of 10,600 km was surfaced. The study observed that most roads are impassable in the rainy season, that unpaved roads causes air pollution as a result of excessive amount of dust. The study also noted that the surfaces of water ditches are clogged with waste that eventually causes flooding as well as high health risks. And like in many developing countries, the movements from the rural to urban areas continue to create an avalanche of unplanned and dense nature of housing in towns restricting access for large vehicles, such as emergency, commercial, water swage, and waste disposal. This is further compounded by the poor maintenance of motor vehicles that runs on diesel or regular gasoline which in turn generates lots of carbon monoxide and lead pollution. (UNEP, 2004)

Mineral Extraction (e.g., diamond, etc)

The exploitation of mineral resources took on a new dimension in Liberia especially during the war. Liberia is among countries endowed with enormous mineral resources that include: Iron ore, timber, diamond and gold. These Minerals continue to contribute to national wealth and to the socio economic development of the country. Adekoya (2003), and Ajakaiye, (1985) noted the importance of mineral resources to the wealth of a nation prior to being exploited and pass through stages of exploration, mining, and processing. It is not surprising to see the aforementioned stages damage to the environment would have occurred during the exploitation of the minerals. These minerals have been exploited on a large commercial scale since the early part of the 20th century with significant contributions to socio-economic development of the country (Kogbe and Obialo, 1976). These mineral extractions have contributed greatly to the environmental problems and degradation of Liberia and continue to damage the infrastructure of the country.

The areas from which the minerals are being extracted suffer the most environmental problem and immense degradation and devastation not only in their vegetation but also to landscape.

As the conflict ruined the manufacturing and iron mining sectors, timber harvesting and Alluvial, diamond and gold mining became important contributors to the Liberian economy. Revenues from these sources further funded and fueled the conflict.

The environment implications in the case of mining in Liberia are:

1. It disturbs the environment adversely affecting aquatic habitats in lakes, streams, rivers and wetlands.
2. Water becomes contaminated at mine sites when it comes in contact with waste rocks containing water bodies with highly acidic metal and waste water.
3. People are exposed to the toxic waste as a result they may develop rashes.
4. It destroys forests and wetlands because a lot of trees have to be cut down to get to spot that has gold or diamonds (see Maganbay.com.)

Government Policies

Francis Nyepon (2007) noted that each year, thousands of pristine beaches, coastlines, agricultural lands, mangroves, and residential lands are destroyed due to lack of protective legislation, financial support, and environmental awareness. This is further compounded by the lack of government activities to come up with legislation to combat all the ills of deforestation. The government is handicapped by

pressures from interest groups and lobbyists. There is gross lack of personnel to adequately monitor activities of reforestation and combat tree poachers who continuously cut down trees illegally without the probability of planting any tree back to supplant the ones they cut. Then, there is corruption with the government apparatus that continue to derail all activities geared towards forestation.

CONCLUSION

Until the government is able to rein in its illicit activities in the country's forests, illegal logging will continue to take a heavy toll on Liberia's natural resources. Further pressure from subsistence activities—about 98% of the country's energy needs are met by fuel wood and charcoal according to the ITTO—will not help the situation.

The Liberian problem is complex and monolithic because of the many problems that plagued the country during years of unrest and instability. Many factors thus contributed to the many facets of deforestation in the country. The prolonged war, poverty, illegal logging, erosions, forest fires, illegal habitation and many other factors made Liberian situation a very complex and unique one.

It is also monolithic because of wars, atrocities of war and forest decapitation. Years of prolonged war reduced Liberian forests to a level of destruction unprecedented in the country's history.

The objective of this paper is to prove that forest conservation is the most desirable environmental protection that Liberia should embark on to bring about forestation and reforestation. Liberia is a country that must do its part to improve on the importance of reforestation and take appropriate measures to combat the problems associated with dwindling forests, mineral loss, illegal logging and other activities that threatens sustainable environment. The study also made recommendations that it followed, it will curb the devastation of Liberian forests. In adhering to the recommendations Liberia is joining hands with other nations to preserve the planet from catastrophic end.

Efforts must be made to preserve Liberian forests. Government as well as actors including those who live in rural areas of the many counties in Liberia, private loggers, and external demand must work together to save Liberian forests and bring about sustainable environmental conditions. It is generally assumed that the forest to a great extent provide daily livelihood and jobs for those involved in logging and those who live in rural areas. The forest is an important source of revenue for the government as well. The great conservationist Aldo Leopold who pioneered the protection of wild forest road areas said, "When we see the land as a community to

which we belong, we may begin to use it with love and respect.” Thus, if there is one thing that should always unite us as a community, across generations, across parties, across time, it is the love for the land. (quoted by Bill Clinton, 2001)

The government of Liberia as well as the people of Liberia and those with vested interest in sustainable environmental development in the country should come to a realization that a safer environmental atmosphere is the only commonsense way move the country forward. Those cultivating and producing rubber should take heed and deceit from illegal dumping of toxic waste into Liberian rivers a situation Somah (2004) considered environmental hazard. Governments’ officials and those in places of authorities must do their part to come up with conservation strategy geared towards fuel wood burning to limit the use of timber products and make a concerted effort to encourage planting of trees to conserve the countries forest. Sustainable enforcement procedures must be part of a new ideology geared towards combating the ills of environmental neglect that had eluded the country’s sustainable environmental policy.

RECOMMENDATIONS

The administration and management of the forest activities is complex. This multifaceted program requires constant monitoring. Strategies and defined policies must be implemented so that a sustainable environment could be achieved. The following recommendations are suggested for consideration.

Conservation

Concerted efforts must be made by the government, especially the Ministry of agriculture and stakeholders to conserve forest resources to avoid extinction. The forest and its minerals are constantly being depleted by various activities of citizens, and especially those involved in shifting cultivation that must be educated and encouraged to espouse permanent farming practices because their future depends on it.

Protecting the forest

Concerted efforts must be made to preserve the forest, replace fallen trees, and curtail illegal loggings. Illegal logging destroys the forest as loggers have little or no regard for the environment.

Reforestation and Government Policy

The government must intensify its efforts in encouraging the masses on reforestation. This will help alleviate the deforestation especially in areas where massive forest destruction has occurred. The need to continue to plant new trees must be encouraged

REFERENCES

Adekoya, J.A. (1995). Environmental Effects of Solid Minerals Mining. *Journal of Physical Science*. Kenya, PP 625-640

Ajakaiye, D.E. (1985). Environmental Problems Associated with Mineral exploitation in Nigeria. Paper presented at the 21st Annual Conference of the Nigeria Mining and Geosciences Society held in Jos: pp. 104-108

Allen, C. J. Barnes, D.F.(1985). The Causes of Deforestation in Developing Countries. *Annals of American Geographers* 75 (2) pp. 163-184

Akinyeye, Y. (1997).Forests Conservation as a Strategy of Environmental Protection : The Nigerian Experience in Oshotokun, Akinjide , Dimension of Environmental Problems in Nigeria. Ibadan Nigeria: Friedrich Ebert Foundation.

Brown, S. et al. (1996). Mitigation Options in Forestry in: *Climate Change 1995: The IPCC Second Assessment Report, Volume 2: Scientific-Technical Analyses of Impacts, Adaptations. And Mitigation of Climate Change.* [Watson, R.T., Zinyowera, M.C. and Moss (Eds.)]. Cambridge University Press

Clinton, William J. (2001). Remarks on Action to Preserve America’s Forest. January 5.

Daily Times Newspaper. OTC Depleting Forest Reserves? Friday October 20, 2000 <http://www.liberia.net/dtime-oc4.htm>

Daily Terra (2007). Deforestation rates in tropical Africa. Oct 28. www.globalcarbonproject.org/global/puff/GCP

Ejigu, Mersie (2006). Land, Forest, Insecurity and Conflict, *The International Forestry Review*. Vol. 8(1), March 2006. Special Issue: Africa – its forests and their future

Enviro Facts (Biodiversity), www.bcb.ac.za/envfacts/facts/deforestation.htm

FAO. 2005. *The State of Food Insecurity in the World: Eradicating World Hunger, Key to Achieving Millennium Development Goals*, FAO 2005.

Forestmonitor.org. www.forestmonitor.org/fr/reports/5500066/550083

Foster, A. D. and Rosenzweig, M.R.(2002). Economic Growth and the Rise of Forests. PIER Working Paper 02-028. Penn Institute for Economic Research, Department of Economics, University of Pennsylvania, Philadelphia, PA July.

- Foster, D. Andrew & Mark Rosenzweig (2002). "Household division and rural economic growth." *Review of economic studies*, 69 (4) 839-870
- Fry, Ian. (2008) .Reducing Emissions from Deforestation and Forest Degradation: Opportunities and Pitfalls in Developing a New Legal Regime. *RECIEL* 17 (2), pp.166-182.
- Global Policy Forum (2001). The Role of Liberia's Logging industry. Retrieved on June 8, 2010 from <http://www.globalpolicy.org/component/content/article/168/39174.html>
- Global witness (1999). *The role of Liberian logging industry on national and regional insecurity—Briefing to the UN Security Council—January*
- Hofstatter, Benjamin.(2001) "Liberia: Trade, Environment and Conflict." www1.american.edu/ted/ice/Liberia-diamonds.htm#2
- International Monetary Fund May 2005, Liberia: Selected Issues and Statistical Appendix, IMF Country Report No. 05/167. Retrieved June 4, 2010 from <http://www.imf.org/external/pubs/ft/scr/2005/cr05167.pdf>
- Jonathan, A. Patz, Thaddeus K. Graczyk, Nina Geller, and Amy Y. Vittor (2000) *International Journal of Psychology* (1-11)
- Kaimowitz, D. and Angelsen, A. (1997). *A Guide to Economic Models of Deforestation*. Jakarta, Indonesia: Center of International Forestry Research. Mimeograph.
- Kogbe, C.A., Obialo A. U. (1976). Statistics of Mineral Production in Nigeria (1916-1974) and Contribution of the mineral Industry to the Nigeria economy. In C.A. Kogbe (ed). *Geology of Nigeria*, Elizabethan Publishing Co., Lagos, Nigeria.
- Lund, G., 1999: A 'forest' by any other name.. *Environmental Science and Policy*, **2(2)**, 125-134
- Martinez-Ehrhardt, Karen (1998). Social Determinant of Deforestation in Developing Countries: A Cross-National Study. *Social Forces* 77(2) pp.567-586
- "Liberal Environmental Profile." Mongabay.com. www.rainforest.mongabay.com/20liberia.htm
- Mannion, A.M. The Environmental Impact of War and Terrorism. www.reading.ac.uk/nmsrutime/saveasdialog.aspx?
- Nyepon, Francis W. (2007). Lack of Sustainable environmental policy obstructs Interim Poverty Reduction Strategy (IPRS), and growth. *Terra Daily*, Thursday November, 8.
- Ogunkunle, A. T. J. and F. A. Oladele (2004) Ethnobotanical Study of Fuel wood and Timber Wood Consumption and Replenishment in Ogbomoso, Oyo State, Nigeria. *Journal of Environmental Monitoring Assessment*, Vol. 91, No. 1-3, February
- Pearce, D.W & Brown, Katrina (1994). The causes of tropical deforestation: The economic and statistical analysis of factors giving rise to the loss of tropical forest. UCL Press, London.
- Somah, Syrulwa L (1995). The historical settlement of Liberia and its environmental impact. University Press of America, Lanham, Maryland.
- Patz JA, Graczyk TK, Geller N, Vittor AY. Effects of Environmental Change on Emerging Parasitic Diseases. *International Journal of Parasitology*. 2000; 30: 1395-1405.
- Pearce, D. W. and Brown, K.(Eds.) (1994). *The Causes of Tropical Deforestation*. London: UCL Press.
- The Economist; Fuelling Africa's Wars; January 13 – January 19
- The World Health Report (2004) *Changing History*. Washington, DC
- United States Department of State; the 1999 Human Rights Report on Liberia (<http://pages.prodigy.net/jtell/State1999.html>); released February 25, 2000
- United Nations Environment Programme (2004). *Strategy on Land Use Management and Soil Conservation—a strengthened functional approach*. UNEP Policy Series 4.
- Van Kooten, G.C., et al. (1999). Tropical Deforestation: Issues and policies. Chapter 5 in the *International Yearbook of Environmental and Resource Economics 1999/2000*; Edited by H. Folmer and T. Tietenberg, Cheltenham, UK: Edward Elgar.
- Walker, R.T. (1987). Land Use Transportation and Deforestation in Developing Countries. *Geographical Analysis*; Vol. 19 (1), pp 18-30

Waste. Org. (1994). The predicament of tropical rainforests: why they must be saved. Retrieved on 4/15/09 from the World Wide Web at: <http://www.waste.org/landshark/environment/rainforests.html>

Watson, T.A., et al. (2000) Land use, Land use change and forestry. Printed by Cambridge University Press for the International Panel on Climate Change.

World Bank (2000). A Revised Forest Strategy for the World Bank Group. World Bank, Washington, DC

WRM Bulletin, (2001). Logging in Liberia: Reform process or business as usual? (13)