National Journal of Environmental Law
ISSN: 2581-6683 (Online)
Volume 2, Issue 1
www.stmjournals.com

Environmental Protection and the Cameroonian Agricultural Policies: What Prospect for implementation

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Abstract

Nourishing the world requires a heavy reliance on the environment. Such reliance leads to poor and unsustainable agricultural practices, such as "bushfire" and "slash and burn" farming methods, to synthetic fertilizers, synthetic organic pesticides, and overgrazing. With the constant increase in population, there is a steady loss of biodiversity caused by the population's huge demand for food and other agricultural activities. This study critically analyzes and shows how unsustainable local and modern agricultural practices in Cameroon cause environmental degradation, which may lead to the destruction of forest cover, climate change, ozone depletion, species' extinction and the like. These constitute the greatest environmental problems plaguing the humanity in the 21st century and felt mostly by local communities. The study attempts to examine the extent to which the legal frameworks governing agricultural practices in Cameroon have addressed the concern of environmental sustainability and shows that unsustainable agricultural practices are some of the proximate causes of environmental degradation in Cameroon. Through empirical and theoretical approaches to data collection, the study exposes the negative impacts of unsustainable local and modern agricultural practices on the environment. The study recommends the significant and timely involvement of local communities in the processes to address the concerns of environmental degradation.

Keywords: *Agriculture, Cameroon, Environment, Policy degradation, Sustainable, agricultural practices*

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INTRODUCTION

In the three-hundred-billion-year history of life on this planet, a stage has been reached when, through the rapid acceleration of science and technology, man has acquired the power to transform his environment in countless ways and on an unprecedented scale. The environment is indispensable for human well-being and for the enjoyment of basic human rights; the right to life [2]. The protection and improvement of the environment is a major issue which affects the well-being of the 14 million or more species inhabiting the earth. It is, therefore, the urgent desire of the peoples of the entire world and the duty of all governments [3] to conserve and protect the environment. This duty is clearly stated in article 8 of the 1992 Rio Declaration on Environment and Development, which provides that to achieve sustainable development and a higher quality of life for all people, it is the responsibility of the states to reduce and eliminate unsustainable patterns of production and consumption and promote appropriate demographic policies [4].

The call to eliminate unsustainable pattern of production, thus conserving the environment, is re-echoed in other international instruments as well as Cameroon's domestic laws. For instance, the 1996 Environmental Law is to the effect that "the government shall elaborate strategies, national plans or programs geared towards assuring the conservation and sustainable utilization of environmental resources" [5]. Despite national and international calls for sustainable development, the world has entered the sixth

wave of mass extinction, after the fifth, which ended the era of the Dinosaurs [6]. The present mass extinction is not caused by natural phenomenon like the previous ones, but by man's unsustainable intervention with the environment for food, timber, settlement and mineral [7]. The demand for land for agriculture is increasing as forest is being cleared to make way for farmland [8], altering the ecosystem of the area. This is in negation of Principle 8 of Rio Declaration which provides that to achieve sustainable development and a higher quality of life for all people, it is the responsibility of the states to reduce and eliminate unsustainable patterns of production and consumption and promote appropriate demographic policies [9]. More land under cultivation means more depletion of the ecosystems. Unsustainable agriculture has weakened ecosystems worldwide. On the other hand, well-functioning ecosystems are prerequisite to high and sustainable agricultural production. The area of land under cultivation is increasing and forests have been cleared to increase farmlands [10]. Sustainable development, defined as "development that meets the needs of the present without compromising the ability of the future generation to meet their own needs" [11], is considered as the most appropriate remedy to environmental degradation. The concept (sustainable development) originated from environmental dangers that threaten the planet, caused by rapid industrialization and the abundant exploitation and pollution of the environment. It may be understood to mean development without depleting or diminishing the capacity of the earth's ecosystems to support life, or at the expense of others' well-being. In order to achieve sustainable development, environmental protection constitutes an integral part of the development process and cannot be considered in isolation from it [12]. The natural resources of the earth, including the air, water, land, flora and fauna and ecosystems, must be safeguarded for the benefit of present and future generations through careful planning and Management [13]. It is a multi-dimensional concept encompassing environmental integrity, social well-being, economic resilience and good governance: each of these sustainability dimensions involves several issues. Sustainability is an ambitious objective that can be reached through different pathways.

Agriculture has an important relationship with the environment, especially with the ambition to see Cameroon become an emerging economy by 2035, and because of its extensive use of land and the much talk about "3rd generation agriculture". The context within which farmers practice agriculture brings with it correspondingly different challenges and opportunities. These challenges include global environmental challenges such as climate change, land degradation, water availability, etc. Maintaining growth in the agricultural sector in Cameroon is essential, given its social and economic importance for the country [14]. However, the environmental challenges beg for a sustainable path towards attaining and sustaining this growth.

Considering that sustainable development has been an important goal for all nations of the world, this article examines the extent to which environmental protection is taken into consideration in Cameroon's agricultural policy. Environmental sustainability can be ensured if farmers are educated on agricultural practices that are environmentally sustainable [15]. Agriculture needs to undergo radical changes to become more environmentally sustainable. This is not just because it is important to take care of the environment, but also because threats to the environment also threaten human beings, who are at the center of concerns for sustainable development. They are entitled to a healthy and productive life in harmony with nature [16]. Hence, education in environmental matters is essential in order to broaden the basis for an enlightened opinion and responsible conduct by individuals, enterprises and communities in protecting and improving the environment in its full human dimension [17].

Agricultural Policies and Environmental Concerns in Cameroon

Cameroon's agricultural policy refers to the regulatory frameworks of agriculture. Cameroon has overhauled its agricultural policy to re-center it around the objective of

poverty and hunger eradication in the context of sustainable development and in line with the international agenda with particular attention on the Millennium Development Goals (MDGs). By ratifying environmental conventions resulting from the Rio Summit [18], and by creating a ministry specifically in charge of environmental issues, Cameroon has shown its will to subscribe not only to the objectives of these conventions but also its commitment to respect and implement the related obligations [19]. In spite of efforts made by the national and international community, there are still serious difficulties impeding the application of these conventions, of which in particular is inadequate capacities at the individual, institutional and systemic level [20].

In order to achieve a more rational management of resources and thus to improve the environment, states have the responsibility to adopt an integrated and coordinated approach to their development planning so as to ensure that development is compatible with the need to protect and improve the environment [21]. The conservation of biodiversity has become a major preoccupation for the government of Cameroon, which has recognized the high value of ecosystem services. A legal framework has been established to address concerns about the protection of the environment and the conservation of biodiversity.

Furthermore, in Cameroon, issues of environmental protection are addressed in the context of the country's sectoral laws and policies among which the regulatory frameworks of agriculture stand prominent. The agricultural policy is also an important component of the National Environment Management Program (NEMP). Thus, an understanding of environmental implications of agriculture in Cameroon must also be based on an examination of the texts which regulate this sector as they address environmental concerns. Most legal instruments regulating the agricultural sector in Cameroon are either silent or have not adequately addressed the concerns of environmental sustainability. However, a few of them contain brief provisions addressing the protection of the environment.

Cameroon created a ministry in charge of the environment at the eve of the World Summit in 1992 in Rio De Janeiro, Brazil. Immediately after this summit, a National Environmental Action Plan, which defines the general policy of environmental protection and rational management of natural resources was elaborated. A framework law on the environment was later adopted in 1996. This law instituted the practice of environmental impact assessment (EIA). Decree No.2005/0577/PM of 23/02/2005 lays down the modalities to carry out EIA. Order No.0070/MINEP of 22 April 2005 states different categories of projects requiring EIA. Shifting cultivation is, however, not among these projects. Hence, shifting cultivation is passing through the sieve of impact EIA in Cameroon and is impacting negatively on the environment. Order No. 0070/MINEP of 22 April 2005 in the agricultural sector targets only projects with the surface area above 100 hectares. For irrigated agricultural projects with underground water, this surface area comes down to 10 hectares. Shifting cultivation deals with surface areas which barely reach 1 hectare. The problem is that the small surfaces, when summed for all the farmers, have a great Impact [23].

A strategic environmental assessment of the policies of the agricultural sector is the proper way EIA can intervene in order to ensure environmental sustainability [24]. In the forestry sector, in particular, policy makers must ensure that the ownership of trees and forests is addressed. Although the concept of community ownership of forest was put in place to resolve this problem, its implementation is not effective. If villagers have rights to forests, they will consider the trees like a market commodity that can be protected. In so doing, they will reduce the burning of forests which is a great source of carbon emission and climate change.

The decree on the creation, organization and functioning of a national seed and new plant

variety council only makes mention of the fact that the National Seed Council (NSC) shall comprise one representative of the ministry in charge of environment and one representative of the ministry in charge of forestry [25]. It can only be implied from the provision of this decree that the representatives of the ministries in charge of environment forestry are resource persons when considering the agricultural and environmental related impacts.

Furthermore, the law-regulating activities of the fertilizer sub-sector in Cameroon, which aim at increasing farm productivity and agricultural production and the sustainable management of natural resources, only make mention of the fact that the use of fertilizing substances is carried out within the context of sustainable management [26]. However, Section 5 is to the effect that the conditions for producing, importing, exporting, packaging, storing and distributing fertilizers [27] or any other related activity shall be fixed by joint order of the ministers in charge of agriculture, trade, environment and forests, and public health. The law goes further to state that the intensive use of fertilizers in a form shall be subject to a prior assessment of the physical state of the soil [28]. Any individual or corporate entity, whether public or private, which owns a farm and intensively uses fertilizers shall be bound to regularly conduct an impact assessment of such fertilizers on the environment [29].

This provision of the law is not effective in the sense that it applies only to those who practice agriculture on large scale. Those who practice agriculture on small scale, their activities are never checked, yet when summed up, they have a great impact on the environment. However, the law tries to invoke the precautionary principle of Rio Declaration on Environment and Development, which is to the effect that in order to protect the environment, the precautionary approach shall be widely applied by states according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental Degradation [30].

Section 17 punishes the production, distribution, and/or use of fertilizers that do not comply with regulations; the production, distribution, and/or use of fertilizers containing noxious substances or harmful properties, even when used in the prescribed quantity, and are likely to affect plant growth, harm human and animal health, and damage the environment; the flouting of registration formalities and refusal to submit fertilizers or documents relating thereto for quality control; refusal to submit to the control procedures governing fertilizer use; as offences with corresponding penalties under Section 18 of the same (imprisonment of 1 to 5 years or with fine of from 50.000Fto 100.000.000F or with both such imprisonment and fine). Under Section 20, in addition to the penalties under section 18, the fertilizers in question may be: returned to the country of origin, at the expense of the importer or distributor in case of imported fertilizers; seized and destroyed where they are considered hazardous, and unfriendly; or declassified.

On its path, the law laying down the principles and rules governing phytosanitary protection in Cameroon is to the effect that phytosanitary protection shall be undertaken through the use of phytosanitary products which are safe for humans, animals and the environment [31]. With respect to phytosanitary control, the law further states that chemical treatments must be affected in compliance with good agricultural practices, with a view to preserving the health of humans and animals and protecting the environment from the hazards caused by the presence or the accumulation of residue of phytosanitary products [32]. As concerns the use of phytosanitary products, the law provides that only phytosanitary products that have been homologated or it sale has been temporarily authorized may be imported, distributed, packaged or used in Cameroon [33]. The law also provides for "homologation"– any process following which the competent authority approves the importation, distribution and use of a phytosanitary product, after examining the complete set of scientific facts showing that such product is efficacious for the intended uses and safe for humans, animals and the

environment, under recommended conditions of use [34].

Another legal text regulating the agriculture sector provides that farmers must use only provisionally authorized pesticides and in conformity with international norms [35] and that phytosanitary products must be kept in a manner that does not constitute or pose environmental risk or risk to human health [36]. Furthermore, the decree on the organization of National Phytosanitary [37] Council (NPC) placed the council under the authority of the minister in charge of agriculture. As a consultative organ in matters relating to the protection of the vegetation in Cameroon [38], a representative of the ministry in charge of the environment and nature protection is one of the members of the council [39]. The decree fixing the modalities of execution of vegetable quarantine operations only makes mention that before importation, the importer of agricultural inputs (phytosanitary) must ensure that they have been evaluated as regards their effect on the environment [40]. Failure to observe the provisions of the decree, notably importation without permit or phytosanitary certificate, the products shall be destroyed or returned at the expense of the violator, in addition to a criminal action and sanctions [41]. Under Principle 14 of Rio Declaration on Environment and Development, states are to effectively cooperate to discourage or prevent the relocation and transfer to other states of any activities and substances that cause severe environmental degradation or are found to be harmful to human Health [42]. The 2005 decree fixing the conditions of homologation and control of phytosanitary products provides that for the homologation of bio pesticides, the promoter must submit a document containing among other things, an impact assessment on the environment [43]. Under Article 9 (2), application for the renewal of homologation must contain among other data on the environment, data on the impact of biopesticide on humans – if they are toxic or not. This is in line with Principle 17 of Rio Declaration on Environment and Development, which is to the effect that environmental impact assessment, as a national instrument, shall be undertaken for proposed activities that are likely to have a significant adverse impact on the environment and are subject to a decision of a competent national authority [44]. Chapter II (Arts. 17–20) of the 1996 framework law relating to environmental management in Cameroon [45] also provides for EIA for all projects likely to result in environmental harm.

The National Commission of Homologation of Phytosanitary Products and Certification of Treatment Equipments referred to as the Commission [46], headed by the minister in charge of agriculture or his representative also comprises a representative of the ministry of the environment and nature protection [47]. The fabrication, formulation, and conditioning of phytosanitary products is subject to obtaining the permission of the minister in charge of agriculture for a period of 10 years renewable [48]. The permit is, however, granted upon the production of a document containing, among other things, procedure to eliminate effluent, wastes and packaging [49]. Under Art. 44, authorization and permit can be suspended or withdrawn by the minister in charge of agriculture if the beneficiary does not comply with regulation in force or in the case where his installations constitute a danger to the health of humans, animals and the environment.

Among other things, the law on the regime of security in matters of modern biotechnology in Cameroon regulates the use, development, the security manipulation, trans-frontier movement of genetically modified organism capable of producing unfavorable effects on human and animal health, biodiversity and the environment [50]. All genetically modified organisms or products which present a risk to human, animal and plant health, biodiversity and the environment must be destroyed in accordance with conditions laid down by regulation [51]. The evaluation of such risk must be done in accordance with the principle of precaution, and aimed at guaranteeing human, animal and plant safety, and also the protection of biodiversity and the environment [52]. Risk evaluation is based on the instruction of the minister in charge of the

environment after consultation with other competent authorities [53]. It is forbidden to proceed to export to other countries or import genetically modified organism-related substances, which are susceptible to causing environment degradation or irreversible ecological or biodiversity change, or if the danger of such substances to human, animal and plant health is Proven [54].

In case of a danger resulting from the voluntary or accidental release of GMO, constituting a threat to human, animal, and plant health, biodiversity and the environment, the competent administration informs the authorities in charge of the management of the catastrophes and also the administration implicated for advice in order to reach an urgent strategy to intervene in the danger [55]. All use of GMOs must be done in such a manner as to ensure the security of the local community and the environment [56]. The non-respect of a condition or provisions of this law; refusal to furnish information or explanations to an inspector or controller in the exercise of his functions; and the giving of false information to a sworn inspector or controller constitute offenses [57].

As part of their commitments under the COMIFAC Treaty, the state parties to the treaty undertake, within the purview of the conservation and sustainable management of forest ecosystems of Central Africa, to: adopt measures aimed at putting forest conservation and sustainable management actions in line with development programs of other sectors, notably agriculture and strive to further involve business operators in the sustainable management and conservation of forest ecosystems [58]. It should also be noted that Cameroon has ratified the Convention on Biological Diversity (CBD) [59]. Cameroon ratified the CBD on 14 June 1992.

Among the priority areas and policies of the Cameroon government, the protection of the environment through rational use of natural resources and the management of natural resources and sustainable protection of the environment stand prominent [60]. The Government of Cameroon has adopted three strategic objectives to promote the conservation of biodiversity: (i) to reduce the degradation of ecosystems and reverse degradation that has already occurred through management systems which are appropriate for the environment, socially beneficial and economically viable, (ii) to promote the value and importance of biodiversity; using incentives to help preserve biodiversity and promote the sustainable use of resources; and (iii) to implement biodiversity conservation plans with appropriate planning and follow-up with all relevant stakeholders [61]. However, practical realities are not in line with these policies.

Despite these regulations and other policy instruments in the agricultural sector, environmental concerns in the agricultural sector are still weak despite the fact that the sector both contributes and suffers from environmental harm.

The Symbiosis between Unsustainable Agricultural Practices and Environmental Harm

Agriculture in Cameroon is at a crossroad, with a major challenge –environmental degradation. Unsustainable local and modern agricultural practices constitute a threat to the environment. It has to find ways to feed the increasing population while being environmentally sustainable. The relationship between UAP and environmental harm is two-way. UAP contributes to environmental harm in several major ways and environmental harm in general adversely affects agricultural output. Thus, it is increasingly clear that the path that agriculture has been on is not environmentally sustainable. Finding solutions to these challenges has never been more pressing [62].

The cost of agriculture on the environment on which we depend is less recognized by many [63]. Poor agricultural practices contribute to environmental harm through the release of GHG causing climate change, unpredictable rainfall, changing seasons, hot temperature, drought and desertification; tree loss; erosion and topsoil depletion; groundwater contamination; and reduction in genetic and biodiversity loss. The central challenge for agriculture in the future is to become more

productive while becoming more resilient and more environmentally sustainable. This task has been termed a "doubly Green Revolution" [64]. Thus, there is the need for agriculture to reduce its own environmental harm while increasing crop yield.

On its part, environmental degradation may affect agricultural output in many ways. Higher temperatures resulting from climate change may negatively affect crop yield, thereby causing food insecurity and eventually hunger [65]. For instance, increased temperatures have negative effect on rice yields by up to 10% for each 1°C increase in minimum temperature in the dry season. Increases in maximum temperatures can lead to severe yield reductions and reproductive failure in many crops. In maize, for example, each degree day spent above 30°C can reduce yield by 1.7% under drought conditions [66]. Changing climate increases extreme weather events (extreme temperature, floods and droughts) that affect agriculture [67]. Climate change is already affecting rainfall amounts, distribution, and intensity in many places such as Cameroon [68], felt mostly by rural communities who depend on rain-fed agriculture. This has direct effects on the timing and duration of crop growing seasons, affecting plant growth. Rainfall variability is expected to increase in the future, and floods and droughts will become more common [69]. Its impact will be largely irreversible [70]. Hence, the need to adapt to climate change is fundamental in agriculture. Climate change will not only lead to further land degradation, it will reduce land availability because climate mitigation strategies for instance, avoiding deforestation, afforestation as means of sequestrating carbon dioxide [71], require land that might otherwise be used for food Production [72]. Climate change will also result in multiple stresses for animals and plants in the future [73]. By 2050, the number of food insecure people resulting from climate change is expected to increase by 10% to 20% more than would be expected without climate change. Sub-Saharan Africa is likely to be the worst affected region [74]. According to FAO, food production in Sub-Saharan Africa has stagnated over the last 35 years, albeit an increasing population of 2.3% annually [75]. This has led to a growing consensus amongst the international humanitarian community that adaptation measures are urgently needed to help vulnerable people cope with the changing environments. This requires adapting food production methods through technical capacity transfers and technological innovations, while also making existing agricultural production systems more resilient and Sustainable [76]. Globally, agriculture contributes 30% to 40% of anthropogenic GHG emissions. Three-quarters of agricultural GHG emissions occur in developing countries, and this share may rise above 80% by 2050 [77]. The developing world, of which Cameroon is part, is, therefore, the focus of agricultural GHG emissions. These environmental challenges will have profound effects on farmers' ability to grow crops and rear animals, to meet the needs of a growing population. Many of the rural people who are likely to be adversely affected may have limited capacity to adapt to environmental stresses that may affect them [78]. The effects will differ greatly by region, and will likely affect farmers in lower latitudes, particularly Sub-Saharan Africa including Cameroon, most severely. This region is also where technology and information transfer is the lowest, where a majority of livelihoods depend on Agriculture [79]. FAO evaluates the rate of deforestation in Cameroon at 1% to 1.5%per year between 2005. There is a great increase, as this rate was evaluated at 0.6% between 1980 and 1995 and it was the second highest rate of deforestation in the Congo Basin after that of the Democratic Republic of Congo [80]. In fact, in Cameroon, land use change and agriculture are great contributors of green gas from anthropogenic sources in the forest sector [81]. The Intergovernmental Panel on Climate Change's fourth assessment report estimates it at 17.4% [82]. The wood which could be exploited is burnt and climate is affected.

The situation is so because the forestry law adopted in 1994 does not give right to farmers to exploit the trees they have in their farms. Individuals cannot own natural trees. For this reason, they do not see them like an economic commodity [83]. Another reason for farmers

burning the forest is to have access to land as the forestry law does not give right to own a piece of the forest. The concept of community ownership of forest introduced is not effective in its implementation. Hence, when the trees are burnt, land title can then be awarded as it will be said that the operator concerned has "developed or improved the land". So, deforestation is indirectly favored by law [84]. The following sub-sections will further detail the relationship between agriculture and the environment.

The Nature of Environmentally Unsustainable Agricultural Practices in Cameroon

Cameroon like most African countries is primarily an agricultural economy with about 70% of the population engaged in agriculture [85]. Agriculture is the corner stone of the Cameroonian economy [86]. Agriculture in Cameroon is not being practiced on a sustainable basis, causing environmental degradation. Under the African Convention on the Conservation of Nature and Natural Resources (revised version), Maputo, 2003, the parties pledged to take effective measures to prevent land degradation, and to that effect, develop long-term integrated strategies for the conservation and sustainable management of land resources, including soil and vegetation [87]. They in particular undertake to adopt measures for the conservation and improvement of the soil, to, *inter alia*, combat its erosion and misuse as well as the deterioration of its physical, chemical and biological or economic properties [88]. The following are the unsustainable agricultural practices (UAP) in Cameroon.

The Practice of Primitive Agricultural Methods

These include shifting cultivation characterized by "bushfire" and "slash-and-burn" cultivation and overgrazing. In Cameroon, the traditional and predominant method of clearing a farmland is still through bush burning, mostly in local communities. The "slash-and-burn" practice was used to feed fewer mouths than need to be fed today. It consists of burning off vegetation, farm the land for a few years, and then leave it fallow for some years, to let the soil regain its fertility [89]. These methods increase the concentrations of greenhouse gases (GHGs) in the atmosphere trapping heat and causing global warming and climate Change [90].

Furthermore, there is the problem of deforestation to open up new farming lands when the old ones lose their fertility and also due to increase in population, a phenomenon known as shifting cultivation. In the forest area of Cameroon, shifting cultivation is done at the expense of trees which otherwise could be exploited. In other words, economic asset is burnt to put up something whose value is not sure to be above. Moreover, the trees burnt produce carbon dioxide which causes climate change [91]. About 13 million hectares of forests are lost annually due to deforestation for agriculture. There is an increase of forest fires for agriculture [92]. According to FAO, Cameroon ranks first in deforestation in the Congo basin with an increasing rate from 0.9% in 2007 to 1% in 2013, equivalent to a loss of about 200,000 hectares per year [93]. The current annual deforestation rate is expected to continue.

As global warming accelerates, it is expected that the adaptation of agriculture to climate change can only be meaningful, if organic agriculture such as irrigation gains prominence. Unfortunately, agricultural practice in Cameroon is still predominantly rain-fed; with limited irrigation schemes and, therefore, particularly vulnerable to the impacts of climate change [94]. The consequences are that the increasing frequency and severity of droughts is likely to cause crop failure and eventually Famine [95]. Another area of unsustainable agriculture is in the livestock sector. Ruminant animals such as cattle, sheep, goats, buffalo, etc., are one of the biggest sources of GHG emission. The way these animals digest grass and feed produces methane, which has been calculated to account for 5% to 10% of overall human caused GHG emissions [96]. These emissions are harder to reduce or mitigate than those of many other sectors. Furthermore, herders frequently indulge in "bushfire"– burning the old grass in order for young plants to shoot for their cattle.

Sometimes, the fire extends from the hills to valleys and forests. This poor practice greatly contributes to GHG emission, further causing climate change risks. It also destroys water catchments and, depleting topsoils exposing it to erosion. The non-legally binding authoritative statement of principles for a global consensus on the management, conservation and sustainable development of all types of forests provides that appropriate measures should be taken to protect forests against harmful effects of pollution, including fires, in order to maintain their full multiple value [97].

The African Convention on the Conservation of Nature and Natural Resources (revised version), Maputo, 2003, also provides that parties shall, take all necessary measures for the protection, conservation, sustainable use and rehabilitation of vegetation cover. To this end, states are under the obligation to take concrete steps or measures to control fires, forest exploitation, land clearing for cultivation, grazing by domestic and wild animals, and invasive Species [98].

Unsustainable Modern Agricultural Practices

These consist of the use of agro-chemicals, genetically modified organisms (GMOs), and elimination of species.

Agro-chemicals

Besides the conversion of land for agriculture, increased use of agro-chemicals such as synthetic pesticides, herbicides and synthetic fertilizers also contribute to environmental degradation [99]. Synthetic fertilizers, pesticides and herbicides are made from minerals that are depleting such as phosphate and potassium. The production of agro-chemicals is also an important source of GHG emissions. In particular, fertilizer production is energy-intensive, accounting for 0.6%–1.2% of the world's total GHGs [100]. Chemical-intensive agriculture has also degraded soils and destroyed resources that are critical to storing carbon, such as trees and other vegetation. The rise in the use of chemical inputs has also had adverse environmental and health impacts on farm workers and consumers. A substantial portion of pesticide residues ends up in the environment, causing pollution and biodiversity loss or Decline [101].

The Green Revolution brought about a shift from diversity to monocultures. When farmers opted to plant Green Revolution crop varieties and raise new breeds of livestock, many traditional, local varieties were abandoned and became extinct. And yet, maintaining agricultural biodiversity is vital to long-term resilience of the environment to adverse trends or shocks [102]. Thus, sustainable agriculture is a critical option for environmental protection. A more permanent solution to the agro-chemicals dilemma may be found in more perennial cropping systems. These crops provide multiple advantages from an environmental perspective, significantly reducing the need for tillage; deeper root systems that both protect and build soil; better drought tolerance; and lower fertilizer and pesticide Requirements [103].

Genetically Modified Organisms

First of all, it is important to understand what a GMO is precisely. The World Health Organization (WHO) defines them as organisms whose DNA has been altered in a non-natural way. GM plants are usually changed to be insect-resistant, virus-resistant, or herbicide-tolerant. With these changes come some potentially problematic environmental Challenges [104]. GMOs are a broad group of plants, animals, and bacteria that are engineered for a wide variety of applications ranging from agricultural production to scientific research. The types of potential hazards posed by GMOs vary according to the type of organism being modified and its intended application [105]. Environmentalists and scientists have long feared that the introduction of genetically modified seeds and plants could cause detrimental effects from "genetic pollution," which occurs when an engineered gene enters another species of crop or wild plant through cross-pollination. This contamination may pose public health threats, create super weeds which could require greater amounts of more toxic pesticides to manage, and threaten extinction of rare plants and their

weedy relatives relied upon for crop and plant biodiversity [106]. The debate over the environmental impact of genetically modified (GM) crops is growing increasingly complex and intense. It is further complicated as new research is published. Assessing the environmental impact of GM crops is often difficult as many factors are considered. Some scientists focus on the potential risks of GM crops, while others emphasize their potential benefits. The environmental and ecological concerns potentially associated with GM crops are evaluated prior to their release. In addition, post-approval monitoring and good agricultural systems need to be in place to detect and minimize potential risks, as well as to ensure that GM crops continue to be safe after their release. Comparisons among GM, conventional, and other agricultural practices, such as organic farming, will bring to light the relative risks and benefits of adopting GM Crops [107]. Bees are very important in the pollination of many food crops, but they are unfortunately extremely endangered by modern agricultural techniques, such as GM crops. Monarch butterflies are specifically at risk from GMO maize plants. In addition to bees and butterflies, birds are also at risk from pesticides; they work as biological control agents and pollinators, again, like bees [108]. Furthermore, pests that are targeted by these agricultural methods can adapt to pesticides and herbicides, in addition to the DNA changes in GM plants to make them resistant. This means that they will not always be effective, but their toxic legacies will Remain [109].

Finally, biodiversity, while it is critical in all ecosystems and to the sustainability of all species, is put at risk by GMOs. When GM crops are planted, generally in a mono-crop fashion, many heritage seeds are no longer used. The nature of GMOs means fewer weed flowers and, therefore, less nectar for pollinators. Toxins released into the soil through the plants' routes mean fewer soil bacteria, which are integral to healthy soil for plants to grow without the use of chemical fertilizers. Toxic residues are left in the soil of GM crops. Nutrients are not returned to the soil in monocrops and from GMO foods, meaning that soil is becoming dry and void of all nutrients. A cycle of dependence on GMO seeds and chemical fertilizers, pesticides, and herbicides is then created in order to grow a single crop. In addition to soil issues, the irrigation used to grow GM foods naturally carries all of these problems into water sources and into the air. This exposes different bacteria, insects, and animals to the same Problems [110]. All of these impacts must be taken into consideration in the larger picture; GMO's DNA may end up in soil, compost, animal feed and byproducts, and other living organisms from insects to larger pests. Bees can transport pesticides, herbicides, and DNA through air into the environment. Once a plant is introduced in an agricultural environment, it is reasonable to assume it will become part of a larger ecosystem, meaning the problem of environmental damage done by GMOs is much larger than simply potentially harming our health.

Elimination of Species

There has been a systematic elimination of species that are deemed to be incompatible with some cash crops; for instance, cocoa farming, and their disappearance represents a loss to the forest ecosystems. The removal of plant species from the plantations presents the risk that some will disappear altogether in some areas of the country [111]. Changes in land use have had an impact on biodiversity both within and outside of the cash crops plantations. As larger plantations are established, the risk of biodiversity loss increased. There are higher rates of forest conversion, with new plantations accounting for 78.7%of the new areas of production. This trend has had a negative impact on biodiversity, especially in frontier regions. Areas previously covered in forests have become agricultural land. In some regions, this is adversely affecting the delicate biological transition from forest to Savannah. In other cases, existing agricultural land and fallow land has been converted to cash crops production [112]. The increasing number of smallholder plots has led to a serious fragmentation of habitat. This in turn has led to a significant reduction in the number of endemic species, especially birds.

Tackling Environmental Degradation in the Agriculture Sector: The Use of Sustainable Methods and Strategies

The African Convention on the Conservation of Nature and Natural Resources (revised version), Maputo, 2003, is to the effect that parties shall, when implementing agricultural practices and agrarian reforms, improve soil conservation and introduce sustainable farming and forestry practices, which ensure long-term productivity of the land; control erosion caused by land misuse and mismanagement which may lead to long-term loss of surface soils and vegetation cover [113]. Sustainable farming practices can reduce agriculture's destruction of the environment while continuing to provide food. For instance, sustainable farming systems can reduce agriculture's GHG emissions and can be a primary vehicle in stabilizing and reversing climate change while continuing to provide food [114]. Getting to environment-friendly agricultural systems, however, requires a shift in focus, research and attitudes away from poor agricultural practices toward low-input, resilient agricultural systems that increase carbon sequestration in the soil and lessen output of GHG [115]. Many environmental risk-management strategies fit squarely into sustainable agriculture practices and can, therefore, be promoted through programs and policies targeting sustainable environmental management [116]. A synergy between the two is highly recommended.

There is no "one size fits all" solution to the problem of how to feed billions while safeguarding the environment [117]. Therefore, it is necessary to rethink the current environmental challenges, including the role and system of agricultural practices in the light of environmental degradation. In the next decades, agriculture will have to carry out an enormous task – feeding the increasing global population and supplying bio energy [118] to meet a growing share of the world's power needs. The implication is that greater doses of chemical fertilizers and pesticides will be Used [119]. As provider of environmental services, sustainable agriculture can and is environment friendly. The agricultural sector both depends upon and impacts the natural environment. Because of this, agriculture has a major role to play as a steward of our natural environmental and ecosystems. Not all agricultural practices are equal in their impacts upon the environment. Thus, addressing environmental harm in the agricultural sector requires recognition of the differences among different types of agricultural practices. Environment-friendly agricultural practices should include a fair international and national system that rewards farmers for their contributions to protecting the environment [120]. The recent food crises that has struck parts of Africa has increased international awareness of the risks posed by environmental harm, especially climate change in aggravating food insecurity in vulnerable regions [121]. Environmental degradation necessitates the involvement of all stakeholders, including farmers in the ongoing processes to address this peril. Achieving this will require increased recognition of the centrality of farmers, especially local farmers. Sustainable agriculture mainly refers to organic agriculture or conservation agriculture (CA). It focuses on ecological and not chemical intensification of agricultural production. Sustainable agriculture is a production system that sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of chemical inputs.

SUSTAINABLE METHOD ORGANIC AGRICULTURE

Organic production is a prime example of a sustainable farming method. It is an overall system of farming that combines best environmental practices, the preservation of biodiversity, a return of nutrients from organic waste to the soil, and low input [122]. It involves the utilization of nature's own systems to improve the soil and to combat pests and diseases. The soil is fertilized using manure and composted waste or by growing nitrogen-fixing crops between seasons. These techniques aim to render farming ecologically sustainable. This method refrains from using synthetic fertilizers, chemical herbicides and pesticides, chemical feed additives, growth-promoting hormones and genetically modified organisms (GMOs) [123]. A frequent

misconception is that organic agriculture means turning back the hands of time to a primitive mode of farming. Contrary, what it offers is an ecologically intensive farming system (using nature's own systems) that can perform successfully without any chemical inputs. This is achieved through a combination of techniques including, crop rotation, biological pest control, use of locally adapted seeds/breeds and the re-integration of animals' dumps on farms, use of compost, manure and nitrogen-fixating legumes that are plowed under [124] to replenish the soil, and biological methods to control pests and diseases [125]. In the process, the stability and resilience of the surrounding ecosystem is improved rather than depleted as may be the case when artificial inputs are Used [126]. Also known as conservation agriculture (CA) [127], organic agriculture is accessible and uses simple agriculture technology with low production costs. CA is now used in over 117 million hectares worldwide [128]. Combined with 'No Till' approach, permanent soil cover reduces water erosion of fertile topsoils and results to retention of soil-moisture. Soil cover prevents germination of weed seeds and suffocates the establishment of the few that Emerge [129]. Contrary to the criticism that organic agriculture cannot meet the world's food demands, primarily because of low yields and insufficient organic fertilizer [130], a study has found that organic methods could produce enough food on a global per capita basis to sustain the current human population, and potentially an even larger population, without putting more land into production [131]. An examination of a global dataset of 293 examples reveals that on average, in developed countries, organic systems produce 92% of the yield. In developing countries, however, organic systems produce 80% [132]. The UN Special Rapporteur on the Right to Food reports that small-scale farmers can double food production within 10 years in critical regions by using ecological methods and calls for a fundamental shift towards agro-ecology as a way to boost food production [133]. For instance, soil and water conservation in the drylands of Burkina Faso and Niger have transformed formerly degraded lands. The average family has shifted from being in cereal deficit of 644kg per year (equivalent to 6.5 months of food shortage) to producing an annual surplus of 153kg. In Ethiopia, some 12.500 households have adopted sustainable agriculture, resulting in a 60% increase in crop yields using green manures and animal manures [134]. Sustainable farming practices that preserve soil fertility and maintain or even increase organic matter in soils can reduce the negative effects of drought while increasing crop productivity [135]. For instance, enhanced soil fertility leads to stabilization of soil organic matter and in many cases to a sequestration of carbon dioxide into the soils. This in turn increases the soil's water retention capacity, thus contributing to better adaptation of organic agriculture under unpredictable climatic conditions with higher temperatures and uncertain precipitation levels [136]. Decline in global and local food supplies due to climate change can be avoided through more efficient irrigation and watershed management, improved crop varieties, improved land cultivation, sustainable livestock management and the development of crop varieties and breeds that are adapted to changing climatic conditions. An effective use of climate data and forecasts, through early warning systems, can assist in analyzing the impacts of climate change on agricultural Production [137]. A better understanding of organic agriculture requires an examination of the following: composting, mulching, crop rotations, mixed or inter-cropping, agro forestry, biological pest control measures, green manures, nutrient recycling, integrating livestock into farming systems, preventing erosion, and irrigation or water harvesting [138]. These are sustainable farming practices that can reduce agriculture's contribution to environmental harm and are easy to implement.

Agro Forestry

Unlike bush burning and widespread forest clearing, sustainable agriculture demands the practice of agro forestry which involves the cultivation of trees with crop growing and animal husbandry on the same land [139].

Agro forestry can be an economically and environmentally sustainable option for small-scale farmers who are struggling to combat the impacts of climate change. For food-insecure communities, agro forestry creates more resilient agricultural systems where the risk of crop failure is spread between diverse Crops [140]. By developing positive ecological interactions between species, agro forestry systems aim to provide a range of environmental, economic, and social benefits to farmers. Increasing tree cover on farms can help to combat deforestation and the impacts of climate change; it can reduce soil erosion through increasing soil organic matter, fixing nitrogen, help to capture water and nutrients, halt land degradation, providing shade and support greater biodiversity. By increasing the productivity and diversity of their crops, and by optimizing the use of natural resources on their farms, farmers can benefit from a reduced use of agrochemicals [141]

Crop Rotation

Crop rotation means growing different crops at different times on a given plot or parcel of land yearly. This practice both enriches the soil and reduces the risk of pest infestation. It minimizes non-renewable inputs such as pesticides and fertilizers that damage the Environment [142].

Manure and Composting

Appropriate soil and nutrient management through composting manure and crop residues can increase yields and resilience of crops, while reducing the need for often costly synthetic fertilizers [143]. Composting apart from enriching the soil also increases humus content [144]. This practice also serves a greater environmental good.

Mixed Cropping/Diversification

Large-scale monocultures make crops more susceptible to pests and fungi; they also deplete humus content. Humus is not only important as a source of nutrients, soils that are rich in humus also bind more carbon dioxide. When the humus content of a farmland is reduced, CO_2 is released, raising the level of atmospheric CO_2. One-third of man-made increase in atmospheric CO_2 concentration over the last centuries may be attributed to the clearing of forests and a reduction of the humus content of soils [145]. Agricultural diversification occurs when more species, plant varieties or animal breeds are grown and raised on a given farm – different crops and cropping systems interspersed in space and time. Diversification is an important element of climate change adaptation. However, little systematic information exists to guide farmers and farming communities on how to best manage diversification options [146]. Diversification is highly consistent with the principles of sustainable agriculture, whereby animals provide manure to fertilize the fields. Growing beans and other legumes provide nitrogen that crops make use of [147].

Silvopastoral System

Silvopastoral system is an effective way to conserve the environment. It can reduce GHG emissions. Land for livestock production, including grazing land and cropland dedicated to the production of feed, represents approximately 70% of all agricultural land in the world. Overgrazing is the greatest cause of land degradation. Improved land management practices through silvopastoral system would help to achieve a balance between conflicting for animal food and environmental Protection [148].

Utilization of Irrigation

In situations with decreasing rainfall and increasing rainfall variability, there are many ways of improving water harvesting and retention through the use of pools, dams, and pits (irrigation systems) [149]. Utilization of irrigation requires adequate provision of irrigation and drainage infrastructures which are crucial for adaptation [150]. Participatory irrigation management in the Philippines for instance, has increased rice yields by about 20% [151].

Generally, agricultural systems ought to be managed in a wide sustainable development context which includes the fact that agriculture has often had a negative impact on the environment. The environmental costs of organic agriculture are much lower than those of conventional agriculture [152]. Organic

agriculture continues to provide better alternatives for sustainable development. As a response to the pollution and loss of arable lands created by conventional agricultural systems, organic farmers can develop non-chemical ways to farm their land successfully; as a response to the lack of adequate technologies and technical information, organic farmers can also become innovators and experts in adaptive management [153]. Hence, organic agriculture can upgrade traditional knowledge through interactive learning, strengthening farmers' analytical abilities and creativity. Organized rural communities can unite and extend skills. In doing so, organic management revalorizes local knowledge and empowers Farmers [154].

Generally, the International Federation of Organic Agriculture Movements (IFOAM) has adopted four overriding principles for organic agriculture: *the Principle of Health* according to which organic agriculture should sustain and enhance the health of soil, plant, animal and human as one and indivisible; *the Principle of Ecology* according to which organic agriculture should be based on living ecological systems and cycles, work with them, emulate them and help sustain them; *the Principle of Fairness* according to which organic agriculture should build on relationships that ensure fairness with regard to the common environment and life opportunities and *the Principle of Care* according to which organic agriculture should be managed in a precautionary and responsible manner to protect the health and wellbeing of current and future generations and the Environment [155].

Sustainable agricultural systems can thus allow farmers to improve food production with low-cost, readily available technologies and inputs, without causing environmental harm. Organic agriculture, for instance, uses less fossil fuel-based inputs and has a better carbon retention capacity than conventional agricultural practices. This is because conventional agriculture utilizes more energy than organic systems due to heavy reliance on energy-intensive fertilizers, chemicals, and concentrated feed, which organic farmers Forgo [156].

SUSTAINABLE STRATEGIES

The Indispensable Role of Information

Environmental issues are best handled with participation of all concerned citizens, at the relevant level. At the national level, each individual is entitled to have appropriate access to information concerning the environment that is held by public authorities, and the opportunity to participate in decision-making processes. It is the responsibility of States to facilitate and encourage public awareness and participation by making information widely available [157]. Improved access to information and public participation in decision-making enhance the quality and the implementation of decisions, contribute to public awareness of environmental issues, give the public the opportunity to express its concerns and enable public authorities to take due account of such concerns. Hence, managing environmental risks should be a priority for farmers who are exposed to multiple forms of such risks. This is particularly challenging for farmers, especially those in rural areas, who are suffering from environmental problems and also have limited means and access to information. Information is particularly relevant because as environmental risks become more rampant, farmers' capacity to evaluate and forecast the risk of extreme events, for instance, climate for planting decisions will be Affected [158].

The problem of environmental harm requires extra knowledge on the part of farmers. The need for better information is indispensable. Lack of education and training is a key limitation [159]. The emerging alternative sources of agricultural information such as the internet are yet to expand to the rural areas, and in fact may not because of language and cost barriers. It is expected that farmers' organizations and the private sector will take the lead towards increased extension, training activities, internet connectivity and technical information provision. However, the present level of contribution by farmers' organizations and private sector in these areas including research is still very low [160].

Farmers should have access to information on regular basis on current issues related to environmental problems and agriculture. This can be achieved through devolving the bulk of the services down to the local councils, which are closer to farmers, and encouraging them to form farmer groups for enhanced capacity through group efforts. This may help them take advantage of new innovations.

Institutional Requirement and an Enabling Policy and Legal Frameworks.

It is important to consider the institutional requirements needed at the local, national, regional, and international levels to support good agricultural practices and mitigating against environmental Harm [161]. Sustainable measures must be supported by strong institutions and enabling policy and legal Frame works [162].

Sectoral Collaboration

Collaboration that brings together a range of actors: international aid donors, governments, civil society groups and local community groups such as farmers' organizations [163] is indispensable. The nexus between agricultural practices and environmental harm is a cross-cutting issue that will involve multiple actors of different kinds. The United Nations High-Level Panel on Threats, Challenges and Change noted that: *"The fragmented sectoral approaches of international institutions mirror the fragmented sectoral approaches of Governments: for example, finance ministries tend to work only with the international financial institutions, development ministers only with development programs, ministers of agriculture only with food programs and environment ministers only with environmental agencies. Bilateral donors correctly call for better United Nations coordination but show little enthusiasm for similar efforts on their own account" [164]*.

The main task for governments and international organizations is to address these challenges. It requires significant attention by governments and international agencies, not living out the efforts of those directly affected – farmers, most especially local one. In this respect, Principle 22 of the Rio Declaration provides that 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 [165].

Policy Recommendations for Environmentally Sustainable Agriculture

Guaranteeing a long-term environmental goods in the agricultural sector requires major policy transformation to strengthen farming methods. This will require the establishment of integrated national frameworks for sustainable agriculture, environmental protection and a harnessing of the technology and innovation needed to increase food productivity and environmental goods. Rational planning constitutes an essential tool for reconciling any conflict between the needs of development and the need to protect and improve the environment [166]. In this respect, the governments should recognize and give appropriate priority to the agricultural sector, in order to benefit farmers in vulnerable areas, to participate in, and benefit from information, technology development, transfer, dissemination, building agricultural infrastructures; improving access to credits; building and maintaining irrigation systems. Farmers should also be supported in creating groups for knowledge sharing, production planning and problem-solving.

Zoning and land-use planning policies should take into account the wider environmental context in which farms exist, and how they affect watersheds and agro-ecological zones. Special attention should be paid to production that occurs near towns and cities, and where plantations threaten to expand into natural forests or into the transitional zones between forests and the savannah. Land-use planning, and zoning should target the protection of wild and rare species and encourage sustainable agricultural production and the preservation of natural ecosystems.

International commitments toward environmental sustainability need timely delivery and must be aligned with national

development strategies. All the unhealthy environmental practices must be reduced if Cameroon must meet the targets of the MDGs of eradicating extreme poverty and hunger (MDG 1) and ensuring environmental sustainability (MDG 7) in the shortest possible time.

A cross-sectoral policy should consider options that recognize agriculture's important role in addressing environmental problems. One of the most important ways to achieve this would be to prioritize funding and support for agricultural systems that are both adaptive and mitigative to environmental risks.

In Cameroon, the results of research are kept in libraries and at universities; they are not translated into practice, so they do not have an influence on farmers. The promotion and implementation of research findings are necessary for sustainable development in Cameroon. Thus, research should not only remain as an academic and intellectual discourse, means to get farmers to involve in the solution process should be devised, implemented, monitored, evaluated and reported. These can be done by enhancing the awareness, skills, and effective participation of farmers in the agriculture-environment solution processes, providing them with updates on this. To ensure this, farmers should be made to understand the inter-relationship of agriculture and environmental protection. They should also be taught how to mitigate and adapt to environmental harm, given that environmental risks can never be completely avoided. These can be achieved through interactive discussions and presentations undertaken to ensure deeper understanding and sharing of experiences on unsustainable agricultural practices and environmental degradation.

CONCLUSION

Man has the fundamental right to freedom, equality and adequate conditions of life, but he bears a solemn responsibility to protect and improve the environment for present and future generations [167]. Man's capability to transform his surroundings, if used wisely, can bring to all peoples the benefits of development and the opportunity to enhance the quality of life. Wrongly applied, the same power can do irreversible harm to human beings and the human environment. We see around us growing evidence of man-made harm in many regions of the earth: dangerous levels of pollution in water, air, earth and living beings; major and undesirable disturbances to the ecological balance of the biosphere; destruction and depletion of irreplaceable resources; and gross deficiencies, harmful to the physical, mental and social health of man [168].

Unsustainable agriculture contributes to environmental harm. It is a problem which could be avoided. Addressing environmental harm in the agricultural sector calls for new methods of farming and herding. In response to the environmental challenges of agriculture, this study has effectively and critically analyzed and exposed the environmental costs of unsustainable agricultural practices – both local and modern.

The Cameroon agricultural policies are void or contain little response to environmental protection. Hence, in Cameroon, policy efforts to protect the environment in the agricultural sector exist at the legal and institutional levels to an extent. But the absence of coordination of interventions makes it difficult to reach convincing results in term of implementation. The findings of this article are significant for all existing or future initiatives and objectives for environmental protection in the agricultural sector. It is pressing to have sufficient capacities which are able to be expressed in a concerted way.

Farmers have also been slow in changing their farming methods such as bush burning, massive deforestation, rain-fed agriculture, and lack the requisite education, information and training necessary to adapt to the challenges of environmental harm. These challenges need urgent attention by the relevant authorities and concerned organizations.

Biodiversity supports human societies at the ecological, economic, cultural and spiritual level. These benefits are, however, compromised by human activity, which allied

with population growth leads to an accelerated deterioration of ecosystems as well as a reduction in the number of species and their genetic diversity. The Convention on Biological Diversity is a major instrument of orientation of efforts to conserve biodiversity [169]. In 1992, more than 176 states ratified this International Convention which has as one of the objectives: the conservation of biological diversity, that is, the variety and variability of genes, species and ecosystems. The signatory countries agree to contribute their share to the safeguard of the natural environment while relying on the definition of sustainable development proposed by the Brundtland commission in 1987 [170].

Time has come when we must shape our actions with a more prudent care for their environmental consequences. Through ignorance or indifference, we can do massive and irreversible harm to the earthly environment on which our life and wellbeing depend. Conversely, through fuller knowledge and wiser action, we can achieve for ourselves and our posterity a better life. What is needed is an enthusiastic but calm state of mind and intense but orderly actions [171]. Achieving such environmental goals demands the acceptance of responsibility by citizens and communities and by enterprises and institutions at every level, all sharing equitably in common

This study has made recommendations that may guide the decisions and actions of these authorities and concerned organizations. In particular, it is important to put in place regulatory measures that adequately address the environmental impacts of agriculture, such as measures that could limit damage to forests and other environmental resources, and to encourage practices that promote the conservation of biodiversity. This could be achieved by first gaining a better understanding of farming systems and then promoting practices aimed at the conservation of biodiversity in the agricultural sector. This should include the development of crop varieties with improved performance. Other measures worth promoting are: (i) research on, and development of, mechanisms to conserve biodiversity in the agricultural sector, (ii) improved education programs for local populations to understand the environmental significance of agriculture and diversity, as well as effect of ecosystem fragmentation, (iii) cooperation among the different organizations and government agencies responsible for agriculture, forests and wildlife, and the environment and protection of nature. Policy makers should make reference to the environment and aim to create synergies among all the relevant agencies.

Generally, the agricultural regulatory frameworks must be reviewed to adequately address environmental concerns. However, one must admit, the agricultural legal frameworks cannot address the issue alone. Other sectoral policies must be considered.

REFERENCES

1. Hunter, D. et al, International Environmental Law and Policy, Foundation Press, New York, 1998, P. 12.
2. Para 1 of the preamble of Stockholm Declaration of the United Nations Conference on the Human Environment, 16 June 1972.
3. Para 2, ibid.
4. Principle 8 of Rio Declaration on Environment and Development, Rio de Janeiro, 14 June 1992.
5. See article three of the 1996 framework law on environmental management.
6. Hunter, D. et al. Note 3, p. 5.
7. Larsson, M., «Sustainable Agriculture and Food Security in a Changing Climate: A Study with examples from Ethiopia», Church of Sweden, SK09174, P. 12.
8. Larsson, M., op. cit., P. 13.
9. Principle 8 of Rio Declaration on Environment and Development, Rio de Janeiro, 14 June 1992.
10. Larsson, M., op. cit., P. 13.
11. World Commission on Environment and Development. Our Common Future. New York: Oxford University Press, 1987.
12. Principle 4 of Rio Declaration on Environment and Development, Rio de Janeiro, 14 June 1992.
13. Principle 2 of Stockholm Declaration of the United Nations Conference on the Human Environment, 16 June 1972.

14. Yengoh, G. T. et al., (2010), «Paths to Attaining Food Security: The Case of Cameroon», OPEN ACCESS, P. 18.
15. Principle 1 of Rio Declaration on Environment and Development, Rio de Janeiro, 14 June 1992.
16. Principle 19 of Stockholm Declaration of the United Nations Conference on the Human Environment, 16 June 1972
17. Principle 13 of Stockholm Declaration of the United Nations Conference on the Human Environment, 16 June 1972.
18. See article 3 (1) of Decree n^{o} 2005/153 of 4th May 2005 bearing on the creation, organization and functioning of a national seed and new plant variety council.
19. Section 2 of Law N^{o} 2003/007 of 10th July 2003 to regulate activities of the Fertilizer Sub-sector in Cameroon.
20. Section 7 (1), ibid.
21. Principle 15 of Rio Declaration on Environment and Development, Rio de Janeiro, 14 June 1992.
22. See Section 2 of Law N^{o} 2003/003 of 21 April 2003 Relating To Phytosanitary Protection.
23. Section 19. (1), ibid.
24. Section 21. (1), ibid.
25. Section 3, ibid.
26. Article 17 of Decree N^{o} 2005/0770/PM of 6th April 2005 fixing the modalities for the fight against phytosanitary.
27. Section 18, ibid.
28. Decree N^{o} 2005/0769/PM of 06 April 2005 on the organization of National Phytosanitary Council (NPC).
29. Article 2, ibid.
30. Article 3 (1), ibid.
31. Article 19 of Decree N^{o} 2005/0771/PM of 06 April 2005 fixing the modalities of execution of vegetable quarantine operations.
32. Article 37, ibid.
33. Principle 14 of Rio Declaration on Environment and Development, Rio de Janeiro, 14 June 1992.
34. Article 8 of Decree N^{o} 2005/0772/PM of 06 April 2005 fixing the conditions of homologation and control of phytosanitary products.
35. Law N^{o}. 96/12 of 5 August 1996 relating to environmental management in Cameroon.
36. Art 20 of Decree N^{o} 2005/0772/PM of 06 April 2005 fixing the conditions of homologation and control of phytosanitary products.
37. Art. 21 (1), ibid.
38. Art. 35 (1), ibid.
39. Art. 35 (2) (I), ibid.
40. Art. 1 of Law N^{o} 2003/006 of 21 April 2003 on the regime of security in matters of modern biotechnology in Cameroon.
41. Art. 17, ibid.
42. Art. 18, ibid.
43. Art. 21, ibid.
44. Art. 22 (2), ibid.
45. Art. 36 (3), ibid.
46. Art. 40 (1), ibid.
47. Art. 56, ibid.
48. Article 1 of Treaty on the conservation and sustainable management of forest ecosystems in Central Africa and to establish the Central African Forests Commission (COMIFAC).
49. Convention on Biological Diversity (CBD) 5 June 1992.
50. Beye, G., (2002), «Impact of foreign assistance on institutional development of national agricultural research systems in Sub-Saharan Africa», Special Programme for African Agricultural Research Food and Agricultural Organization of the United Nations Rome, FAO Research and Technology Paper 10, FAO, P. 107.
51. Integrated Assessment of Trade-Related Policies and Biological Diversity in the Agricultural Sector in Cameroon: Impacts of liberalization in the cocoa sector», op. cit., P. 1.
52. Ching, L. L., «Sustainable agriculture: Meeting Food Security Needs, Addressing Climate Change Challenges», P. 1.
53. Ibid., P. 1.
54. Parry, M. et al., (2009), «Climate Change and Hunger Responding to the Challenge», World Food Programme, Rome, P. 30.
55. Thornton, P. et al., (2013), «How Does Climate Change Alter Agricultural Strategies to Support Food Security? », Background paper for the conference "Food Security Futures: Research Priorities for the 21st Century", Dublin, P. 2.
56. Ibid., P. 3.

57. UNCTAD, (2011), «Sustainable Agriculture and Food Security in LDCs», Least Developed Countries Series, UNCTAD Policy Brief, N° 20/C, P. 1.
58. Oxfam, (2011), «Combating rural poverty and hunger through agroforestry in Bolivia», Oxfam GB for Oxfam International, Oxford, UK, P. 3.
59. Thornton, P. et al., op. cit., P. 3.
60. Parry, M. et al., op. cit., P. 4.
61. Storing carbon dioxide.
62. Parry, M. et al., op. cit., P. 27.
63. Thornton, P. et al., op. cit., P. 4.
64. Parry, M. et al., op. cit., P. 4.
65. African Conservation Tillage Network, (2011), «Conservation Agriculture (CA) for Food Security», Act-Update Newsletter vol. 2, P. 1 .
66. Parry, M. et al., op. cit., P. 4.
67. Thornton, P. et al., op. cit., P. 10.
68. Ibid., P. 4.
69. Kleinschmit, J., op. cit., P. 3.
70. Tchoffo, B., op. cit., P. 3.
71. Ibid.
72. IPPC, (2007), Climate Change 2007: Synthesis Report, IPCC Fourth Assessment Report, Geneva, Switzerland.
73. Tchoffo, B., op. cit., P. 3.
74. Ibid.
75. Larsson, M., op. cit., P. 3. See also Fonjong, L. N., (2004), «Changing Fortunes of Government Policies and its Implications on the Application of Agricultural Innovations in Cameroon», Nordic Journal of African Studies, Vol. 13, serie (1), P. 13. See also Benjamin Tchoffo, op. cit., P. 3.
76. Fonjong, L. N., (2004), «Changing Fortunes of Government Policies and its Implications on the Application of Agricultural Innovations in Cameroon», Nordic Journal of African Studies, Vol. 13, series (1), P. 13.
77. Article VI (1) of the African Convention on the Conservation of Nature and Natural Resources (Revised version), Maputo, 2003.
78. Article VI (2) of the African Convention on the Conservation of Nature and Natural Resources (Revised version), Maputo, 2003.
79. Larsson, M., op. cit., P. 4. Enete, A. A. and Amusa, T. A., (2010), «Challenges of Agricultural Adaptation to Climate Change in Nigeria: A Synthesis from the Literature», Field Actions Science Reports, Institute Veolia Environment, Vol. 4, P. 6.
80. Bellarby, J. et al., (2008), «Cool Farming: Climate Impacts of Agriculture and Mitigation Potential», Amsterdam, Greenpeace International.
81. Znaor, D. et al., (2005), «Environmental and Macroeconomic Impact Assessment of Different Development Scenarios to Organic and Low-input Farming in Croatia», UK, University of Essex Centre for Environment and Society.
82. Pimbert, M., (1999), «Sustaining the Multiple Functions of Agricultural Biodiversity», FAO background paper series of the Conference on the Multifunctional Character of Agriculture and Land.
83. Kleinschmit, J., op. cit, p. 3
84. Integrated Assessment of Trade-Related Policies and Biological Diversity in the Agricultural Sector in Cameroon: Impacts of liberalization in the cocoa sector», op. cit., P. 6.
85. Ibid.
86. Article VI (3)(b) of the African Convention on the Conservation of Nature and Natural Resources (Revised version), Maputo, 2003.
87. Ching, L. L., op. cit., P. 1. Kucharik, C.J. and Serbin, S.P., (2008), «Impacts of Recent Climate Change on Wisconsin Corn and Soybean Yield Trends», Environ. Res. Lett, P. 3.
88. Scialabba, N. E H., op. cit.
89. Kleinschmit, J., op. cit., P. 7.
90. Larsson, M., op. cit., P. 9.
91. The so-called green fertilizer.
92. Larsson, M., op. cit., P. 10.
93. Scialabba, N. E H., op. cit.
94. Khor, M. (2008), «Food Crisis, Climate Change and the Importance of Sustainable Agriculture», Presentation at FAO Food Security Summit, Rome.
95. African Conservation Tillage Network, op. cit., P. 1.
96. Ibid.
97. Ching, L. L., op. cit., P. 1.

98. Badgley, C. et al., (2007), «Organic agriculture and the global food supply», Renewable Agriculture and Food Systems 22(2), PP. 86-108.
99. Ibid.
100. Ibid.
101. Ching, L. L., op. cit., P. 1.
102. Niggli, U. et al., (2008), «Low Greenhouse Gas Agriculture: Mitigation and Adaptation Potential of Sustainable Farming Systems», Rome, FAO.
103. Ching, L. L., op. cit., P. 1.
104. UNCTAD, op. cit., P. 2.
105. Oxfam, op. cit., P. 2.
106. Ching, L. L., op. cit., P. 1.
107. Thornton, P. et al., op. cit., P. 6.
108. Ching, L. L., op. cit., P. 1.
109. Thornton, P. et al., op. cit., P. 5.
110. Larsson, M. op. cit., P. 20.
111. Ibid., P. 13.
112. Thornton, P. et al., op. cit., P. 7.
113. Larsson, M. op. cit., P. 20.
114. Thornton, P. et al., op. cit., P. 5.
115. Ching, L. L., op. cit., P. 1.
116. Ibid.
117. Scialabba, N. E H., op. cit.
118. Ibid.
119. Ibid.
120. Ibid.
121. Zeisemer, J., (2007), «Energy use in organic food systems», Rome, FAO.
122. See Principle 10 of Rio Declaration on Environment and Development, Rio de Janeiro, 14 June 1992.
123. Thornton, P. et al., op. cit., P. 9.
124. Enete, A. A. and Amusa, T. A., op. cit., P. 8.
125. Ibid.
126. Parry, M. et al., op. cit., P. 44.
127. UNCTAD, op. cit., P. 2.
128. Parry, M. et al., op. cit., P. 42.
129. Ibid., P. 51.
130. See Principle 22 of Rio Declaration on Environment and Development, Rio de Janeiro, 14 June 1992.
131. Principle 14 of Stockholm Declaration of the United Nations Conference on the Human Environment, 16 June 1972.
132. Principle 1 of Stockholm Declaration of the United Nations Conference on the Human Environment, 16 June 1972.
133. Para 3 of the preamble of Stockholm Declaration of the United Nations Conference on the Human Environment, 16 June 1972.
134. The National Coordination of the ANCR-NCSA process, op. cit., P. 20.
135. "A development which meets present needs without compromising the capacity of future generations to meet theirs".
136. Para 6, ibid.
137. Para 7, ibid.
138. UNCTAD, op. cit., P. 2.
139. Oxfam, op. cit., P. 2.
140. Ching, L. L., op. cit., P. 1.
141. Thornton, P. et al., op. cit., P. 6.
142. Ching, L. L., op. cit., P. 1.
143. Thornton, P. et al., op. cit., P. 5.
144. Larsson, M. op. cit., P. 20.
145. Ibid., P. 13.
146. Thornton, P. et al., op. cit., P. 7.
147. Larsson, M. op. cit., P. 20.
148. FAO, http://en.wikipedia.org/wiki/Food_security, (retrieved on 29/5/2018).
149. Thornton, P. et al., op. cit., P. 5.
150. Ching, L. L., op. cit., P. 1.
151. Ibid.
152. Scialabba, N. E H., op. cit.
153. Ibid.
154. Ibid.
155. Ibid.
156. Zeisemer, J., (2007), «Energy use in organic food systems», Rome, FAO.
157. See Principle 10 of Rio Declaration on Environment and Development, Rio de Janeiro, 14 June 1992.
158. Thornton, P. et al., op. cit., P. 9.
159. Enete, A. A. and Amusa, T. A., op. cit., P. 8.
160. Ibid.
161. Parry, M. et al., op. cit., P. 44.
162. UNCTAD, op. cit., P. 2.
163. Parry, M. et al., op. cit., P. 42.
164. Ibid., P. 51.
165. See Principle 22 of Rio Declaration on Environment and Development, Rio de Janeiro, 14 June 1992.
166. Principle 14 of Stockholm Declaration of the United Nations Conference on

the Human Environment, 16 June 1972.

167. Principle 1 of Stockholm Declaration of the United Nations Conference on the Human Environment, 16 June 1972.
168. Para 3 of the preamble of Stockholm Declaration of the United Nations Conference on the Human Environment, 16 June 1972.
169. The National Coordination of the ANCR-NCSA process, op. cit., P. 20.
170. "A development which meets present needs without compromising the capacity of future generations to meet theirs".
171. Para 6, ibid.
172. Para 7, ibid.

Cite this Article
Nah Anthony Tetinwe. Environmental Protection and the Cameroonian Agricultural Policies: What Prospect for implementation. *National Journal of Environmental Law*. 2019; 2(1): 1–21p.