Chapter 14:
Ecosystem services: legal issues on Nigeria's wetlands

Erimma Gloria Orie

1 Introduction

This chapter deals with the Nigerian legal framework relevant to wetlands as an ecosystem service. At the outset, it is necessary to define concepts such as 'ecosystem' and 'wetlands'. In Nigeria, ecosystems provide general and environmental services such as flood attenuation, water purification, soil stabilisation and erosion reduction, food, groundwater recharge, and climate change mitigation. In this functional context, an ecosystem can be defined as:[1]

> a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit.

In other words, an ecosystem is a complex set of relationships among the living resources, habitats, and residents of an area. It is a community of living and non-living things that work together. Ecosystems vary in size and composition, although each ecological community is considered a functioning unit. An ecosystem may include animals, birds, fish, micro-organisms, plants, soil, water and people. When all the elements in an ecosystem live in balance, the ecosystem is said to be healthy, sustainable and rich in biodiversity.[2]

Ecosystem services, on the other hand, are the direct and indirect contributions ecosystems provide to human well-being. They are the outcomes from ecosystem functions that are to the benefit of humans.[3] They support human survival and quality of life (directly or indirectly).[4] According to the UN Millennium Ecosystem Assessment,[5] ecosystem services can be classified into four types, namely: supporting service, regulating service, cultural service, and provisioning service. Within the European Union (EU), a conceptual framework for mapping and assessment of ecosystems and their services (MAES) has been developed to steer a more harmonised approach to

1 See Article 2 of the Convention on Biological Diversity, at <https://www.cbd.int/convention/articles/default.shtml?a=cbd-02> (accessed 29-7-2018).
2 See <http://www.nhptv.org/natureworks/nwepecosystems.htm> (accessed 3-3-2018).
3 Miller & Tangley (1991: 268).
4 Orie (2018).
5 WRI (2005: v).

ecosystem and ecosystem services assessments.[6] More recently, the idea of a common international classification is gaining ground as it has been recognised that if ecosystem accounting methods are to be developed and comparisons made, then some regularisation is desirable. Some ecosystems are accorded special protection by international and domestic laws. These include wetlands, which are defined in Article 1.1 of the Ramsar Convention on Wetlands of International Importance, 1971[7] (the Ramsar Convention) as:

> areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres.

Wetlands "may incorporate riparian and coastal zones adjacent to the wetlands, and islands or bodies of marine water deeper than six metres at low tide lying within the wetlands".[8] More broadly, wetlands can be categorised into five types, namely marine, tidal, lacustrine, palustrine and riverine.[9] Wetlands provide many ecosystem services including sewage treatment,[10] pollination,[11] and provision of hydro-electricity. In Nigeria, wetlands perform strategic functions such as cultural,[12] supporting[13] and provisioning[14] services amongst others. Wetlands are recognised as a precious part of the ecosystem. Notably, a reasonable percentage of Nigeria's over 170[15] million

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6 For further information see <https://biodiversity.europa.eu/maes> (accessed 29-7-2018).

7 Convention on Wetlands of International Importance, Especially as Waterfowl Habitat (1972) II ILM 963.

8 Article 2.1 of the Ramsar Convention.

9 See <https://www.ramsar.org/sites/default/files/documents/library/info2007-01-e.pdf> (accessed 29-7-2018).

10 With regard to global water scarcity, wetlands are remarkable for their non-provisioning ecosystem services like water purification and waste water treatment. See Russi et al. (2013: 2).

11 Orie (2017).

12 Cultural services include non-material benefits derivable from the ecosystems like intellectual development, spiritual, archaeological and/or emblematic enrichment, recreation and aesthetic values. Wetlands provide these to varying degrees. Emblematic plants and animals, e.g. national symbols such as American eagle, British rose, Welsh daffodil; Spiritual, ritual identity, e.g. holy places; sacred plants and animals and their parts as in southern part of Nigeria; on the Coburg Peninsula (the world's first Ramsar site), traditional Aboriginal owners still conduct an active ceremonial life and undertake semi-traditional hunting and gathering in this coastal wetland. See <http://wwf.panda.org/about_our_earth/about_freshwater/intro/value/#culture> (accessed 3-1-2017).

13 Wetlands support nutrient cycling and soil formation. They also support agriculture through maintenance of water tables and nutrient retention in floodplains, for example, rice, a common wetland plant, is an important agricultural product in Southern European countries, Asia and Nigeria. US AID (2008: 10).

14 Conceptually, wetlands and other freshwater habitats provide food, fiber and fuel, freshwater, biochemical and genetic materials for the benefit of humankind. They are important sources of wild game fish and other aquatic food items agrarian for people. They provide habitat for a myriad of other diverse species.

15 See <http://www.worldbank.org/en/news/press-release/2016/03/15/nigerias-booming-population-requires-more-and-better-jobs > (accessed 3-1-2017).

population derive their livelihood from wetland resources, albeit in an unregulated manner.[16] Nevertheless, wetlands are increasingly threatened and degraded mainly due to unsustainable anthropogenic exploitation activities and situations like oil and gas installations, sand mining and channelisation, Nypa palm dispersion, population, dredging and reclamation, and coastal urbanisation among other things that change the water quality, quantity or flow rates, increasing pollution and change the make-up of species.

In Nigeria, this situation is exacerbated by a lack of effective national law for wetland management, a weak institutional framework, improper wetland valuation,[17] etc. These deficiencies do not only result in the depletion of existing wetlands, loss of biodiversity and unsustainable ecosystems, but also in lack of incentives and financing mechanisms for achieving conservation goals. Such negative impacts reduce the capacity of wetlands to provide significant ecosystem services and ensure sustainable ecosystems. The key legal question, therefore, is whether the law can be used to improve or ensure sustainable wetlands in Nigeria. Consequently, this chapter examines the relevance of wetlands in the ecosystem services, the issues and challenges associated with the regulation of wetlands and strategies for conserving wetlands in Nigeria.

Nigeria's marine and coastal environment is rich in resources and species diversity. The mangroves in this environment are the largest remaining tract in Africa[18] and also the third largest in the world covering about 9,723 km^2.[19] The mangrove ecosystem provides a nursery and breeding ground for many of the commercial fishery species obtained in the Gulf of Guinea.[20] The coast of Nigeria is said to have about 199 species of finfish and shellfish, a large number of which are used commercially.[21] The shrimp fisheries of the country are exceptionally strong, and their produce is being exported to other countries, including the United States of America. Artisanal fisher folk harvest a large variety of fish, crustaceans, and molluscs from the estuaries and channels and utilise mangrove and swamp forest products for different kinds of domestic uses.[22]

Similarly, a variety of birds,[23] mammals, and reptiles, including a few endemic species like the Sclater's guenon and the Nile Delta red colobus monkey, inhabit the mangroves and swamp forests of the coast. Although a few species of sea turtles lay eggs

16 Orie (2017).
17 Wetland valuation is a way to estimate ecosystem benefits and it allows financial experts to carry out a cost benefit analysis. It is therefore an important tool for environmental managers and decision makers to justify public spending on conservation activities and wetland management.
18 Federal Republic of Nigeria (2015).
19 US AID (2008: 10).
20 Ibid.
21 Ibid.
22 Ibid.
23 It was the response to international bird conservation concerns that resulted in the first major international agreement on wetlands, the Ramsar Convention. Wetlands are among the key areas in migration flyways of birds. See Copernicus (2015).

on the beaches, they are rare and under threat from human predation.[24] The wetlands are also used for the cultivation of different staples like plantain (*Musa sapientumvar paradisiacal*), banana (*Musa sapientum*), sugarcane (*Saccharumofficinarum*), bitter leaf (*Vernoniaamygdalina*), red spinach/plumed cock's comb/silver cock's comb, locally called *Soko* (*Celosia argentea*), and West African mallow leaves, locally called *Ewedu* (*Corchorusolitorius*), cocoyam (*Colocasiaesculenta*), fruits and vegetables. The production of logs, fuel-wood, peat, fodder, extraction of medicines and other materials for biota, genes for resistance to plants pathogens, and ornamental species are also aspects of the provisioning services.

2 Effects of loss of wetlands

Wetlands are some of the Earth's greatest anchor productive ecosystems and incredibly biodiverse. Yet, wetlands are also among the world's most threatened ecosystems with 50% of all wetlands having disappeared in the last century.[25] For example, corals are the lynchpin of the entire undersea ecosystems but have been suffering from a severe warming climate in recent years. In the same vein, the kelp harbours communities of diverse types of fish and other living organisms and in turn provides significant value to humans through their contribution to fisheries.[26] In fact, kelp is worth Australian $10 billion to the Australian economy annually due to its contribution to tourism and fishery.[27] Specifically, the kelp supports an entire ecological community such that when "we lose the kelp we lose a biological engine that controls or dominates temperate reefs."[28] However, more recently, there has been the massive death of giant kelp around Tasmania.[29] About 100 km of the forests were wiped out due to a marine heat wave, upsetting marine biodiversity, while about 90% of the kelp forest off the western coast of Australia has been wiped off between 2011 and 2013.[30] These threats to the ecosystem lead to loss and wetland degradation, leaching of soil nutrient, and acidification ultimately.

There is evidence that the loss and degradation of wetlands increase hazards from coastal storms and tidal surges, loss of shelter from fast-moving currents, loss of hiding place from predators, and loss of reproduction site (spawning and nursery sites) for aquatic, amphibian and terrestrial life forms.[31] The loss of the remaining wetlands

24 Copernicus (2015).
25 European Comission (2007).
26 Matthiesen (2015).
27 Wernberg (2015).
28 Mooney (2016a).
29 Mathiesen (2016).
30 Wahlquist (2016).
31 Adegun et al. (2014).

would result in the loss of refugia for the biotic communities inhabiting the wetlands and, in particular, to the loss of recovery from natural hazards such as flood. The cumulative result is that the ecosystem services that wetlands provide to people are compromised, leading to unintended but foreseeable consequences for the environment. For instance, it was reported that whenever the Oyan Dam in Nigeria was 'opened', the storm usually affected the floodplains and wetlands covering about 2,800 ha of River Ogun catchment within Lagos comprising Ikosi-Ketu, Mile 12, Agiliti, Thomas Laniyan Estate, Owode-Onirin, Agboyi, Owode-Elede, Maidan and Isheri North Scheme.[32] On 10 July 2011, the entire Lagos State was flooded. In some areas of the state, the flood water-mark on the houses was about 3.5 m. Conservatively, about 25 persons reportedly lost their lives in the Lagos flood which caused the state to close down schools.

In 2012, about 21 states were declared disaster zones by the Federal Government of Nigeria, because of severe flooding which destroyed both farmlands and wetlands.[33] The year 2017 saw about 27 states also submerged due to massive flooding. In adding, an unknown number of oil wells submerged, especially in the Forcados area of Delta State.[34] Besides, some hydrological modelling opined that three feet of sea level rise could put nearly all the Delta's onshore oil fields in Nigeria under water.[35] Such immersion would translate into a massive loss of wetlands and invaluable species.

Interestingly, there tends to be realisation in some quarters that the greatest impacts of climate change may not be the direct effects of warming on one species as compared to the effects of warming on the way species interact with each other.[36] Indeed, some scientists have submitted that warming does not kill the coral itself, but it actually breaks the relationship between the coral and the symbiotic algae in the same way that the changes in the ecosystem processes have serious negative impacts on artisanal fisheries of Nigeria.[37] All these losses (real and potential) are the outcome of an unconcerned attitude of both the people and government to protect the wetlands, which are incessantly converted to uses with economic gains.

3 The regulation of wetlands in Nigeria: issues and challenges

Three issues need to be analysed in the context of the regulation of wetlands in Nigeria, namely, the policy, legal and institutional frameworks that support the federal government's strategic mission to secure, conserve and manage the country's rich biological

32 Ajibola et al.(2016).
33 Orie (2013).
34 Orie (2015).
35 Awosika (1995).
36 Barton & Ives (2014).
37 Mooney (2016b); Mustapha (2013: 130).

endowment together with the diverse ecosystems sustainably. This section reviews the major past and present efforts of the government in biodiversity conservation, especially, as it concerns Nigeria's wetlands.

3.1 Policy framework

The 1999 National Policy on the Environment, among other objectives, focuses on securing a quality environment that is adequate for good health and well-being, the conservation and use of the environment and natural resources for the benefit of present and future generations, and the restoration, maintenance and enhancement of the ecosystems and ecological processes for the conservation of biological diversity. The policy is complemented by the Policy on Biodiversity.[38] Some other policies that have a bearing on the protection of wetlands include:

- The National Forest Policy (2006): the purpose of this policy is to ensure sustainable forest management, promote participatory process of development, facilitate private sector forestry development and adopt an integrated approach to forestry development.
- The National Policy on Erosion, Flood Control and Coastal Zone Management (2005).
- Nigeria's National Agenda 21 (1992) which integrates environment into development planning at all levels of government – the private sector and the non-governmental sector.
- The Climate Change Policy (2017) approved by the federal government recently.

3.2 Legal framework

Section 20 of the 1999 Constitution[39] of the Federal Republic of Nigeria (as amended) provides the fundamental legal principles for environmental protection in Nigeria. It provides that the state shall protect and improve the environment and safeguard water, air, land, forest and wildlife.[40] In an effort to achieve environmental sustainability, the Nigerian government established the Federal Environmental Protection Agency (FEPA), which was scrapped in 1999. In another development, the National Environmental Standards and Regulations Enforcement Agency (NESREA) Establishment Act (2007) was enacted. The latter supersedes the FEPA Act (1988). Section 8(k) of

38 Federal Republic of Nigeria (2015).
39 The Constitution of the Federal Republic of Nigeria 1999 as amended.
40 Ibid.

the statute mandates NESREA to present for the Minister's approval proposals for guidelines, regulations and standards on environmental matters (excluding the oil and gas sector) such as: atmospheric protection, air quality, ozone-depleting substances, noise control, effluent limitations, water quality, waste management and environmental sanitation, erosion and flood control, coastal zone management, dams and reservoirs, watersheds, deforestation and bush burning.

NESREA's authority extends to the enforcement of environmental guidelines and policies like the National Policy on the Environment, 1999. The Agency is charged with the responsibility of the protection and development of the environment, biodiversity conservation and the sustainable development of the country's natural resources as well as environmental technology. The federal government, through NESREA, has developed 24 environmental regulations that have been gazetted and are now in force. Six of these regulations are (directly or indirectly) linked to the management of wetlands in various capacities. These regulations include:[41]

- the National Environmental (Wetlands, River Banks and Lake Shores) Regulations, 2009, S. I. No. 26. They provide for the conservation of wetlands and their resources in Nigeria;
- the National Environmental (Watershed, Mountainous, Hilly and Catchments Areas) Regulations, 2009, S. I. No. 27. They make provisions for the protection of water catchment areas, identification of major watersheds; restriction on the use of watersheds, mountainous and hilly areas, delineation of roles, prevention of fires in watersheds, afforestation and reforestation, as well as grazing of livestock;
- the National Environmental (Access to Genetic Resources and Benefit Sharing) Regulations, 2009, S. I. No. 30. These regulate the access to and use of genetic resources;
- the National Environmental (Soil Erosion and Flood Control) Regulations, 2010, S. I. No. 12. These make provision to check all earth-disturbing activities, practices or developments for non-agricultural, commercial, industrial and residential purposes to protect human life and the environment;
- the National Environmental (Desertification Control and Drought Mitigation) Regulations, 2010, S. I. No. 13. They seek to provide an effective and pragmatic regulatory framework for the sustainable use of all areas already affected by desertification and the protection of vulnerable lands; and
- the National Environmental (Protection of Endangered Species in International Trade) Regulations, 2010, S. I. No. 16. These provide for the protection of endangered wildlife species of fauna and flora.

41 Abere & Jasper (2010).

Furthermore, there are some existing laws at the federal and state levels that complement the federal laws on the conservation of natural resources. These include:

- the Natural Resources Conservation Act (1989) which is the most recent legislation on natural resources conservation. The Act establishes the Natural Resources Conservation Council which is empowered to address soil, water, forestry, fisheries and wildlife conservation by formulating and implementing policies, programmes and projects on conservation of the country's natural resources;
- the Environmental Impact Assessment Act (No. 86 of 1992). This Act requires that environmental impact assessment must first be carried out before any project likely to impact the natural environment could be undertaken;
- the Endangered Species (Control of International Trade and Traffic) Act (No. 11 of 1985). This Act makes provision for conservation and management of the country's wildlife and protection of some of the rare and endangered species;
- the National Parks Services Act, Cap N65 Laws of the Federation of Nigeria 2004, one of the principal laws on biodiversity conservation, was promulgated to provide for the conservation and protection of natural resources and plants in national parks.

Nigeria is a signatory and a party to several international agreements for the conservation and sustainable use of biodiversity, which demonstrates the country's commitment to the conservation of natural resources. The country is a signatory to the Ramsar Convention which provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. The Convention covers all aspects of wetland conservation, recognising wetlands as ecosystems that are extremely important for biodiversity conservation in general and for the well-being of human communities. The country also took an active part in all the negotiation processes leading to the adoption of the Convention on Biological Diversity in Rio de Janeiro in 1992. Subsequently, Nigeria ratified the Convention in 1994 and thereafter, started the process of preparing her Biodiversity Strategy and Action Plan. In 1993, a report of a country study compiled by FEPA acknowledged the position of Nigeria's biological diversity, policies, laws, and conservation programmes.[42] Additionally, the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) was ratified in 1974.

An overview of the legal framework reveals that it comprises both laws and regulations. In Nigeria, an Act is a bill that has been enacted by the National Assembly and assented to by the president. On the other hand, a regulation could be a mere creation

42 Myada (2015).

of a minister in charge of a particular sector.[43] It is a subordinate legislation that is associated with an Act of Parliament. It is more descriptive than an Act because, in many cases, most of the details of the Act are mentioned in the regulations. Thus, regulations indicate how a certain law has to be implemented step by step. The NESREA Act (2007) is the environmental law in Nigeria. Nonetheless, the Act merely mandates NESREA (the implementing agency) to present for the minister's approval proposals for guidelines, regulations and standards on environmental matters including wetlands. Obviously, there is no specific law that gives direction on the regulation of wetlands.

3.3 The institutional framework

Presently, despite the importance wetlands and the ecosystem portend, the lead agency is not one of the few institutions the President heads. Instead, the Federal Ministry of Environment implements and enforces the provisions of the National Environmental Standards Regulation (NESREA) Act, its supporting regulations, and other relevant laws.

Apart from the above structure, there are several linkage centres in Nigerian institutes and universities created in 2001 as part of the activities undertaken in support of the Convention for Biological Diversity. These include the Linkage Centres for Arid Environments (Maiduguri), Freshwater Environments (Minna), Highlands/Montane Environments (Jos), Delta Environments (Port Harcourt), Marine and Coastal Environments in conjunction with the Nigerian Institute for Oceanography and Marine Biology (Lagos), and Forests, Conservation, and Biodiversity at the University of Agriculture (Abeokuta), which is designed to focus on coordinating data and research relevant to biodiversity conservation. Regrettably, there is very little information on how well these centres have done in fulfilling their mandates. Ordinarily, these institutions are expected to assist in the management of the Nigerian wetlands for the benefit of the immediate community and country at large. However, the reverse is the case due to some of the challenges discussed in the subsequent section.

43 For example Section 34 of the NESREA Act empowers the Minister of Environment to create several regulations on various aspects of the environment. National Environmental (Wetlands, River Banks and Lake Shores) Regulations, 2009, National Environmental (Watershed, Mountainous, Hilly and Catchments Areas) Regulations, 2009. S. I. No. 27.

4 The legal issues and strategies for conserving Nigeria's wetlands

The main legal issues and strategies pertinent to Nigeria's wetlands and its ecosystem are outlined in the following subsections.

4.1 The absence of law

Nigeria has ratified the Ramsar Convention but is yet to transmit it into its body of laws. By virtue of Section 12 of the Nigerian Constitution, such conventions cannot have the full force of law until they are domiciled.[44] The above section provides that "…no treaty between the federation and any other country shall have the force of law except to the extent to which such a treaty has been enacted into law by the National Assembly."[45] Thus, there is presently no legal basis to implement the Ramsar Convention for the protection of wetlands in Nigeria. Although there are some related laws on the subject matter, the absence of a specific law on the protection of wetlands is a major challenge to the institution charged with enforcement. Related to this is the fact that some other related laws on the subject matter, like the Land Use Act, are neither consistent with relevant government policies on forestry and biodiversity nor are they comprehensive.[46]

In addition, the absence of unique and vulnerable wetlands geographical information system (GIS) maps for each community and technical training on how to use the maps for stormwater management planning is a major challenge. These maps identify the locations of the vulnerable wetlands in relation to developed sites which makes it easy to determine and plan for the appropriate type and placement of stormwater control options to protect these resources better and reduce phosphorus loading to the river.[47] These challenges are aggravated by lack of a national law on climate change which has made it possible for other impacts of climate change to equally affect the management of ecosystems.

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44 Orie (2014).

45 The Supreme Court of Nigeria in the *locus classicus* case of *General Sani Abacha and 3 others v. Chief Gani Fawehinmi* (2000) NWLR (pt4) 533 at 585-586, held that no international treaty can be said to have come to effect in Nigeria except the provisions of such treaty have been enacted into law by the Nigerian National Assembly and that it is such law that breathes life into such treaty in Nigeria.

46 The Policy on Forestry and Biodiversity recognises the need for local communities to own or at least be active stakeholders in the management of the protected areas. On the other hand, Sections 5, 6, 21 and 22 of the Land Use Act divest individuals and communities of rights of ownership and to that extent are inconsistent with the objectives of both the forestry and biodiversity policies of the government.

The ratification of the Convention is not enough. There is an urgent need to integrate the Convention into the Nigerian body of laws. The point being canvassed here is that the absence of laws in areas like climate change mitigation is affecting the health of the environment, which in turn impacts on the quality of wetlands. For instance, in some remote areas in China, where laws on the mitigation of the impacts of climate change are not yet effective, climate change has led to the change in the movement of the bees in that environment. This resulted in a situation where the farmers lacked the requisite population of bees to pollinate plants, and were compelled to engage in manual cross-pollination exercises.[48]

4.2 Valuation of wetlands

Wetland valuation is used to build local and political support for their conservation and sustainable use. It helps to diagnose the causes of environmental degradation and biodiversity loss. It also allows more balanced planning and decision-making, and develops incentive and financing mechanisms for achieving conservation goals.[49] However, in Nigeria, this is not the case. A study by Ajibola[50] reveals that valuing wetland resources is fraught with challenges such as lack of data, complex wetland ecosystems, inadequate government policy, sophisticated survey design and hostility from residents within and around wetlands. Egbenta[51] adds that the inadequacy of legal regulations is a major challenge frustrating wetland valuation.[52]

Strategically, markets need to capture values of ecosystem services and to improve the understanding of the various services and their potential trade-offs. Collaboration between the government, professional bodies and various stakeholders to provide data banks for the valuation of wetland resources is equally necessary. In addition, the multinational oil companies need to be compelled to adopt contemporary (environmental) valuation methods in the determination of compensation payable to claimants, understand the link between various services and to various components of biodiversity. Also, there is the need to analyse the role that an economic institution, specifically, 'the market', plays in promoting the adoption of ecosystems management in both public and private domains. Ecosystem service approaches provide an opportunity to link ecosystem functions with social values, but in reality, the essential role that social dynamics play in the delivery of outcomes remains largely unexplored. Social factors

48 Liess (2015).
49 Barbier et al. (1997).
50 Ajibola (2012: 34).
51 Egbenta (2010). For further reading see Turpie et al. (2010).
52 After a comprehensive review of the various statutory provisions for compensation, Egbenta (2010) is of the view that there is no comprehensive statutory provision for assessing compensation resulting from oil spills/pollution in the petroleum industry.

such as management regimes, power relationships, skills and values can dramatically affect the definition and delivery of ecosystem services. The rationale for this is founded on the fact that, ultimately, services must support individual or societal values.

4.3 Recognition of market or economic value

Although the commercial value of biological diversity in Nigeria exceeds the cost of conservation measures by more than US$3 billion at 1993, biodiversity conservation has not been recognised as a feasible investment in Nigeria's economic development.[53] Consequently, biological diversity valuation has not been fully incorporated into the national economic planning. The challenge, therefore, is that until biodiversity conversion is accorded such recognition, it may be difficult to incorporate it into national economic planning. Unfortunately, unlike some jurisdictions like Peru and the Czech Republic,[54] the Nigerian legislations do not actually provide for the payment for ecosystem services (PES).[55] In Peru, the high-level political commitment and the multi-stakeholder participation in monitoring results, transparency and verifiability are some of the success factors of the PES system.[56] In contrast, the individuals and other use right holders in Nigeria do not benefit from the sale of specified ecosystem products derived from their lands. The implication is that individual and community landowners do not adjudge themselves as stakeholders of the ecosystems who, therefore, should be involved in the protection of the respective wetlands and ecosystems.

Generally, regulating ecosystem services is a complex process, and the specific relationship will look different for different services. The main challenge is how to manage the various service relationships, potential trade-offs, and stakeholders' interactions among others. Part of the strategy Nigeria needs to adopt is to recognise biodiversity conservation as a feasible investment in Nigeria's economic development and consequently incorporate natural resources valuation fully into the national economic planning. Thus, in line with Article 6 of the Convention on Biodiversity, the Federal Ministry of Environment initiated the strategy and action planning process in order to guarantee the conservation of Nigeria's biological diversity. This strategy should be adopted by other ministries and the communities. Embracing and capturing economic values of ecosystem services in mainstream decision-making tools and indicators. For

53 See the Fourth National Biodiversity Report, Federal Republic of Nigeria (2010). The Fifth National Biodiversity Report has been submitted in 2014.

54 The Czech Republic legislation provides possibilities on how to compensate forest owners providing ecosystem services.

55 This is clear from a combined reading of the Land Use Act and the National Conservation Act. For further reading see Orie (2016).

56 Fagbohun & Orie (2015).

example, a national income and growth matrix can help in designing effective policies for sustainable growth and societal well-being.

4.4 Wetland rehabilitation and recreation

A major strategy for Nigeria is to restore its wetlands as a way of checkmating its loss of ecosystem services and the consequent loss of biodiversity. This can be achieved through partnerships with some expert organisations like LIFE-Nature. Nigeria should learn from the experience of Hungary's Hortobágy region where the LIFE-Nature organisation was able to restore the wetlands of the region. In addition, with the help of terrestrial arthropod monitoring, the organisation proved that the high intensity of grazing in the wetland areas could be beneficial for the improvement of the fauna in such wetland area and also the communities.[57] Similarly, in Spain, LIFE-Nature was able to reverse decades of environmental damage by recreating the wetlands of Lake Banyoles. These projects are good examples of collaboration among different administrations (local, national and regional) and private entities (Foundation *Territori IPaisatge*) working together for the conservation of a natural site. However, to ensure that the results of the restoration work would be preserved, the Nigerian government as beneficiary should introduce traditional cattle grazing in restored areas.

4.5 Capacity building and lack of awareness

Nigeria lacks capacity mostly in the areas of finance, human and technical resources. The various complimentary laws on wetland are not properly understood by many of the enforcement agencies and even the communities. There are few trained and qualified people in the field to enforce compliance. In addition, oversight function at all levels is sorely lacking, making way for 'entrepreneurial opportunities' to make money through the unsustainable use of the wetlands, such as over-harvesting of seafood and conversion of wetlands for construction purposes. Effective management of wetlands requires the allocation of more financial resources to acquire and collect accurate data on the distribution and abundance of the resources involved, the ecological parameters of sustainability for each, the amount harvested from year to year, the benefits of the wetlands to Nigeria and other relevant factors. There is no such information on Nigeria's wetland; no data on the actual content of the wetlands, their peculiarities and the challenges of the habitats. Without a proper understanding of existing regulations and

57 The intensive grazing of cattle keeps the grass short and gives the competitively weak plant associations such as the *Puccinellio-Salicornetea* the space to spread in suitable soil areas.

information about the status of most habitats and species, effective management becomes extremely difficult.

Critical to the conservation of biodiversity and the sustainable management of wetlands, in particular, is the need for a systematic and long-term approach to building the knowledge base of Nigerians and the integration of this knowledge into the decision-making process to ensure the prudent use of wetlands.[58] One major way of doing this is through an ecosystem management approach (EMA),[59] which encourages cost-efficient policies and development strategies that blend short-term needs with long-term targets that place conservation and management of ecosystems at the centre[60] in a way devoid of major challenges. To achieve this, the Ramsar Convention Secretariat, over the years, developed handbooks as guidelines to assist those with interest in, or directly involved with the implementation of the Convention at the international, regional, national, subnational or local levels. One of the latest is the Ramsar handbook for the wise use of wetlands.[61]

There is need to provide more ecosystem sensitive infrastructure, and to pursue the transfer and uptake of appropriate technologies, improve the knowledge of change in wetland areas in Nigeria, as well as improve the consistency of data on change in wetland areas in published papers and reports. Participation in global ecosystems agreements will also attract overseas ecosystems management assistance (OEMA) to Nigeria. Another means to protect wetlands is to educate the public about the benefits of wetlands. According to the NBSAP,[62] by 2020, 30% of Nigeria's population should be aware of the importance of biodiversity to the ecology and economy of the country. This government strategy appears not to be sufficiently proactive. In a country of over 170 million people, and considering the benefits that Nigeria stands to lose from such lack of awareness exacerbated by the impact of climate change, the 30% awareness by 2020 is a far cry. If the public does not recognise the benefits of wetland preservation, wetlands will not be preserved.

Furthermore, there is a need to change the content and character of awareness creation and information dissemination to be in tandem with the times. The law should specifically incorporate a framework for promoting awareness. Such framework should also preclude the following practices: physical draining of wetland water; draining of streams and watercourses feeding the wetlands; mining in wetlands, human settlements and their related infrastructural developments in wetlands, and disposal of

58 Ramsar COP3 (1987) defined wise use of wetlands as "their sustainable utilisation for the benefit of mankind in a way compatible with the maintenance of the natural properties of the ecosystem." (This definition was updated in 2005 by Resolution IX.1, Annex A, to "Wise use of wetlands is the maintenance of their ecological character, achieved through the implementation of ecosystem approaches, within the context of sustainable development").

59 For further discussion on EMA see Lackey (1998).

60 UNEP (2012).

61 Ramsar Convention Secretariat (2010).

62 Target 1 of the NBSAP.

solid waste and effluents in wetlands. On the other hand, the framework should seek to promote the use of wetlands for farming, grazing, fishing, timber production and salt-winning in a manner that promotes the conservation of the ecosystem, biodiversity and sustainable productivity of the wetlands. Another more proactive measure will be to incorporate this information into the schools' curricula from primary to tertiary education.

4.6 The top-down approach

Wetlands in Nigeria are owned by the government of Nigeria.[63] The top-down approach of government to biodiversity management and in particular wetland conservation is a big challenge to the system. Despite the current limited recognition of wetland benefits, there still exist many potentially conflicting interests such as between the interests of landowners (the government),[64] the local community (the original owners of the land before the advent of the Land Use Act which divested them of such ownership rights), and the general public; and between developers and conservationists. Part of the challenge is also how to integrate biodiversity concerns in sectoral policies and programmes and modify existing government policies and regulation to achieve consistency, for instance the Land Use Act, the National Policy on Forestry and the Policy on Biodiversity Conservation.

In terms of strategy, many conservationists are of the view that the best hope for protecting and conserving natural resources is through a public participatory approach which will entail carrying the local communities along and also by compensating them for preserving the wetlands.[65] Communities near protected areas and any other remaining wild areas in Nigeria rely on these resources for their existence, and it is to their advantage to conserve them for future uses. Carrying the local communities along will require the establishment and formalisation of the 'Development Triumvirate' that will comprise the government, the private sector, and other stakeholders like the indigenous community, the civil society, to name a few. For example, in Costa Rica and Peru, the governments adopted the payment for environmental service system which entails paying the community members compensation for forest conservation, reforestation and agroforestry.[66] The system was such a huge success that it was recommended for other

63 Regulations 1-4 and 8 of the National Environmental (Wetlands, Rivers Banks and Lake Shores) Regulation, 2009.

64 A person who desires to carry out regulated activity listed in the schedule to the National Environmental (Wetlands, Rivers Banks and Lake Shores) Regulation, 2009 on wetlands shall apply to NESREA in line with Regulations 8 and 9. Regulation 14 provides that even landowners, occupiers or users of property contiguous to a wetland have a duty to prevent the degradation or destruction of such wetlands.

65 Orie (2016).

66 See <http://www.fao.org/docrep/006/y5305b/y5305b01.htm> *(*accessed 13-01-2016).

countries.[67] Protection can be accomplished only through the cooperative efforts of citizens.

Efforts to manage ecosystems divorced from ownership realities are equally ineffectual. Therefore, to implement integrated ecosystem management, there is a need for the inclusion of individual and community landowners. An institutional mechanism for managing ecosystems across the various states in Nigeria is required, and cooperation among a broad range of interests.

4.7 The impact of climate change

According to the Millennium Ecosystem Assessment,[68] climate change will not only further worsen the loss and degradation of many wetlands and cause the extinction of or decline in their species,[69] but the human populations that are dependent on their services will also be negatively impacted. The main challenge is that there is currently no climate change law in Nigeria, although the country is a signatory to the United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement.

A major step in the fight for a sustainable ecosystem through the protection of wetlands is the protection of the ecosystem against the impacts of climate change. This strategy calls for the enactment of a law on climate change. This will invariably ensure the protection of wetlands and ultimately a sustainable ecosystem.

5 Conclusion and recommendations

This chapter examined wetlands issues in Nigeria. It attempted to proffer legal strategies to overcome the challenges associated with management of wetlands. Wetlands are indispensable for the countless benefits or ecosystem services that they provide to humanity globally and Nigeria in particular, ranging from regulating, provisioning, supporting to cultural services. These wetlands are consistently over-exploited, albeit, in an unregulated manner leading to several challenges for the ecosystem. It was found that, although Nigeria is a signatory to the Ramsar Convention, it is yet to incorporate it into the Nigerian body of laws.

The piecemeal complementary laws and regulations on land management are neither consistent with relevant government policies nor are they comprehensive. In

67 Fagbohun & Orie (2015).
68 WRI (2005).
69 Rise in temperature will lead to drought, loss or reduction of the species of the wetland and even disappearance of the wetlands.

addition, the institutional framework for the enforcement of the laws is weak and ineffective due to inadequate inter-ministerial cooperation at the federal level which also affects state and local government levels. The institutional framework should be strengthened through capacity building of enforcement operators and collation of relevant data to ensure effective management of the Nigerian wetlands. Furthermore, the management of ecosystems when divorced from landownership realities is equally ineffectual. Therefore, to implement an integrated ecosystem management, there is a need for the inclusion of community landowners. The chapter, therefore in answer to the legal question whether the law can be used to improve or ensure sustainable wetlands in Nigeria, advocates for the establishment of a national law and a strong institutional framework for the regulation of wetlands in Nigeria and for a consideration of the critical role that social dynamics play in generating outcomes between the social and the ecological link which the ecosystem services framework provides.

In the light of the above discussion, the chapter, therefore, makes a case for:

- The establishment of a national law on the regulation of Nigerian wetlands. Such law should incorporate ecosystem management concerns like building capacity and data, wetland rehabilitation and recreation, perpetuating wetland areas, valuation of wetland, and payment for ecosystem services. The law, when established, should work in synergy with other relevant and complementary laws and regulations in Nigeria. For instance, wetlands conservation issues should be integrated into Nigeria's national land-use planning policies.
- A strong institutional framework for effective management of the Nigerian ecosystems and wetlands in particular. This will entail having the correct mix of infrastructure and facilities necessary for such management operations, proper funding, capacity development, data availability, collaboration with sister ministries or agencies as well as ensuring that other relevant/complementary laws and regulations like the Environmental Impact Assessment Act are co-opted as part of the enforcement mechanism.
- The establishment of a law on climate change to indirectly address the protection of wetlands.

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