

AN APPRAISAL OF THE ROLE OF INTERNATIONAL ENVIRONMENTAL LAWS IN PROMOTING SUSTAINABLE AGRICULTURE IN NIGERIA

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Abstract

Modern agricultural practices can be described by environmentalists as a serious threat to the environment with linked consequences such as excessive soil erosion, loss of prime farmland to urban uses, draining of wetlands, conversion of fragile lands to farmland, water pollution from pesticides, fertilizers, and animal wastes, destruction of wildlife habitat loss of endangered species, genetic diversity and air pollution. This paper focuses on discovering the impact of agricultural practices on the environment and ways to achieve sustainable development through the use of legal instrument in addressing unsustainable agricultural practices on the environment. In achieving this aim, the paper adopted the doctrinal analytical style in highlighting the shortfalls of unsustainable agricultural practices and preferring cogent solutions. This paper found out that the negative impacts of agricultural practices post-civilization are enormous pointing categorically to the fact that laws are not properly adhered to, when carrying out agricultural practices. DDT Chemicals and other deadly substances which have been banned are still smuggled into the country and used by farmers. In conclusion, there should be a balance between agricultural practices, sustainable development, and environmental protection. It is therefore recommended that major agricultural problems and threats to the environment identified and curtailed for sustainable development and environmental protection. National and international laws regulating the agricultural sector should be adhered to by farmers and the appropriate punishment meted out to defaulters as provided for by the laws.

Keywords: Legislation; Agriculture; Environment; Chemicals; Sustainable Development; Pollution.

1. Introduction

Man's disobedience from the days of creation made God curse the ground and man had to till vigorously to access the benefits of the earth which had earlier been made easy and free for him, this is the genesis of agricultural practices in the world. The subsistent method of farming has been made easier by using machines, fertilizers, and all sorts of artificial products to induce

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faster crop yield as opposed to the earlier method of subsistence farming. Agriculture is a major source of national development as well as one of the major drivers of the economy of any nation and it takes a well-fed individual to perform other essential tasks in life.¹ This means food is necessary for life and this is made possible through agricultural practices of farming, livestock rearing, and other forms of food production, which should be done in a sustainable and environmentally friendly manner for full food production on one hand and environmental protection because according to Franklin Roosevelt “a nation that destroys its soil destroys itself.” Nigeria cannot afford to destroy the soil in the guise of agricultural practices. International and national environmental regulations are available to act as checkmates to farmers when carrying out their noble and civil duty of ensuring that the stomach infrastructure department of the economy is not subjected to hunger and starvation. Food production and dietary choice affect not only our health but also emissions of climate forcers: the agriculture sector (including forestry and land use) is responsible for an estimated 24% of global GHG emissions, while food-related risk factors comprised five of the 10 leading causes of death globally (8, 165). Agricultural emissions also contribute substantially to the secondary formation of PM_{2.5}.² Emissions of short-lived climate pollutants, (SLCPs) occur at every stage in a food’s life cycle, from the farm field to the table, cultivation and livestock are the two agricultural industries most responsible for anthropogenic methane emissions, and both provide important opportunities for mitigation. Open burning of biomass, which often includes the burning of agricultural residues, is a key agriculture-related source of black carbon.³ Historically, agriculture has been the single most important source of terrestrial biodiversity loss, with 70 percent of projected losses in terrestrial biodiversity being attributed to agriculture through widespread land conversion, pollution, and soil degradation. Curbing biodiversity loss, therefore, necessarily implies addressing agriculture’s impact on biodiversity.⁴

The Environmental Performance Index 2008 (BETA) states that agriculture includes “annual and perennial crop production and livestock production in both intensive and extensively managed systems.” The index identified the complete elements of agriculture as protecting natural habits

¹ MO Erhun, A Legal Framework for Sustainable Agricultural Practice in Nigeria. *Canadian Social Science* 2019. 15(10) p 32.

² World Health Organization, Agriculture- Reducing Global Health Risks; through Mitigation of short-lived Climate Pollutant. P.58.

³ Ibid.

⁴ J Potts, et al, Voluntary Sustainability Standards and Biodiversity: Understanding the Potential of Agricultural Standards for Biodiversity Protection. *International Institute for Sustainable Development (IISD)* (2016). p.3.

in agricultural landscapes, environmental management for agricultural production needs, sustainable human livelihoods from agro-ecosystems, and environmental management of the full food-fibre value chain.⁵ According to the report, the key indicators to use in developing environmental parameters for agriculture and the ones that reflect policy concerns are: degradation of land, pollution of water and air greenhouse gas emissions, soil degradation, biodiversity, and land use change.⁶ Agricultural activities must take into considerations laid down policies that promote environmental protection and preservation of the ecosystem.

Agricultural practices have gradually transcended from subsistent farming to mechanized farming methods, bringing about a lot of changes and alterations of the eco-system, through the use of heavy equipment and toxic chemicals to enhance production and cater to the ever-increasing population. Therefore, for both agricultural planning and production, necessary environmental data will include metrological data, that is, the sort of climate data required to plan farming activities. This type of planning might involve the timing of planting, harvesting, and farm chemical applications, the types of crops planted, irrigation scheduling, and so on.⁷

Notwithstanding, the need to create a balance between environmental protection and sustainable development in the area of agriculture is necessary to forestall further depletion of the already fragile ecosystem.

2. Definition of Terms

2.1 Environmental Laws

Environmental laws are the standards that governments establish, to manage natural resources and environmental quality. The broad category of “natural resources” and “environmental quality” includes such areas as air and water pollution, forests and wildlife, hazardous waste, agriculture practices, wetlands, and land use planning. They are principles, policies, directives, and regulations enacted and enforced by local, national, or international entities to regulate the human treatment of the non-human world.⁸

⁵ A Oluwumi, Environmental Considerations in Nigerian Agricultural Policies, Strategies, and Programs. Nigeria Strategy Support Program (NSSP) Report No. NSSP 004 November 2009, p.13.

⁶ Ibid.

⁷ Ibid.

⁸ Environmental Law, available at <https://www.britannica.com/topic/environmental-law/Levels-of-environmental-law>, accessed September 2, 2022.

2.2 International Environmental Laws

International Environmental laws are sometimes called international ecological laws as a field of international law regulating the behaviour of states and international organizations concerning the environment.⁹ International Environmental law focuses attention on the existence of global environmental problems and the need for international solutions. It pioneers and develops important legal and policy principles.

2.3 Sustainable Development

Sustainable development as defined by World Commission on Environment and Development (WCED) means “development that meets the needs of the present without compromising the needs of future generations to meet their own needs.”¹⁰ At the heart of the concept is the belief that social, economic, and environmental objectives should be complementary and interdependent in the development process. Sustainable utilization of resources is one in which exploitation of natural resources takes into consideration the social, political, and other realities of the resource communities and also leaves substantial benefits whether financial or otherwise in exchange for actual or anticipated deprivation of natural endowments.¹¹ Sustainable development has three principal dimensions: economic growth, social equality, and protection of the environment. The economic dimension is the principle that society’s well-being would have to be maximized and poverty eradicated through the optimal and efficient use of natural resources.

The social aspects refer to the relationship between nature and human beings, uplifting the welfare of people, improving access to basic health and education services, fulfilling food security needs, and respect for human rights. The environmental dimension, on the other hand, is concerned with the conservation and enhancement of the physical and biological resources base and ecosystem.¹² Again, the concept of sustainable development has been defined as a process of change in which the utilization of resources, the direction of investments, the orientation of technological innovation and exchange, and institutional change reflect both future and present needs.

The practicable operational meaning of sustainable development details:

⁹ C Cheshire and P North, *International Law*, 12th ed, (12th ed, London,1992)

¹⁰ World Commission on the Environment (WCED)

¹¹ Y Oke, *Nigerian Energy and Natural Resources Law* (Notes and Materials) (Lagos: Princeton & Associates Publishing, 2016) p.1

¹²Ibid

- i. Ensuring that production processes do not over-exploit the carrying and productive capabilities of the natural resources base and comprise the quality of the environment, thus limiting the options of the poor, the present and future generations.
- ii. Ensuring that people have basic human rights and freedom to participate in the political, economic, social, and environmental spheres of their communities and society.

2.4 Agriculture

Agriculture is the practice of cultivating soil, growing and harvesting of crops, breeding and raising livestock, dairy and forestry, with the purpose of improving the livelihood of crop handlers.¹³ It can also be defined as the cultivation of crops and animal husbandry as well as forestry, fisheries and the development of land and water resources.¹⁴

2.4.1 Development of Agriculture

Agriculture is the science or practice of farming, including the cultivation of the soil for the growing of crops and the rearing of animals to provide food, wool, and other products. The cultivation of food and goods through farming produces the vast majority of the world's food supply it has been practiced sporadically for the past 13,000 years.¹⁵ Agriculture- *Agri* is from the Latin *ager* ("a field"), and *culture* is from Latin *cultura*, meaning "cultivation" in the strict sense of "tillage of the soil."¹⁶ Agriculture involves all activities essential to food, feed and fibre production, including all techniques for raising and processing livestock.

Plant cultivation and livestock production have abandoned subsistence agricultural practices in favour of intense technological farming resulting in cash crops that contribute to the study of agriculture known as agricultural science, cultivation of crops on arable land and the pastoral herding of livestock on range land remain at the foundation of agriculture economy.¹⁷ Population and population growth, urbanisation are major determinants of the demand for food and other agricultural products growth. The United Nations medium project forecasts that the world population will reach 9.8 billion by 2050.¹⁸

¹³ Okunade, S. O., & Williams, J. O. (2014). Agriculture in Nigeria: Problems, consequences and the way forward. Ilorin: Adewumi Press.

¹⁴ H Johnson, Introduction- International Agricultural Law and Policy, <https://www.elgaronline.com/view/9781786439444/chapter01.xhtml>

¹⁵ History of Agriculture <https://www.foodsystemprimer.org/food-production/history-of-agriculture>, accessed September 2, 2022.

¹⁶ Agriculture, <https://www.newworldencyclopedia.org/entry/Agriculture> accessed September 4, 2022

¹⁷ L Bolens, Agriculture in Encyclopedia of the History of Science, Technology, and Medicine in Western Cultures. (London: Kluwer Academic Publishers, 1997) p. 20-22

¹⁸ UN estimate of the population of the world, <https://www.un.org/desa/world/population/project>

The evolution of agriculture has four major stages that are related to the epoch of civilization.

- i. Hunting and gathering
- ii. Subsistence agriculture
- iii. Peasant farming
- iv. Commercial agriculture.

In Nigeria, a significant attempt to transcend from subsistence agricultural practices to mechanized farming altering the traditional land tenure system took place in western Nigeria in the early 1950s. The idea was to encourage the group of farmers to pool resources of land and labour to operate larger farmers in which mechanized farming was possible. This new trend required more land use and artificial means of supplying manure to crops thereby gradually introducing chemicals into the agricultural sectors which has today altered the natural ecosystem and the need to conform to sustainable agricultural practices.¹⁹

2.4.2 Importance of Agriculture

Agriculture is the most widely spread form of human activity and it is more basic than any industry. It provides four prime necessities food, clothing, shelter, and employment.

- i. Food Supply: Food is important for the growth, repairs of damaged body cells, and provision of energy. The bulk of the materials that perform these roles is derived from foods that are taken in the form of plant products, such as cocoyam, cassava (tubers), oranges, guava, mango, pawpaw (fruits) cocoa, coffee, and kola nut (beverage) pepper and ginger (spices) and animal products like meat, milk, and egg.
- ii. Employment: It provides ready employment for people who live in rural areas in Nigeria. It also provides job opportunities for others such as scientists who investigate agricultural problems. Also, workers in industries use agricultural materials for the production of goods. Trader's middlemen, transporters, and retailers all engage in the use of agricultural products.
- iii. Medicine and Pharmaceuticals: Agricultural practices help harvest plants that are used for drug production today. Plants are used to grow bio-fuels, bio-pharmaceuticals, bio-plastics and pharmaceutical-specific drugs such as tobacco, marijuana, cocaine, pine and

¹⁹ SA Agboola - *An Agricultural Atlas of Nigeria*. (London: Oxford University Press, 1979) p. 179

other useful materials such as resins are products of plants. Bio-fuels include methane from biomass ethanol and biodiesel.²⁰

- iv. Trade & Industry Growth (Instead of relying on imports): Agriculture is the source of raw materials for much of the secondary production (industrial) sector of the economy. Some common agro-based industries are canning factories which produce tomato puree, jam, and juice, textile factories which produce cotton, rubber factories which produce rubber materials like tires, tubes, and soles, meat industries which produce corned beef, and sausage and bacon, etc.
- v. Foreign Exchange: The foreign trade of Nigeria rest on almost entirely on the export of agricultural raw materials until the development of the petroleum industry. The purchasing power of any country depends upon what it can sell to pay for imports.

3. Environmental Impacts of Agricultural Activities

Agricultural activities often cause environmental problems because it changes the natural environment and produces harmful by-product.²¹ Agriculture is the leading source of pollution in many countries as pesticides, fertilizers, and other toxic farm chemicals can poison freshwater, marine, ecosystem, air, and soil.²²

Today agricultural practices are carried out with modern technology, the advancement in science and technological activities yields disruptive results in nature. The main reasons for environmental pollution are irregular and rapid industry, urbanization, organic and inorganic wastes that are left in the environment, unintended usage of agricultural lands, and wrong agricultural applications.²³ Erroneous use of pesticides and chemical fertilizer tillage, plant rotation, and inappropriate animal wastes are assumed mistakes.

The environmental impact of agriculture is the effect that different farming practices have on the ecosystems around them and how those effects can be traced back to those practices. The connection between emissions into the environment and the farming system is indirect, as it also depends on other climate variables such as rainfall and temperature. The environmental impact

²⁰ R, Akpofure, *Environmental Science: An Introduction* (Ibadan: Kraft Publishers) p.553

²¹ Ibid

²² Agriculture the Leading Source of Pollution, available at www.Worldlife.org/industries/sustainable-agriculture, accessed September 6, 2022

²³ M Onder, Effects of Agricultural Practices on the Environment, 2011(24) International Conference on Biology, Environment and Chemistry.1

of agriculture involves a variety of factors from the soil, to water, the air, animals and soil variety, people, plants, and the food itself.

4. Some of the Environmental Issues Related to Agriculture

4.1 Climate Change This is closely related to agriculture both are interrelated processes, both of which take place on a worldwide scale. Global warming is projected to have significant impacts on conditions affecting agriculture including temperature, precipitation, and global runoff.

These conditions determine the carrying capacity of the biosphere to produce enough food for the human population and animals. Rising carbon dioxide levels would have an effect, both detrimental and beneficial on crop yields. Assessment of the effect of global climate changes on agriculture might help to properly anticipate and adapt farming to maximize agriculture production.

According to the United Nation, the livestock sector (primary cows, chickens, and pigs) emerges as the top contributor to the most serious environmental problems. It is one of the largest sources of greenhouse gases responsible for 18% of the world's greenhouse gas emissions. It generates 64% of the ammonia, which contribute to acid rain and acidification of the ecosystem. Agriculture is the major contributor to increasing methane and nitrous oxide concentrations in the earth's atmosphere, between 2005 and 2050 demand for livestock will grow by 70% which might aggravate more gas emission, overgrazing and intensification of grain production for animal use,²⁴

4.2 Deforestation Causes the loss of habitat for millions of species, and is also a driver of climate change. Trees act as a carbon sink. That is, they absorb carbon dioxide, and unwanted greenhouse gas, out of the atmosphere. Removing trees release carbon dioxide into the atmosphere leaving behind fewer trees to absorb the increasing amount of carbon dioxide in the air. In this way, deforestation exacerbates climate change. When trees are removed from the forest, the soil tends to dry out because there is no longer shade and not enough trees to assist in the water cycle by returning water vapour to the environment.

In 2000, the United Nations Food and Agriculture Organization (FAO) found that “the role of population dynamics in a local setting may vary from decisive to negligible” and that

²⁴ F Igbirogba, How Poor Agricultural Practices aggravate Climate Change, March 2022, <https://guardian.ng/features/agro-care/how-poor-agricultural-practices-aggravate-climate-change/> accessed on the 7th 2022.

deforestation can result from a combination of population pressure and stagnating economic, social land technological conditions.

4.3 Irrigation Amongst numerous problems caused by irrigation is the depletion of underground aquifers through over-drafting. Over-irrigation can cause deep drainage from rising water tables that can lead to problems of irrigation salinity with the consequent build-up of toxic salts on the soil surface in areas with high evaporation, irrigation with saline or high sodium water may damage soil structure owing to the formation of alkaline soil.

4.4 Pollution and Agriculture To acknowledge that farming pollutes and degrades the environment should neither indict farming as a way of life,²⁵ the plain truth is that farms pollute groundwater, surface water, air, and soils, they destroy open space and wildlife habitat: they erode soils and contribute to sedimentation of lakes and rivers, they deplete water resources, these are the consequences of farming in general.²⁶ Synthetic pesticides, fertilizers, herbicides such as Malathion, roger are the most widespread method of controlling the pest in agriculture. Pesticides can leach through the soil and enter the groundwater, as well as linger in food products and result in death in humans. Pesticides can also kill non-target plants, birds, fish, and other wildlife. A wide range of agricultural chemicals are used and some become pollutants through use, misuse, and ignorance. The erosion of topsoil, which can contain chemicals such as herbicides and pesticides, can be carried away from farms to other places. Pesticides can be found in streams and groundwater. Pesticides are now been used without proper training on application and understanding the toxic effect on the environment, most of them are banned or in illegal stockpiles.²⁷ Pesticides residue upon entering the environment might ultimately pass unto humans through the consumption of drinking water, aquatic resources and other agricultural produce contaminated with pesticides.²⁸ Also, pesticide residues in amphibian and other animal tissues could constitute a threat to the human who consumes such animals, these calls for restricted use of pesticide in Nigeria.²⁹ Atrazine is an herbicide used to control weeds that grow

²⁵ Farming has caused widespread environmental degradation in Nigeria as discussed earlier; it ranks as the leading cause of water quality impairment in the country.

²⁶ JB Ruhl, Farms their Environmental Harms and Environmental Laws 27 *Ecology Laws Quarterly Review* 2001. 266.

²⁷ R Zhou et al, Distribution of Organochlorine Pesticide in Surface Water and sediment from Qiantang River East China, 2006 *Journal of Hazardous Materials*, 137: 68-78.

²⁸ Ibid.

²⁹ MS Asien et al, Amphibians Biodiversity and Health about Pesticide use in a cocoa Plantation at Ojo Camp Ugboke, Ovia, South- West LGA, Edo-State. Uniben Research Digest 2019. Publication of the Office of the Vice Chancellor, Research and Publication Committee, University of Benin.

among crops. This herbicide can disrupt endocrine production which can cause reproductive problems in mammals, amphibians, and fish that have been exposed – pollutants from agriculture have a huge effect on water quality. Quantities of fertilizer applied to crops are nitrogenous and phosphorus components. The largest quantities of fertilizer applied to crops are nitrogen and phosphorus components. Nitrogen fertilizers are highly water-soluble and are rapidly cycled in the soil, finding their way into the drainage system, downstream water courses, and groundwater also released in the atmosphere as ammonia.³⁰ Toxic effects of phosphorus become prominent when agricultural run-offs become deposited in lakes, streams and other water sources, excessive phosphorus leads to eutrophication.³¹

4.5 Waste Several harmful wastes emanate from agricultural practices; prominent among them is plasticulture practice. Plastic culture is the use of plastic mulch in agriculture.

Farmers use plastic sheets as mulch to cover 50 – 70% of the soil which allows them to use a drip irrigation system to have better control over soil nutrients and moisture. The use of pesticides with plasticulture allows pesticides to be transported easier in the surface runoff towards wetlands or tidal creeks. The runoff from pesticides and chemicals in the plastic can cause serious deformations and death in shellfish as the run-off comes the chemicals towards the ocean. The plastics themselves constitute waste as most of them end up in landfills although they could be reused or recycled. These plastics which are used as mulches are biodegradable, they can contain stabilizers and dyes as well as heavy metals this limits the number of products that can be recycled.

4.6 Sustainable Agriculture

The concept of sustainable agriculture was formally recognized for the first time in 1987 with the publication of the Brundtland report “Towards Sustainability.”³² It means ecologically and economically viable activity managed to prevent or minimize polluting or other environmentally intrusive activities adversely affecting the soil, water, crops, animals and human beings and avoid minimizing the consumption of non-renewable natural resources.³³ Farmers in their bid to serve the society should use farm practices compatible with the increasing demand of protection

³⁰ Food and Agricultural Organization of United Nations 2011, The state of the Worlds land and water resources for food and Agriculture: Managing risks systems.

³¹ J Karr et al, Low-Level Nitrite export from confined Dairy farming detected in North Carolina streams (2003) *Agric and Ecosystem and Environmental Journal*. 103-1110.

³² United Nations Report of the World Commission on Environment and Development 1987

³³ N Hawke and N covalent. *Agri- Environmental Law and Policy* (London: Cavendish Publishing Limited 1998, 10.

of the environment and natural resources. Sustainable agriculture is the idea that agriculture should occur in such a way that we can continue to produce what is necessary without infringing on the ability of future generations to do the same. For sustainable agriculture to thrive farmers are to adopt environmentally friendly practices such as conservation tillage, improved manure storage or soil nutrient testing, and nitrogen balancing, policymakers have a role in making sure that laws guide the activities of farmers and they adhere to them.³⁴ Increase in population has increased the practice of agricultural land conversation to meet the demand for food which in turn has increased the effects on the environment. Agriculture can hurt biodiversity as well, organic farming is better for the environment, it involves farming without using artificial materials like fertilizer, pesticides, etc. it can have a lower impact on the environment. However, in most cases, organic farming results in lower yields in terms of production per unit area.

The main tool for sustainable agriculture is policy and agrarian reform, participation, income diversification, land conversation, and improved management of inputs. One of the responsibilities of the Food and Agricultural Organization is strengthening governance and allocating resources sustainability while helping to build safe and efficient food systems that support smaller holds of agriculture and reduce poverty and hunger in rural areas while reducing the risks and enhancing the resilience of their food and agriculture.³⁵ environmental sustainability in agriculture focuses on responsible and thoughtful management of natural resources. Among other things, this involves:

- i. Reduction of carbon emission
- ii. Minimizing water, air and soil pollution
- iii. Promoting bio diversity
- iv. Managing water carefully³⁶

5. Global and Local Responses to Challenges of Sustainable Development and Unsustainable Agriculture Practices

- i. Earth summit Rio de Janeiro, 1992 – The overreaching message agreed upon by nations is that development in whatever area whether or not in the area of agriculture, it should be sustainable. Its aim was to put the concept of sustainable development as our major

³⁴ Agriculture and the Environment OECD, [www. OECD.org/agriculture/topic/agriculture-and-the-environment](http://www.OECD.org/agriculture/topic/agriculture-and-the-environment), 2021, accessed September 10, 2022.

³⁵ Food and Agricultural Organization (FAO)

³⁶L Siemon, Sustainable Farming in Aotearoa- Farm Environmental Plans. 2021 <https://www.asurequality.com>news> accessed September 11th 2022.

concern and to seek mutual feat to protect the planet from environmental degradation that even threatens to change the global climate. Agenda 21- Calls on all nations to strike a balance between social upliftment, economic prosperity, and environmental conservation. Global change resulting from various practices such as technology, innovation, and agricultural practices enhancement is probably the greatest environmental challenge facing the world, causing serious disruption of the world's weather and climate pattern, extreme events, and rising sea levels.

- ii. International Food Policy Research Institute (IFPRI) established in 1975 launched Global Food Policy Report to mitigate the effect of climate change to address multiple challenges and crisis in the agricultural sector. Farmers are at the fore front of climate change it affects their productivity and their policies can help mitigate climate change arising from greenhouse gases emanating from agricultural practices³⁷
- iii. The World Health Organization and Food and Agriculture Organization, (WHO and FAO) have jointly developed the International Code of Conduct on Pesticide Management. The most recent edition of this voluntary framework was published in 2014. It guides government regulators, the private sector, civil society and other stakeholders on best practices in managing pesticides throughout their lifecycle, from production to disposal.³⁸
- iv. Along the line of national response, it has been identified that agriculture can also has a huge potential in the adaptation and mitigation of climate change, but the government can formulate good climate change policies and effectively implement the agricultural sectors strategies of the policies to fight against climate change some of NASPA-CCN strategies for the agricultural sector includes: Increase access to drought-resistant crops and livestock feeds; adopt better soil management practices; provide early warning/meteorological forecasts and related information; increase planting of native vegetation cover and promotion of re-greening efforts.³⁹

³⁷C Nnabuife, IFPRI Launches Global Food Report to mitigate the effect of Climate Change <https://guardian.ng/opinion/agricultural-policies-and-climate-change/accessed> September 12th 2022

³⁸ WHO, Pesticides Residue in Food, September 2022 <https://www.who.int/news-room/fact-sheets/detail/pesticide-residues-in-food> accesses September 17th 2022

³⁹ E Martin, Agricultural Policies and Climate Change 2016, <https://guardian.ng/opinion/agricultural-policies-and-climate-change/> accessed on the 17th September 2022.

6. Unsustainable Agricultural Practices and the Way Forward

Natural resources must be managed even while carrying out various agricultural practices in ways to provide a basis for sustainable development. The environment plays a significant role in production and productivity in the agricultural sector of the economy, adequate attention is not often given to the proper use of the environment to realize maximum benefit.

Inappropriate farming systems and technology have hampered the soil leaving it in a bad state. The traditional fallow system is currently proving inadequate for food and industrial raw materials production as a result of overpopulation. Increased demand for livestock has resulted in overgrazing. In a study on the economic effects of soil erosion in Nigeria, it was established that the major factor thought to be responsible for erosion on Nigeria farms include ecosystem disequilibrium, rising population pressure on land, and fragile and permeable soil. Soil erosion is aggravated by farming systems, soil management practices, and poverty. European Meta-analysis found that organic farms tended to have higher soil organic matter content and lower nutrient losses. Nitrogen leaching, and nitrous oxide emissions per product unit.⁴⁰ It is believed by many that conventional farming systems cause less rich biodiversity than organic farming. Sustainable agriculture must meet economic social and ecological challenges. Sustainable agriculture needs to protect the natural resource base, prevent the degradation of soil and water, conserve biodiversity, contribute to the economic soil well-being of all, and ensure a safe and safeguard the livelihood and well-being of agricultural workers and their families.

Pesticide is a leading source of agricultural pollution, it can be defined as any substance, or preparation used for destroying any pest⁴¹ encompassing to include herbicide, insecticide, fungicide, as well as other preparations toxic to pest organisms prepared to kill the target pest.

In extreme cases, where deforestation is unaccompanied by reforestation, desertification and reduced quality of useable land are the results. For example, the Sahara Desert alone has, during the past fifty years, invaded one million square kilometers of land along its southern fringes. In the area of biodiversity, agriculture is responsible for 70 percent of the projected loss of terrestrial biodiversity due to widespread land conversion, pollution, and soil degradation.⁴²

⁴⁰ HL, Tuomisto, Does Organic Farming reduce environmental Impact? A Meta- European Research. (2012) (112) *Journal of Environmental Management*. 309-320.

⁴¹ Food and Environmental Protection Act the United Kingdom 1985, Section 16(15)

⁴² J Potts et al, Voluntary Sustainability Standards and Biodiversity: Understanding the Potentials of Agricultural Standards for Biodiversity Protection, Institute for Sustainable development 2016

Transgenic Agriculture seeks to optimize agricultural production through novel food products as well as increased resistance of crops to pests and weeds, this occurs when genetic materials from one living organism are inserted into another or deleting the gene of the organism thereby altering the characteristics of the organism's examples is when the gene is transferred from fish into tomatoes to increase its resistance to frost.⁴³ These all come with their risks and disadvantages to the environment and must be regulated. For genetically modified foods (GMO) environmental risk assessment will be required in the case of an application for such cultivation as well as the safety assessment scheme. The most commonly envisaged release of genetically engineered organisms into the environment in the area of agriculture examples include plants with engineered pesticide resistance viruses that destroy serious pests e.g., caterpillars, soil bacteria containing a pest toxin gene, and other such inoculants for increasing the rate of decomposition of compost silage and organism for speeding up the decomposition rate of straw.⁴⁴ All these agricultural practices should be monitored and controlled failure to do so, attracts adverse effects on the environment no matter how many grey areas it has opened in the agricultural sectors, and this can be done through cogent and enforceable environmental laws. Federal government of Nigeria in collaboration with world bank has expressed determination to address environment degradation caused by environmental problems including unsustainable agricultural practices in 19 states of the country including the Federal Capital Territory, this will be done through the agro-climatic resilience in semi-arid landscape, ACRESAL project. One of its objectives is to increase the implementation of sustainable landscape management practices, which helps in environmental protection and sustainability in the area of agricultural practices as well as providing food security through motivated agricultural activities.⁴⁵

7. Establishment of Basic International Legal Principles on Sustainable Development In the area of agriculture

Legal principles are important guiding ideologies to guide law-making and enforcement activities, reflecting the characteristics of certain fields of law. These principles are established to focus mainly on environmental protection and the prevention of environmental pollution.

⁴³ ED Wallis, Fish Genes into Tomatoes: How the world regulates Genetically Modified Foods (2004) 80 North Dakota Law Review. 421

⁴⁴ JN Gibbs et al, Biotechnology and the Environment: International regulations (n1987) New York: Stockton Press. Reprinted in 1991 by British Library Cataloguing in Publication Data. 196

⁴⁵ Vanguard-FG Partners World Bank to address Environmental Degradation; Solution to problems caused by Agricultural Practices August 11, 2022. <https://www.vanguardngr.com> accessed September 17th 2022.

7.1 Coordinated Development Principle

This coordinated development principle refers to the overall planning, parallel implementation, and coordinated promotion of environmental protection, economic construction, and social development, to realize the unification of economic benefits, social benefits, and environmental benefits.⁴⁶ This means to realize the sustainable development of society and the economy, when making decisions we must coordinate the development of three pillars – environment, economy, and society – rather than focusing on any two of them. The economy also implies agricultural activities. This principle ranks first among basic principles of environmental law.

7.2 Prevention/ Precautionary Principle

This principle is the abbreviation of “giving priority to prevention, combining prevention with control, and achieving comprehensive management”. This principle has been reflected in the provisions of the “environmental protection laws”. It has a guiding role in relevant environmental legislation. The preventive principle has been supported by international instruments preventing the introduction of pollutants”. The classic formulation of the no-harm principle in an environmental context appears in the Trail Smelter Case (United States v. Canada). This principle advises farmers not to introduce pollutants to the environment which can cause environmental degradation during their agricultural practices. These principles emphasize taking measures to ban or restrict the circulation of substances or products which are environmentally unfriendly, measures are taken early enough to prevent the impairment or damage occurring in the environment.⁴⁷

7.3 Polluter Pays Principle

This principle requires that the polluters shall pay for the damage caused by environmental pollution and the cost to treat the pollution, people who utilize resources shall make economic compensation, an exploiter of environmental resources shall have the obligation to protect natural resources and organizations and individuals who damage environmental resources shall bear the responsibility to recover and treat the damages occurring by cleaning up the mess and pay compensation. The polluters' pay principle emphasizes that the loss caused by environmental pollution shall be borne by the polluters and cannot be transferred to the state or society. This

⁴⁶ PP Hon, *Environmental Protection Tutorial Laws* (China: Law Press Beijing, 2006) p.1

⁴⁷ Ludwig Kramer, EC, *Environmental Law* Fourth Edition, (London: Sweet and Maxwell, 2000). 21.

also applies to exploiters of the environment during their agricultural activities. This principle is laid down as principle 16 of the UN Declaration of Environment and Development.

8. Legal Protection from Unsustainable Agricultural Practices

Environmental laws are geared towards ensuring the protection of the environment and sustainable development while carrying out agricultural activities.

Food production for the good of mankind cannot be a tangible excuse to destroy the ecosystem through various unhealthy practices by farmers and cultivators. Therefore, there is the need for various international environmental laws and even National and Local Laws to actively control the activities of environmental exploiters under the guise of farming or cattle rearing or various agricultural activities. Environmental matters initiated by negative Agricultural practices should not be treated as civil matters they should be treated as crimes. In the case of ***State of Iowa v. Ted.B. Diehl's*** (filed by IOWA Attorney General Environmental Crime Team).⁴⁸ The trial court resulted in a conviction on four counts of negligently polluting the river and an assessment of a fine of more than \$25,000. This is because agricultural activities are now seen as causing serious threats and are viewed as criminal violations. Pollution from agriculture should not be treated lightly and no discharge is excusable. In the case of ***R. v Secretary of State for the Environment Exparte Standley***⁴⁹ in that case the Agricultural Source Directive provided for the creation of areas designated for particular protection because of their higher vulnerability and the UK must take measures to reward those who farmer who voluntarily take measures to reduce the number of nitrates discharged on their land. This position was however challenged by the community as it was contrary to the polluters' pay principle. Unpermitted discharge should not be allowed to thrive, in the case of ***Community Association for Restoration of the Environment v. Henry Bosma Dairy***,⁵⁰ It was held that livestock of animals causing harm to surface groundwater, found that unpermitted discharges into irrigation ditches violate the Clean Water Act (CWA) of the United States of America.

In the case of ***Save the Valley, Inc. v. EPA***,⁵¹ the plaintiff filed an injunctive relief against EPA to compel the EPA to assume enforcement of NPDES permits in the state of Indiana and initiate proceedings to withdraw the state authority to enforce permits. The plaintiffs alleged that the

⁴⁸ Marywood Criminal No. 13347, September 11, 1992.

⁴⁹ (1997) QBD in LS Pudding, Environmental Law Guide, (London: Old Bailey Press, 1999). 90

⁵⁰ 65 F. Supp 2 d 1129 (E.D of Washington, 1999)

⁵¹ 99 F. Supp 2d 981 (S.D. Fnd, 2000)

EPA must address Indiana's failure to require Industrial Hog Farm to acquire NPDES permit in contravention of the Clean Water Act. The court denied the EPA'S application for dismissal.

In 1994, the National Rivers Authority Water Pollution Incidence in England,⁵² a major water pollution occurred where the eastern river Yar in Isles of Wight the water intake had to be closed, Farmers application of pesticides even though used within the Ministry of Agriculture standards and manufacturers guidelines even though no evidence of improper use was adduced, pollution of water had occurred as the pesticide had been transported through soil erosion. In the case of **Ruchelshaus v. Monsato**,⁵³ the Supreme Court of the United States acknowledged that the use of pesticides the need for pesticides has become important for American agriculture while it had improved its productivity, it has also increased risks of humans and environment.

In the case of **Bennett. Larsen Co**,⁵⁴ many hives were destroyed by pesticide use, although the label indicated and cautioned against spraying close to beehives and there was evidence of violation of labels and standards. In the case of **Martin v. Jaekel**,⁵⁵ two farmers were awarded damages when they sued to recover damages after the defendant aerially sprayed improperly mixed pesticides and caused damage to their property. These cases show that pollution arising from pollution by farmers are not exempted from judicial action and the law takes its course on offenders.

On the 6th of September 2022, the Dutch Agriculture Minister had to resign amid a tumultuous summer of protests by farmers over pollution regulations. Staghouwer had been tasked with transitioning the sector away from intensive farming practices and buying out farmers to reduce total emissions.⁵⁶ This is the extent to which farmers resist regulations to continue to pollute the environment unchecked. This was a great move by the Minister who refused to lower regulatory standards and jeopardize the lives of many and preferred to relinquish power. This is a big lesson for office holders in Nigeria to prefer the welfare of the entire city, rather than temporary monetary gains and clutching unto power as a do or die affair at the expense of lives and properties.

⁵² (1994) London: HMSOP, 11

⁵³ 467 U.S. 990 (1984)

⁵⁴ 348 N. W.2D 540(Wis 1994)

⁵⁵ (1971) IOWA, N.W. 2d 33

⁵⁶ Dutch Agriculture Minister resigns after Farmers kick up a Stink over Pollution Regulations
<https://www.euronews.com/2022/09/06/dutch-agriculture-minister-resigns-after-farmers-kick-up-a-stink-over-pollution-regulation>

9. Nigeria is a Signatory or Party to Several International Conventions and Treaties that Support the Protection of the Environment

- i. Vienna Convention for Protection of the Ozone Layer.⁵⁷ Countries should take appropriate measures to protect the environment against adverse effects resulting from human activities including agricultural practices which tend to modify the ozone layer. It provides an international framework for the reduction of the production of chlorofluorocarbons which contribute to the depletion of the ozone layer leading to skin cancer and other ailments.
- ii. United Nations Convention on the Laws of the Sea (UNCLOS).⁵⁸ The convention aims to establish the basic principle for environmental protection for the enforcement of international rules and standards about off-shore pollution. Article 4 prohibits the contamination of the marine environment with substances likely to cause deleterious effects, impairment, or reduction of sea quality.
- iii. Convention on International trade in Endangered Species of Wild Fauna and Flora It was signed into law in (Washington DC).⁵⁹ It establishes a list of endangered species for which international commercial trade is prohibited.
- iv. United Nations Conference on Environment and Development (UNCED).⁶⁰ The Rio Declaration of Environment and Development also called Earth Summit highlighted how various economic, social, and environmental factors are interdependent and evolved together. The conference reaffirmed its commitment to ensuring sustainable development which is possible at all levels from local, national to the international status. It recognises that balancing economic, social and environmental components was necessary which involved new perception on the way of carrying out activities on the environment, which of course includes agricultural practices and activities in any society towards resource management and protection.
- v. United Nations Convention to Combat Desertification.⁶¹ These laws are meant to curtail the activities of humans which can lead to activities of land degradation, forest reserve clearing, deforestation, and injurious agricultural practices can cause soil erosion. Article

⁵⁷ Vienna Convention for Protection of the Ozone Layer: Instituted in 1985

⁵⁸ United Nations Convention on the Laws of the Sea (UNCLOS) 1982

⁵⁹ Convention on International trade in Endangered Species of Wild Fauna and Flora – signed into law in 1973

⁶⁰ United Nations Conference on Environment and Development (UNCED) 1992

⁶¹ United Nations Convention to Combat Desertification- 1994

2 is the objective of the convention meant to combat desertification and mitigate the serious drought in Africa. This initiative is internationally supported through partnership and cooperation.

- vi. FAO International Code of conduct on the Distribution and use of Pesticide.⁶² The Code established voluntary standards of conduct for all public and private entities engaged in or associated with, the distribution and use of pesticides, and since its adoption, has served as the globally accepted standard for pesticide management.⁶³ The objectives of this Code are to establish voluntary standards of conduct for all public and private entities engaged in or associated with the distribution and use of pesticides, particularly where there is inadequate or no national legislation to regulate pesticides.⁶⁴
- vii. Framework Convention on Climate Change (UNFCCC)⁶⁵ The United Nations Framework Convention on Climate Change seeks to curtail the level of emission of gases associated with energy production and consumption which produces greenhouse gases among such is ammonia which is a common product from farms that generate greenhouse gases.
- viii. International Treaty Plant Genetic Resources for Food and Agriculture⁶⁶ This treaty is also called the Plant Treaty, signed in 2001 and entered into force in 2004 aimed at guaranteeing food security by conservation, exchange, and sustainable use of world plant genetic resources for food and agriculture and recognition of farmers' rights.
- ix. Stockholm Convention on Persistent Organic Pollutant⁶⁷ The Stockholm Convention is a global treaty that aims to protect human health and the environment from the effects of persistent organic pollutants (POPs) which are toxic, resistant to natural breakdown, and travel long distances. The Convention entered into force on May 17, 2004.⁶⁸ POPs have been shown to adversely affect human health and the environment. They have been

⁶² FAO International Code of conduct on the Distribution and use of Pesticide. 1985.

⁶³ International Code of Conduct on the Use and Distribution of Pesticides, available at <https://www.croplifela.org/images/EN/articulos/27/a0220e00.pdf> Food and Agriculture Organization of the United Nations, Rome 2005 accessed October 6th, 2022.

⁶⁴ Ibid.

⁶⁵ United Nations Framework Convention on Climate Change UNFCCC 1994.

⁶⁶ International Treaty Plant Genetic Resources for Food and Agriculture 2004.

⁶⁷ Stockholm Convention on Persistent Organic Pollutant 2004

⁶⁸ Persistent Organic Pollutant available at, <https://www.state.gov/key-topics-office-of-environmental-quality-and-transboundary-issues/stockholm-convention-on-persistent-organic-pollutants>

linked to cancer, damage to the nervous system, reproductive disorders, and weakening of the immune system.⁶⁹

The Organisation for Economic Co-operation and Development (OECD) having recognized the fact that agricultural practices can have significant impact on the environment, while the negative impacts can be grave, the OECD have decided to monitor the linkages between the environment and agriculture. It has identified successful agricultural policies that mitigate the negative impacts while enhancing the positive ones. More effort and co-operation are needed between farmers, policymakers, and the agro-food value chain. Farmers in many OECD countries have made improvement in the use and management of nutrients, pesticides, energy and water, using less of these inputs per unit of land.⁷⁰

10. National Laws Applicable to the Agricultural Sector of the Economy

- i. National Agricultural Land Development Authority (NALDA) Act Cap. N5 Vol. 10 Laws of the Federation of Nigeria (LFN) 2004
- ii. National Agricultural Seeds Act Cap. N5 Vol. 10 LFN 2004
- iii. National Crop Varieties and Livestock Breeds (Registration, etc.) Act Cap. N27 Laws of the Federation of Nigeria (LFN) 2004
- iv. Agricultural Research Council of Nigeria Act Cap. A12 LFN 2004
- v. Agricultural (Control of Importation 1964) Act Cap. A13 LFN 2004
- vi. Nigerian Agricultural Insurance Corporation (NAIC) Act Cap. N89 LFN 2004
- vii. Environmental Impact Assessment Act Cap. E 12, LFN 2004
- viii. The Land Use Act Cap L5 LFN 2004
- ix. The Sea Fisheries Act Cap S4 LFN 2004
- x. Agricultural and Rural Management Training Institute Act (Cap A10 LFN 2004)
- xi. Animal Disease (Control Act cap A 17) LFN 2004
- xii. 1999 Constitution of the Republic of Nigeria sections 20 and 33

⁶⁹ Ibid

⁷⁰ OECD, Agriculture and Environment, Better Policies to improve the Environmental Performance of the Agriculture Sector. <https://www.oecd.org/agriculture/topics/agriculture-and-the-environment/> accessed October 12, 2022.

11. How These Laws have Helped in Regulating the Agricultural Sector

The most important impacts of agricultural practices on the environment are water pollution, the decline of soil quality, loss of biodiversity, and landscape changes,⁷¹ these problems have necessitated the formation of environmental laws to check these problems. Britain has succeeded in implementing and application of Agri- environmental laws and policy since 1980. In Nigeria even though we are yet to have specific Agri- environmental laws we still have some laws that can be used to address the challenges of both national and international laws. These laws have gone a long way in addressing pollution issues arising from the agricultural sector, as it is no longer business as usual. Persons guilty of illegal use and importation of any biological, toxic, and infectious agents when caught are punished accordingly. Restrictions on the use and importation of deadly chemicals in the agricultural sector are prohibited and restricted making it an offense to be involved in dealing with such chemicals and when anyone is found guilty become liable and are made to face imprisonment or a fine. These regulations have acted as the restriction to die-hard offenders who import and make use of toxic chemicals at the expense of the lives of innocent people in the bid to maximize profit for themselves. Once they are caught, they are penalized.

12. Conclusion

The impact of agricultural environmental degradation frequently transcends agricultural areas, the general impact includes loss of flora and fauna, the decline in surface and underground water supply, and food scarcity. It is important to emphasize, that agricultural production, derives its existence from the use of land, without productive land resources no meaningful agricultural activity can take off. Similarly, profitable crop and livestock production can thrive only if the elements of sunshine, water, and soil nutrients are present in the right protection and quality. Increased agricultural and industrial output thrives best where a conclusive man-made socio-economic environment exists. Natural resources must therefore be managed in ways to provide a basis for sustainable development and land conservation for futuristic purposes.

Unfortunately, there are several human activities such as bush fallow, inappropriate technologies, overpopulation, overgrazing, deforestation, and profligate exploitation of mineral resources which are not in tune with proper environmental management practices. Agriculture is the most

⁷¹ D Stanners and P Bourdeau (eds) 'European Environment, 1995, Copenhagen: European Environmental Agency
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dominant land use on earth and will remain so as the world's population and global food remain on the rise. This poses a fundamental challenge to the natural environment and government is also heavily mitigating the environmental impact. Agriculture also contributes more to other forms of environmental degradation than any other economic sector from global greenhouse gases to freshwater withdrawals pesticides, fertilizers are exacerbating environmental pollution. Notwithstanding these pollutions agriculture plays a prominent role in any social activities of agriculture bringing about the end product of food which is necessary for the survival of mankind. Therefore, the need to strive towards sustainable development while carrying out these agricultural activities, so as not to destroy the future while catering to the present. In addition to needing the food that farmers produce, man also needs clean air, and water, and the land is polluted.⁷² The emergency of various international laws in this direction has gone a long way in checking the activities of farmers to ensure their farming methods are healthy enough to sustain the environment. Climate change mediated floods are threatening fish and crop farms, when the flood recede farmers must embark on all year round production deploying Climate Smart Agricultural Techniques, System of crop Intensification (SCI), use less of chemicals fertilizer, employ Good Agricultural Practice (GAP) and embrace Agricultural Biotechnology generally.⁷³ On a final note, to achieve sustainable agriculture farmers are expected to develop a positive attitude and information-knowledge of facts developed vis-a-vis environmental sustainability, adhere to environmental regulations and work towards producing more food on less land, using less energy, less water, fertilizer, and pesticide without further encroaching on the sensitive ecosystem and avoid further acceleration of climate change.⁷⁴

13. Recommendations

- i. Organic farming practices should be encouraged against conventional practices which are the root cause of environmental degradation in the agricultural sector. Fertilizers and pesticide use should be reduced to the barest minimum if they cannot be avoided.

⁷² JB Ruhl, Farms their Environmental Harms and Environmental Laws 27 *Ecology Laws Quarterly Review* 2001. 266.

⁷³ D Odifa, Flooding Destroys Crops and Livestock across States, October 14th 2022, <https://businessday.ng/business-economy/article/2022-flooding-destroys-crops-livestock-across-states/> accessed on the 14th October 2022.

⁷⁴ D. Hinrichsen, Webbing Food Race, Population Reports, series M. No. 13 Baltimore: John Hopkins University School of Public Health, Population Information Program. 1997

- ii. Those who have degraded the environment under the guise of farming or other agricultural practice should be brought to book and made to pay the necessary compensation and fined or face imprisonment.
- iii. Stricter policies and regulations should be made as well as an overhaul of the existing ones if they are not substantial enough to tackle the modern challenges posed by agricultural practice.
- iv. Sustainable resource management for environmental protection and preservation.
- v. Concurrent global feeding of the population vis-à-vis reducing the impact and preserving the habitat for the future generation. A balance should be created for sustainability.
- vi. Co-operations between policymakers and farmers for environmental enhancement in line with global feeding agenda.
- vii. Development of cost-effective agri-environmental policies.
- viii. Correct pricing of natural resources such as land, water, and use as waste sinks, since they are frequently under-priced, they are overexploited leading to pollution from agricultural use.
- ix. Creating awareness for farmers on the use of fertilizers and pesticides in the right quantity, reduction of tillage to reduce run-offs, soil compaction, and erosion.
- x. Extensive functional legal framework for the proper regulation of the agricultural sector.