

## **ENVIRONMENTAL LAW, EROSION AND SUSTAINABLE DEVELOPMENT IN NIGERIA**

**BY**

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### **ABSTRACT**

“Erosion is an ecological problem and a major cause of environmental degradation especially in the developing countries of the world. Erosion has hampered economic activities and at the same time devastated the lives of people. It has undermined several economic developments and occasioned the loss of homes, schools, churches, mosques, farmland. The problem of erosion must be addressed with utmost seriousness in order to achieve sustainable development.

### **INTRODUCTION**

The Earth environment is exposed to varieties of hazards-natural and man made. One of these hazards is erosion manifesting either in the form of soil erosion or coastal erosion. Erosion in whatever form is one grave challenge facing economic activities and development in the world and particularly in the developing countries of the world. It is a challenge to the developing countries as they do not have the wherewithal to combat the challenges. Erosion, apart from being a barrier to the effective use of the land for farming or industrial activities, it is also a major source of pollution of water and air.

Erosion in Africa is one of the cause of poverty and unemployment. Erosion is aggravated in Africa countries because of human activities than natural cause. The government of the various African countries are concerned with curative rather than preventive measures and in most cases, the doses are palliative and do not tackle the problem from the root. Law as an instrument of social engineering can go a long way to order the behavior of people with a view of reducing or dominating the human factors causing erosion. The enormous resources budgeted yearly to combat erosion can be deployed to other sectors for rapid economic growth.

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## 2.0. **CONCEPT, TYPES AND CAUSES OF EROSION**

### 2.1. **CONCEPT OF EROSION**

Erosion is defined as the mechanical process of wearing or grinding something down like particles washing over it. Erosion as a term in Environmental law refers to a process of degradation of the earth environment. Erosion involves physical removal of material from one place to another.<sup>1</sup> Before the materials are transported from one place to the other, a process called weathering must have taken place. Weathering is the breakdown of rock or mineral materials in place.

Erosion that affects the soil particles of the earth environment is known as soil erosion while erosion that affects that coastal region of the earth environment is referred to as coastal erosion.

“Soil erosion is caused by the action of water and wind. Rain striking the ground helps to break soil particles loose. Surface runoff and wind together carry away loosened soil. The faster the wind and water travel, the larger the particles and the greater the load they move. Therefore, high winds cause more erosion than calmer areas, and fast flowing surface runoff moves more soil than slow runoff”.<sup>2</sup> The severity of erosion is determined by the terrain. For instance, the land environment that is steep and consists of unobstructed slopes is more susceptible to erosion by water as surface runoff flows more rapidly over them. On the other hand, a portion of land that is plain or flat and which is exposed will be more vulnerable to erosion caused by wind. It is equally noteworthy that the physical properties of the soil is a variable and an important determinant of the vulnerability of the soil to erosion.

Coastal erosion is the wearing away of land and removal of beach or dune sediments by wave action, tidal currents, wave currents or drainage. Waves generated by storms, wind, or fast moving motor craft, cause coastal erosion, which may take the form of long-term losses of sediment and rocks, or merely the temporary redistribution of coastal sediments. The most effective erosion of soil and rock along the shore is through the wave action – either the direct pounding by breakers or the grinding effect of sand, pebbles, and cobbles propelled by waves, which is called milling or abrasion.<sup>3</sup> If the water is salty, it may cause even more rapid erosion through solution and chemical weathering of the rock.<sup>4</sup> Abrasion occurs when bits of rock and sand in waves grind down surfaces like sandpaper.

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<sup>1</sup> Montgomery, C.W. (2008) Environmental Geology United State of America McGraw Hill Higher Education p. 278

<sup>2</sup> Ibid.

<sup>3</sup> Ibid p. 154

<sup>4</sup> Ibid

A beach is a gently sloping surface washed over by the waves and covered by sediment. The sand or sediment of a beach may have been produced locally by wave erosion, transported by wind from behind the beach, or delivered to the coast and deposited there by streams on coastal currents.<sup>5</sup> Coastal erosion is a major problem in the countries like America where about thirty of the states abut or next to a major body of water such as the Atlantic or Pacific Ocean and the Gulf of Mexico. In Africa, countries like Nigeria, South Africa, Angola, Namibia, Cote d'Ivoire, Sierra Leone, Equatorial Guinea, Ghana, Liberia etc. that are bounded by the Atlantic Ocean have at one time or the other experienced the problem of coastal erosion.

### **3.0. TYPES AND CAUSES OF SOIL EROSION**

**3.1.1 Sheet Erosion:-** Sheet erosion is a peculiar feature of lands with little or no vegetation. Sheet erosion is defined as the uniform/downslope removal of top soil in thin layers from sloping land. Sheet erosion erodes the top layer of the soil and exposes infertile sub-soil, thus leading to severe loss of plant nutrients. Sheet erosion can be recognized if subsoil or plant roots are exposed.

**3.1.2 Gully Erosion:-** Gully erosion occurs near the bottom of slopes and are caused by the removal of soil and soft rock as a result of concentrated runoff that forms a deep channel or gully. Gully erosion is an advanced form of rill and sheet erosion, if unchecked. The flow of water gets more rapid carrying along with it more layers of soil. It cuts channels deep into the soil until gullies are formed. Gully erosion is destructive to farmland, when it's too deep, it can render the farmland uncultivable.<sup>6</sup> Water running downhill cuts a channel deep into the soil and where there is a sudden fall, a gully head forms at the lower end of the channel and gradually works its way back uphill.

**3.1.3 Rill Erosion:-** This is otherwise known as finger erosion. It occurs when furrows make a path for water flow. It is the most common form of erosion. It can occur on steep land or on land that slopes more gently. Sometimes, the flowing water in the exposed land creates finger-like channels on the land. This kind of erosion leads to gully erosion, the most destructive kind of erosion.

**3.1.4 Wind Erosion:-** This type of erosion is common in arid or semi-arid desert areas with high wind and low rainfall. Wind erosion occurs when the land surface is

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<sup>5</sup> Ibid. p. 153

<sup>6</sup> The Bechire – Nigeria. [Ltp: 11 nigeria the beehive.org/content/922/2129](http://11nigeria.thebeehive.org/content/922/2129)

left bare in regions that are arid and it is much more severe in arid areas, and during times of drought. Wind erosion may also occur through over grazing by animals as a result of which plants that are supposed to cover the soil are removed while the hooves of the animals equally break the soil. Wind erosion is a major source of degradation of land, evaporation, desertification, harmful airborne dust and crop damage.

### 3.2.0 CAUSES OF SOIL EROSION

Erosion is one of the environmental problems that have deprived man of the effective use of land resources especially in the developing countries of the world. Erosion is a major cause of degradation and a barrier to sustainable development in the world and particularly the developing countries. Erosion is caused both by natural factors and human activities aimed at industrial and economic improvement. Man interacts with the land from birth till death in variety of ways in his search for the basic necessities of life such as food, clothing and shelter. In the developing countries and particularly in Africa countries, the soil is cultivated by clearing the bush or forest for farming and in the process, the bush is burnt while trees are uprooted. The soil receives additional pressure through construction activities such as roads, erection of buildings, provision of social amenities, grazing by animals etc. These activities aggravate and accelerate the process of soil erosion in the world. The following are some of the cause of erosion.

**3.2.1 Leaching:-** Leaching is one of the ways in which soil chemistry is modified. Application of fertilizers, herbicides, and pesticides – whether on agricultural land or just one's own backyard – is another way that soil composition is changed, in this case by the addition of a variety of compounds through human activities. Less-obvious additions can occur when irrigation water redistributes soluble minerals.<sup>7</sup> After heavy rainfall, flood water permeates the soil and carries along with it dissolved plant foods. Through this, plant foods at the upper layers of the soil are carried too deep into the soil where roots cannot reach. The nature of soils also determines the rate of leaching. For example, coarse soils are easily leached through more than fine textured soils.

The developing countries of the world and particularly the countries in Africa are at the risk of erosion arising from leaching because of the heavy reliance on chemicals such as fertilizers, herbicides and pesticides in the process of farming. In Nigeria, for instance, the governments both at the federal, state and local levels annually commit a substantial portion of agricultural vote in the budget to the

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<sup>7</sup> Montgomery, C.W. Op.cit p. 285

procurement of assorted chemical which are distributed to farmers at subsidized rate or freely to aid their farming activities. The use of fertilizer has become a peculiar feature and pattern in the states of the Northern part of Nigeria. The use of fertilizers and other chemicals becomes imperative because of the low fertility of the soil arising from over cultivation and grazing cum the low rainfall in the year. The rate of Erosion in Nigeria differs from one zone to another. In the rain forest zones of Nigeria i.e the South East, South West and South-South, erosion is caused by rainfall which is estimated at about 250 days per year whereas in the Northern states which are savannah zone, rainfall varies with the highest to be 90 days of rainfall per year, hence the states are exposed predominantly to wind erosion for about seven to eight months of the year.

**3.2.2 Construction Activities:-** While erosion is a natural process that has created the interesting landscapes we enjoy, a sudden alteration of the natural land surface can dramatically accelerate this process. The erosion rate from land disturbed at a construction site may be 1,000 times greater than the natural rate.<sup>8</sup>

Accelerated erosion occurs whenever the soil surface is disturbed. Removing the vegetative cover, altering the natural topsoil, or changing the shape of the slope can increase the potential for erosion, increase runoff, and create more sediment in rivers and lakes. Erosion decreases the productive value of the soil as well as reducing the quality of the waters that receive the sediment. Sediments created by accelerated erosion clog streams, fill lakes, and often can carry pollutants to these waters.

In Nigeria, the need for infrastructural facilities, social amenities and housing has made both the urban centres and rural communities sites for construction activities. The need for roads and bridges, dams, markets, pipe borne water and housing accommodation has aggravated the disturbance of the soil surface with the consequence of causing erosion. It is pertinent to point out that the roads being constructed are not complemented with drainage channels to aid easy access and flow of rainwater. The governments at both the state and local levels have failed to pay attention to the need for proper urban and town planning through layout plan of the towns with a view of controlling erosion. The town Planning master plan of the cities are not usually implemented with the goal of preventing environmental hazards like erosion and flooding. This is so because of corruption and failure of policies by the government. It is required in Nigeria of anybody who wants to build a house to carry out survey of the land which must be approved by the Surveyor-

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<sup>8</sup> See Soil facts North Carolina Erosion and sedimentation Pollution Control Program by H. Joseph Klelss, Land quality section, Department of Environment Health & Natural Resource, North Carolina, USA

General after which a plan of the proposed building must be prepared for approval by the Town Planning Authority. It is pertinent to point out that except in big cities like Lagos, Abuja, Port Harcourt, Kaduna and few others, this legal requirement is not normally enforced by the government. This is why it is possible for houses to be built in such a way as to disturb the natural water course thereby leading to gradual erosion.

**3.2.3 POOR FARMING TECHNIQUES:-** This is one of the anthropogenic factors in the developing countries of the world that have precipitated and aggravated soil erosion. Vegetation acts as an interface between the atmosphere and the soil. Agriculture is the mainstay of the larger percentage of the people in the developing parts of the world. The land is cultivated either for subsistence or commercial farming purposes. Vegetation increases the permeability of the soil to rainwater, thus decreasing runoff. It equally serves as a shield from winds. In Nigeria like any other developing countries of the world, subsistence farming involves the planting of crops with maturity period ranging from between three months to nine months. The farmland is cleared usually preparatory for farming beginning from around November to early February. Preparation for farming involves the destruction of vegetation by clearing the land for cultivation. Clearing of land involves uprooting of trees and setting the bush on fire. The farming practice has adversely affected the degree of infiltration and runoff. Infiltration is decreased while runoff is increased. The rainforest in the southern part of Nigeria has been deforested either through farming or lumbering activities by the army of employed youths who have turned into emergency timbre contractors. In the Northern part of Nigeria which is composed of desert and savannah region, grazing for livestock has terribly, compounded the problem of erosion as the soil has no shield from rain or wind induced erosion. Farming practice which is one of the methods of land use activities has deprived the soil surface of its vegetation and also contribute directly to sliding, slumping, gulley, interill and rill erosion especially in the South East of Nigeria which is the region mostly affected by soil erosion in Nigeria.

Soil erosion from agricultural activities can be reduced or mitigated through practices such as planting only perennial crops in sensitive areas like ditches, lakeshores, steep slopes, along rivers and by conservation tillage, planting cover crops, bush fallowing and provision of appropriate riparian suffers from surface water, mulching. The government should intensify more efforts to check human activities occasioning land erosion by providing education and encouraging the farmers to engage in modern method of farming.

### **3.2.4 CLIMATE**

Climate is the synthesis of weather, taking into consideration the extremes and frequencies of occurrences of various characteristics over a period of about 30-35 years at a given location or area.<sup>9</sup> Weather is the specific characteristics of the atmosphere at a given time in a given place whereas climate represents a generalization of the characteristics of the atmosphere over a period of time.<sup>10</sup>

Water and wind play important role in erosion. Water from heavy and aggressive rainfall contributes significantly to the erosivity of the soil. Water plays an important role in erosion by carrying away material that has been weathered and broken down. When an area receives more water than the ground can absorb, the excess water flows to the lowest level, carrying loose material with it. Glaciers have been noted to cause erosion by removing all the loose materials from the surface over which it travels slowly. Glaciers also erode the solid rock over which they travel. In Nigeria, the rate of rainfall in the regions is directly proportional to erosion site of the regions. The number of raindays decreases from the South to the North.<sup>11</sup> The South East of Nigeria has the largest number of erosion sites. The soil of the South East is perceived to be generally turgid and could not hold water compared to the other part of the country. The erosion in the Northern part of Nigeria is caused by wind and occasional flash floods. Sand particles and silt are lifted by wind which blows across bare land of the arid and Savannah areas of the North. Winds have been noted to deposit sand in large piles especially in the Northern part of the country.

### **3.2.5 POOR ENVIRONMENTAL PRACTICE**

In Nigeria, the attitude of the people to the environment until recently is that of non challenge and carefree. Environmental issues were handled with kid gloves. One of the challenges facing the environment in Nigeria is the issue of waste management and disposal. Waste management both at the rural and urban cities is a huge challenge and a direct cause of erosion. In Nigeria, Aba in the South East and Ibadan in the South West are gory sites of wastes such as water proof, empty bag of pure water, empty cartons, empty can, water bottle, refuse generated from market etc scattered in the streets, roads and public place blocking water channel and thus causing erosion. In some states in Nigeria, the government has evolved a policy of Monthly Environmental Sanitation to ensure that the environment is kept clean.

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<sup>9</sup> Adebayo, W. O (2010) "The Human Environment: Something to Everyone". 29<sup>th</sup> Inaugural Lecture, Ekiti State University, Ado-Ekiti p. 50

<sup>10</sup> Ibid

<sup>11</sup> Ibid Adebayo, W.O at p.44

The attitude of the people generally towards government social facilities and infrastructures is that of a carefree attitude. It is a common feature for the people to fold their arms when the drainage in front of their residential premises are loaded with wastes blocking the free flow of water which may lead to erosion.

#### 4.0. SUSTAINABLE DEVELOPMENT AND EROSION IN NIGERIA

Sustainable development is a product of the *Rio de Janeiro* Earth summit of 1992. The conference focused basically on sustainable development as instrument of harmonizing the economic needs of the world with environmental protection.<sup>12</sup> The Rio Conference however was motivated by the developing countries at the preparatory stages with their views largely accommodated in the five documents adopted by the conference.<sup>13</sup>

Sustainable development refers to the judicious and planned use of natural resource for equitable development to meet the needs of the present generation without jeopardizing that of future generations.<sup>14</sup> Sustainable development calls for improving the quality of life for all of the world's people without increasing the use of our natural resources beyond the Earth's carrying capacity.<sup>15</sup>

Land is one essential natural resource which man depends upon to meet his basic needs of food, shelter and clothing. It is pertinent to point out that notwithstanding the importance of land to humanity, the forces of human interaction and natural forces have made the judicious use of this important resource practically impossible especially in the developing countries of the world like Nigeria.

The quality of the environment is one variable in any economic programme tailored towards improving the standard of living of the people. This suggests therefore, that a poor or degraded environment might influence the level of productivity and diminish the earning of the people engaged in activities relating to, or dependent upon that environment.<sup>16</sup> Erosion in all its ramification and forms already considered is a major problem that has adversely affected the quality of the environment in Nigeria. Erosion has curtailed and impaired the productive use of land to meet the basic necessities of life. Apart from pollution, erosion is the major cause of environmental degradation in Nigeria. Water and wind induced erosion are

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<sup>12</sup> Abegunde, B, Adebayo, W. A and Ogunlade, F. Z. (2007) Environment Law and Development. Petoa Educational publishers, Ado-Ekiti p. 178

<sup>13</sup> Ibid

<sup>14</sup> Ibid at p.183

<sup>15</sup> UNEP: Johannesburg summit 2002. World summit on Sustainable Development Environmental and planning Law review (2005) 1 EPLR (2)

<sup>16</sup> Muzan, A. O (2005) Poverty, Environmental Degradation and sustainability" Environmental and planning Law Review (2005) 1 EPLR (2) 68 at 73.



the two primary causes of land degradation Erosion is noted to have occasioned substantially the loss of soil fertility. In Nigeria, the government especially in the states of the North has encouraged the use of chemical fertilizers to enhance productivity of farm products and the consequence of this is to aggravate water and soil pollution. Soil erosion from agricultural activity especially from farming is a leading cause of diffuse water pollution due to the effects of the excess sediments flowing into the world water wages.

Erosion is one ecological monster in all parts of Nigeria but it is more devastating in the South-Eastern part of the country. The soils in the South East are vulnerable to erosion because it is highly weathered while the soils in the north east and north west areas of the country are sandy and nutrient deficient and thus make them susceptible to erosion. Apart from the fact that erosion has incapacitated agricultural productivity through land loss and damage to transportation, numerous villages have been displaced especially in the south east. The displaced people are forced to abandon their rural environment where they contribute to economic development through farming activities for other places as tenants or to abandon farming for other occupation.

Erosion is a great challenge to the program of sustainable development in Nigeria. To achieve sustainable development, policy for sustainable environment must be formulated and implemented with all seriousness. There is a need to evolve policy to address primarily the issue of environmental degradation arising from the scourge of erosion in Nigeria. The various causes of erosion in Nigeria must be tackled from the root instead of the palliative measure in place designed to provide temporary succor for victims of ecological disaster.

The land use practices and environmental policies in place in Nigeria are the bane of environmental degradation by erosion. The fact must be stated clearly that we cannot afford to destroy or mortgage the environment in our generation and consign the future generation to liability.

Sustainable development calls for improving the quality of life for all of the world's people without increasing the use of our natural resources beyond the earth's carrying capacity. While sustainable development may require different actions in every region of the world, the efforts to build a truly sustainable way of life require the integration of action in three key areas of economic growth and equity, conserving natural resources and the environment and social development.

Conservation of the land resources of the environment from environmental degradation is a task that must be approached with urgency it deserves in order to secure the future for upcoming generations. The government should evolve measures to address especially the anthropogenic causes of erosion.

The need to promote responsible consumption and production patterns, to reduce waste and over-reliance on natural resources must be given urgent attention.

The United Nations conference on Environment and Development 1992 deliberated on many issues which culminated into the Rio declarations which sets out the principles on the environment and Agenda 21 which is a document which sets out the action to be taken. The principles unfolded the courses to be charted by nations in order to achieve sustainable development. For instance, principle 4 emphasizes the importance of environmental protection as a basic factor for the achievement of sustainable development. This in effect if applied to Nigeria demands the government to tackle ecological problems such as erosion in order to realize the goal of sustainable development. The government is to make environmental protection an integral part of the development process. States are required to formulate effective environmental policies internally to protect the environment but also that states keeps a global watch on the environment with a view to conserving; protecting and restoring the health and integrity of the ecosystem in the interest of the present and future generations.

Nigeria is endowed with a rich and diverse natural environment; but over the years it has reaped its riches with insufficient care for the livelihoods and well being of future generations.<sup>17</sup> The result released in 2004 by the National Planning Commission observed that some 92,000 hectares – a quarter of our land – was once covered in forest. Today just half of our forests remain, and the potential for their future exploitation is extremely limited. Deforestation has been followed by erosion and desertification in some areas.<sup>18</sup> Environmental degradation reduces opportunities for poor people to earn sustainable incomes left with no other viable options, they engage in extractive activities contributing to the vicious cycle of poverty and environmental degradation.<sup>19</sup>

The environment provides the foundation for all development efforts in Nigeria. Its close linkage to other major sectors of the economy is exemplified by the fact that agricultural productivity – and therefore food security – cannot be guaranteed in a degraded environment. Environmental degradation is caused by declining soil fertility, unsustainable land use practices, lack of land for farming, harsh climatic conditions for crop growth and animal rearing and other factors.<sup>20</sup> The forestry sector provides a plethora of income opportunities for the rural poor,

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<sup>17</sup> National Economic Empowerment and Development strategy (NEEDS) A publication of National Planning Commission. 2005. Abuja, Nigeria p. xix

<sup>18</sup> Ibid

<sup>19</sup> Ibid at p.33

<sup>20</sup> Ibid p. 65

including cottage industries and the extraction of non-timber forest products such as chewing sticks, ogbono (bush mango), and a variety of healthful condiments. The majority of the rural population relies on medicinal plants for their health care needs, including another important source of income from forests. The coasted environment provides seafood, including fish, sea turtles, and periwinkles, which serve as income sources and foreign exchange earners. The potential to develop ecotourism and to generate income by converting waste to health are also worth noting.

Erosion has crippled agricultural production to the effect that rather than exporting food and cash crops, Nigeria has become importer of both food and cash crops such as rice which can be produced in sufficient quantity and quality in Nigeria. The potential of the agri-business sector as a major employer of the growing labour force and earner of foreign exchange has been undermined by the problem of environmental degradation.

The Rio conference places great emphasis on the role of the people and the community in the task of environmental management and development. The conference declared in an unmistakable terms as follows:

“Indigenous people and their communities, and other local communities have a vital role in environmental management and development because of their knowledge and traditional practices. States should recognize and duly support their identity, culture and interests and enable their effective participation in the achievement of sustainable development”<sup>21</sup>

The principle has stated the obvious in view of the fact that the people are mainly responsible for the anthropogenic causes of erosion. In the process of farming, unorthodox and destructive means as setting bushes on fire, uprooting of trees etc are employed in preparing the land for farming. The effect of these harmful practices is erosion which invariably will lead to decrease in agricultural productivity.

The Rio conference has also recognized the position of law in social engineering. The conference encouraged the use of law for the protection of the environment but such legislation must take into consideration sociological factors of the particular environment. The conference declares as follows:

“States shall develop national law regarding liability and compensation for the victims of pollution and environmental damage. States shall also co-operate in an expeditious and more determined manner to develop further international law

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<sup>21</sup> Principle 12 of Rio declaration

regarding liability and compensation for adverse effects of environmental damage caused by activities within their jurisdiction or control to areas beyond their jurisdiction"<sup>22</sup>

This is the time for urgent action to evolve legal framework to combat the problem of erosion by the international community in order to salvage the developing nations which are bedeviled with this problem. It is necessary to arise so that the burden of the developing nations can be reduced if erosion problem is tackled as a way of encouraging sustainable development in the developing nations. The proposed international action should address primarily the issue of erosion while states should be encouraged to enact into law legislations that will curtail the human factors in erosion.

## 5.0 CONCLUSION

The protection of the environment from the scourge of erosion is one of the steps towards achieving sustaining development in the developing nations of the world. The international community should encourage nations to pursue the goal of sustainable development through the protection of the world environment from degradation. Law is a basic tool of ordering the society and just as law has been used to cure some ills, protection of the environment through law institutions and even conscious human activities within the framework of the law must be given adequate attention.

The problem of erosion is more severe in the developing nations of the worlds like Nigeria where it has crippled agricultural productivity. Man in his pursuit of the basic needs of life such as food, clothing and shelter has unconsciously caused erosion while government through construction activities, mineral and oil exploration has contributed in no mean way to erosion problem affecting the goal of sustainable development. Good government and the support of the people are required to overcome or reduce erosion problem in order to achieve the goal of sustainable development.

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<sup>22</sup> Principle 13