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Achieving Sustainability of Marine Fish Stocks in Nigeria: Can the 2030 Agenda for Sustainable Development Make a Different?

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Abstract

Globally and in Nigeria, Marine Fish Stocks (MFS) are in a deplorable state and the consequences are unimaginable. Having identified this as one of environmental causes of the world's greatest challenges—how to feed more than 9 billion people by 2050—the United Nations (UN) General Assembly adopted a resolution on Transforming our World: the 2030 Agenda for Sustainable Development (Agenda), which contains, among others, Goal 14 that specifically deals on how to conserve and sustainably use the ocean, seas and marine resources for sustainable development. How this goal will impact on the sustainability of MFS in Nigeria is the burning issue for policy makers, fisheries managers and academics. This article argues that the implications of the Agenda on the sustainability of MFS in Nigeria depends on, first, the extent Nigeria has integrated sustainable development into its marine fisheries law; second, the extent which Goal 14 and its associated targets have addressed the causes of the deplorable state of Nigeria's MFS and, third, the extent Nigerian Marine Fisheries Law (NMFL) has implemented the targeted activities. The major findings of this article are (1) NMFL does not integrate sustainable development, (2) the Agenda does not address all the factors causing the poor state of Nigeria's MFS, and (3) the level at which the NMFL has implemented the targeted activities under Goal 14 is low. In order to achieve sustainability of Nigeria's MFS, this article recommends, among others, the enactment of a new NMFL that integrates sustainable development and contemporary conservation, management and compliance measures recommended or prescribed in the Agenda and other UN instruments on marine fisheries.

Keywords

Agenda 2030, sustainable development, sustainability, Marine Fishery Resources

1. Introduction

The State of World Fisheries and Aquaculture 2018 reveals that the share of assessed Marine Fish Stocks (MFS) within biologically sustainable levels declined from 90 percent in 1974 to 66.6 percent in 2015 (Note 1). In Nigeria, the state of MFS is analogous to the global level. The landing of inshore fisheries declined from 25,592 tonnes in 1992 to 19,736 tonnes in 2011. Interestingly, a sudden increase of 27,977; 37,652 and 29,237 tonnes in the landing of inshore waters fishing vessels was reported in 2012, 2013 and 2014 respectively, but the landing crashed again to a historic low level of 10,727 in 2015 (Note 2). The total shrimp landing declined to 5,995 tonnes in 2007 from 15,249 tonnes in 1999. From 2008, the Federal Department of Fisheries and Aquaculture (FDFA) reported a continuous increase of inshore waters shrimping vessels landing up to 22,219 tonnes in 2013. In 2014, the landings of inshore waters shrimping vessels declined to 20,715 and, in 2015, it crashed to 4737 tonnes (Note 3). The annual fish catch from offshore waters (50 m and above), which stood at 4,400 tonnes in 1992, crashed to 882 tonnes in 2006. Offshore landings are unstable but generally contracting. In 2007 and 2008 a sharp increase in offshore fish landings of 2158 and 1520 tonnes respectively were reported, but between 2009 and 2015 no offshore fishing activities was reported (Note 4).

The deplorable state of MFS has serious environmental and socio-economic consequences. On the environmental side, the tendency to fish down on the food chain and target smaller and juvenile fish may affect predator-prey relationship, genetic diversity of fish stocks and the future regenerative capacity of the fishery. This is evidenced in the shift of focus of industrial trawlers from fishing to shrimping. Between 1999 and 2007 less than one fifth of the registered trawlers where engaged in fishing finfish (Note 5) and by 2015 the ratio of registered fishing vessels to shrimping vessels fell to the lowest level of 11.11% (Note 6). Decrease in the total number of registered fishing vessels from 206 in 2008 to 135 in 2015 led to decline in revenue of the Federal Government from registration of fishing vessels from N25, 480,000.00 in 2008 to N16, 200,000.00 in 2015 (Note 7). This also led to loss of jobs in the sector thereby exacerbating the problem of unemployment in the country. Other socio-economic consequences are decline in the income of marine fishers and escalating prices of fish and fishery products (Note 8), leading the FAO to identify Nigeria as one of the African countries where per capita fish consumption has remained static or decreased (Note 9). Regrettably, because Nigeria does not have immediate substitutes for fish contribution to animal protein intake of its population (Note 10), the poor masses are likely to suffer from hunger, malnourishment, disease and death (Note 11). The situation will definitely escalate with Nigeria's population projected to increase to 201 million by the end of 2019 (Note 12). Fish food insecurity will further threaten Nigeria's security and peace (Note 13) because marine fishers who lost their jobs may take to violent crimes like piracy, vandalisation of oil pipelines, terrorism or be recruited into extremist groups.

Having identified the poor state of marine fishery resources as one of environmental causes of the world's greatest challenges—how to feed more than 9 billion people by 2050—the United Nations General Assembly made unprecedented commitments on 27 September 2015 by adopting a resolution on *Transforming our World: the 2030 Agenda for Sustainable Development* (Note 14). The Agenda came into effect on 1 January 2016 and it is expected to end on 31 December 2030. The 17 sustainable development goals and 169 targeted activities listed in the Agenda are integrated, interrelated and indivisible and call for integrated solutions, which will ensure sustainable development in economic, social and environmental terms (Note 15). Goal 14 is on how to conserve and sustainably use the ocean, seas and marine resources for sustainable development. The implementation of the Agenda is through global partnership which aims at bringing together governments, private sector, civil society, the United Nations system and other actors, as well as mobilise all available resources. Actions taken at the regional and global levels to implement the Agenda depend on the willingness of individual states because as Slaughter and Burke-White rightly observed majority of the global problems, including the marine fisheries crises, have domestic root (Note 16). Theoretically, under such a situation sovereignty triumphs because the success of the Agenda will depend on the actions taken at the national level.

This article argues that how the Agenda will impact on sustainability of Nigeria's MFS depends on, first, the extent Nigeria has integrated sustainable development into the conservation and management of its MFS. It also depends on the extent which the Agenda has addressed the causes of the deplorable state of Nigeria's marine fishery resources and how far the Nigerian Marine Fisheries Law (NMFL) (Note 17) has implemented the targeted activities recommended under Goal 14 of the Agenda. It is pertinent to mention from the outset that the first segment of the argument is limited to analysis of the National Environmental Standards and Regulations Enforcement Agency (Establishment) Act 2007 No. 25 (Note 18), which is the statutory threshold on environmental governance in Nigeria, and the NMFL.

The next part of this article provides the conceptual clarifications of the basic terms and from where the core elements of sustainable development are later drawn. Part three examines the causes of the deplorable state of MFS in Nigeria while part four analyse the legal framework on conservation and management of MFS. Part five substantiates the claim that the NMFL does not integrate sustainable development elements, particularly sustainable use of natural resources, precautionary approach and ecosystem approach. Part six examines the targeted activities under Goal 14 and how far the NMFL has implemented them before ending by identifying some of the factors contributing to the deplorable state of MFS in Nigeria, which the Agenda did not address. In order to ensure that the targeted activities under Goal 14 contribute to the sustainability of MFS in Nigeria, the concluding part of this article recommends, among others, the enactment of a new NMFL that integrates the core elements of sustainable development and the contemporary conservation, management and compliance measures recommended or prescribed in the Agenda and other UN instruments on marine fisheries.

2. Conceptual Clarifications

In this article, the term MFS means marine finfish and shellfish. Cetaceans are excluded. Except where there is need for a clear distinction between fishing and shrimping vessels, the term fishing vessels refers to vessels engaged in fishing and shrimping. The definition of sustainable development is complex and unclear (Note 19). Its original conceptualisation is defined in *Our Common Future* (otherwise known as the Brundtland Report) as:

> ... development that meets the needs of the present without compromising the ability of future generations to meet their own needs. The term contains within it two key concepts: the concepts of "needs", in particular the essential needs of the world's poor, to which overriding priority should be given; and the idea of limitations imposed by the state of technology and social organisation on the environment's ability to meet present and future needs (Note 20).

According to Magraw and Hawke, the core elements of sustainable development are integration of economic development, social development and environmental protection, the needs of present and future generations must be taken into account (inter-generational equity), the needs of the world's poor must receive priority, and abject poverty must be eliminated (intra-generational equity), the environment needs to be preserved at least to a significant degree (Note 21), which other literature refer to as sustainable use and conservation of natural resources (Note 22). Most of the elements of sustainable development identified by Magraw and Hawke are also recognised by Sands and others (Note 23), and Birnie, Boyle and Redgwell (Note 24). The later authors added to their list the right to development, which reflects the concerns of developing countries that environmental protection should not outweigh their need for economic development (Note 25). More importantly, Birnie, Boyle and Redgwell emphasised cooperation between states, Environmental Impact Assessment (EIA), public participation in environmental decision making, and access to information as the procedural elements of sustainable development (Note 26). These procedural elements are akin to some of Magraw and Hawke's environmental protection tools, which facilitate implementation, legitimise decision making and improve the quality of sustainable development at national level (Note 27). Ellis identified precautionary approach as the most important among other elements of sustainable development (Note 28), because sustainable development uses it to anticipate or/and minimise potentially serious or irreversible risk for development (Note 29). Finally, from the decades-long process of elaboration of the foundations for sustainable development has emerged ecosystem approach to environmental management (Note 30).

The word "sustainability" also lacks precise meaning. It has been used in relation with social, economic, ecological, spatial, territorial, cultural, national and international policy (Note 31). In the ecological sense, the concept refers to the existence of the ecological conditions necessary to support human life at a specific level of wellness through future generations (Note 32). As a matter of fact, Simone and others noted that there are literatures where sustainable development is seen as the way to achieve

sustainability, that is, sustainability is the ultimate long-term goal of sustainable development. Whereas, in other literature, sustainable development is seen as the goal to be achieved and sustainability is the process to achieve sustainable development (Note 33). In this article, sustainable development and sustainability are treated as synonyms because both aim to pass on to future generations a stock of capital that is at least as large as our own generation has inherited from previous generations. Concomitantly, they are about collective choices and values (Note 34).

3. Causes of the Deplorable State of Nigeria's MFS

3.1 Natural Factors

The major natural factors include the existence in the centre and south of the Gulf of Guinea of a permanent thermocline, which prevents enrichment of the surface water with nutrients of deep-sea origin (upwelling) (Note 35) and Nigeria's relatively narrow continental shelf, which extends for about 15 km in the western area and ranges from 60-80 km in the eastern area. The former reduces the availability of food for pelagic fish species (Note 36) while the later limits the trawlable area to 3,200 nm^2 (27.90%) out of the 11,470 nm^2 that Nigeria is blessed with (Note 37). Lastly, the low-lying nature of Nigeria's coast makes it susceptible to storm surges and inundation of the coastal mangrove and wetlands, which destroy rare and fragile habitats used for spawning and nursery by marine fish (Note 38).

3.2 Human Factors

The human factors are overfishing, environmental activities and climate change. The magnitude of climate change problem makes it imperative to examine it separately from other environmental activities.

3.2.1 Overfishing

Overfishing (Note 39) of MFS is caused by increasing demand for fish due to increasing Nigeria's pollution. 1n 2015, the estimated Nigeria's population based on the National Bureau of Statistics was 187.3 million while the country's fish demand based on the FAO's per caput of 17.5 in 2015 was 3.28 million metric tonnes (m. Mt) (Note 40). Meanwhile, the domestic fish production from all Nigerian fisheries was 1.027 m. Mt. (Note 41). The difference of about 2.25m Mt was met by export and increasing the pressure on marine and inland fisheries. Inextricably linked to population problem is an increased number of poverty costal dwellers. Concentration of development along the coastal zone has resulted in the location of 25% of the country's population in the eight coastal states (Note 42). Consequently, more low-income earners are directly or indirectly moving into the fishing industry, thus increasing the pressure on MFS.

Technology has revolutionised fishing operations in Nigeria. Industrial trawlers use mostly echo sounder and fish finder during fishing or shrimping. As archaic as these technologies are, they enhance trawlers fishing ability and so contribute to overfishing. Sadly, the FDFA neither has any sophisticated patrol vessel nor Vessel Monitoring System (VMS) satellite station for the purpose of monitoring,

control and surveillance of fishing vessels. Even if the FDFA is able to acquire or cooperate with other countries in this regard, poor electricity supply in the country will force the station to operate below optimal capacity. Failure of Nigeria to effectively monitor and enforce conservation measures in its vast and turbulent waters of Exclusive Economic Zone (EEZ) encourages illegal, unreported and unregulated fishing (IUU fishing) in the area by foreign and Nigerian fishing vessels (Note 43). The situation could be really bad since foreign fishing vessels can "go dark" in the area by turning off their Automatic Identification System broadcast from the public maritime tracking systems in order to hid their location and identity when involved in IUU fishing (Note 44).

Over-capitalisation expressed in the rhetoric "too many boats chasing too few fish" is another major factor causing overfishing of MFS. From 1995 to 2011, the total number of registered vessels that actually operated in the Nigeria's marine fisheries sector was far above the recommended maximum fleet of 150 vessels (Note 45). From 2012 to 2015, the number of total licensed fishing and shrimps vessels dropped marginally to 143, 136, 143 and 135 vessels (Note 46). The sector is seriously overcapitalised since the recommended maximum fleet of 150 vessels was fixed more than four decades ago when the stocks biomass were healthy and more vessels were involved in fishing than shrimping; thereby reducing the negative impacts of fishing on the marine ecosystem.

Inseparably connected with over-capitalisation of the sector is a shift in focus by industrial trawlers from fishing to shrimping. No doubt, the Federal Government's policies such as the devaluation of the Naira, banning export of all finfish caught in Nigerian marine waters and providing export incentives for the non-oil sector, which include shrimps, further motivate industrial fishermen to shift their focus to shrimp in order to earn foreign exchange (Note 47). Deep-sea bottom trawling for shrimps constitutes the major unselective and non-environmentally safe way of fishing. It uproots and pulverises the marine ecosystem (Note 48). The smaller cod-end mesh size used for shrimping leads to a higher rate of juvenile fish being caught incidentally as by catch and fish mortality. The multiplier effect of these is the emergence of a lucrative sea market for trash juvenile fish of less than the 14 cm known in the Nigerian fishing industry as *yamayama*. The market for *yamayama* is the major reason small size nets are sometimes used by industrial trawlers (Note 49).

Overfishing of MFS is also caused by the traditional open-access fishery system the sector is operating. The system allows fishing and shrimping throughout the year subject mainly to license, gear and fish size restriction. Unfortunately, there is no serious collaboration between the FDFA and the Nigerian Institute for Oceanography and Marine Research (NIOMR) or any international research organisation to determine the biomass, the total allowable catch and the MSY for each fish species. Due to unavailability of systematic and exhaustive stock assessment (Note 50), current assessment of the state of MFS is based on distorted data provided by fishers, who hardly report correctly their catch, discard and illegal fishing (Note 51).

Other factors which contribute to overfishing of MFS are lack of funds and shortage of competent and experienced manpower by the FDFA (Note 52); foreign direct investment when translated into fishing

vessels in an already over-capitalised fishery; concentration of fishing and shrimping activities along the West inshore waters due to frequency of piracy and militancy activities along the Niger Delta inshore waters (Note 53), and unregulated nature of artisanal fishing due to lack of enforcement of the Inland Fisheries Act by the states.

3.2.2 Environmental Activities

Marine pollution from industrial waste, raw and untreated domestic sewage, run-off of fertilisers, pesticides, plastic, sand mining, and oil spills, which constitute the major source of marine pollution, constitutes serious threat to marine fish populations (Note 54). For instance, between 2005 and 2014 pipeline products loss was 2,958.730 metric tonnes and from 2012 to 2014 pipeline crude oil loss was 7,139,556 barrels (Note 55). Bulk of the incidents, which occurred in the coastal and marine areas, directly killed marine fishes and destroyed rare and fragile habitats for their spawning and nursery. Coastal development such as the establishment of Lekki, Aja, Victoria Garden City, Banana Island and Eko Atlantic in Lagos, and Eagle Island in Port Harcourt, which aim at providing basic infrastructures for the 25% of the country's population that are located in the eight coastal states has similar negative consequences (Note 56).

3.2.3 Climate Change

The most basic way that climate change affects fish is through warming of the oceans (Note 57). Fish species are ectothermic (cold blooded) and are affected by the slightest change in ocean temperature (Note 58). The sea surface temperature of the Atlantic Ocean at Victoria Island, Lagos, between 1990 and 2012 recorded the lowest annual temperature of 26.65˚C in 2000, the highest annual temperature of 29.21˚C in 1995 and an annual average of temperature of 28.33˚C for the twenty-three years of temperature recording (Note 59). This temperature range is above the thermal limits of some commercially important inshore and offshore species (Note 60). While the permanent thermocline impact is not contestable, the stability of warm surface layer in the region limits upwelling (Note 61). Although there could be few Nigerian marine fish species that may respond positively to increasing ocean temperature (Note 62), the extinction of even one fish species due to ocean warming can cause unimaginable consequences, especially in the area of predator-prey relationships.

4. Regulation of MFS in Nigerian

4.1 NESREA Act

Section 4(2) and (3) of the 1999 Constitution as well as item 29 on the Exclusive Legislative List, Part 1 of the Second Schedule to the Constitution give the Federal government power to legislate on marine fisheries in the Nigeria territorial waters and the EEZ (Note 63). The NESREA Act does not prescribe specific measures for the conservation and management of marine fisheries, but it has an overarching effect on all aspects of Nigeria's environment. For instance, the NESREA Act states its objective as the protection and development of the environment, biodiversity conservation and sustainable development of Nigeria's natural resources in general (Note 64). The Agency established under section 1 of the

NESREA Act has, among others, the responsibility to prevent, reduce or eliminate all forms of environmental degradation in seas and oceanic area, as well as restore and enhance marine environment and its resources (Note 65). The NESREA Act only recognises ecosystem approach, environmental education and environmental compliance monitoring as the environmental protection tools that are to be used for the attainment of sustainable development of natural resources (Note 66).

The National Environmental (Coastal and Marine Area Protection) Regulations 2011 (Note 67) made pursuant to section 34 of the NESREA Act contain broad provisions on conservation of fish and aquatic ecosystems. Its objectives include sustainable use and protection, preservation and conservation of coastal and marine area resources, including fish (Note 68). The principles guiding implementation of the Regulations include sustainable utilisation of coastal and marine fisheries, environmental impact assessment, inter-generational equity, ecosystem approach, access of information, participation of all stakeholders in decision making, precautionary principle, polluter pays principle and cooperation between statutory international and national coastal and marine management bodies in the spirit of partnership in the areas of information sharing and conservation, protection and rehabilitation of coastal and marine environment (Note 69). The CMAP Regulations mandate the Agency to collaborate with littoral states to prepare Coastal Area Management Plans (Note 70), which will ensure the sustainability of critical coastal ecosystems that serve as spawning and nursery habitats for marine fisheries.

4.2 NMFL

The NMFL prescribes the Conservation and Management Measures (CMMs) applicable in the marine fisheries sector. Every motor fishing boat must be registered and licensed for either trawling for fish or shrimp before commencement of operation (Note 71). No limit is set on the number of vessels that can be licensed for each year or the ratio of fishing to shrimping vessels. The Minister of Agriculture and Rural Development (MARD), who is the Licensing Officer, has wide discretionary power to decide what conditions may be attached to the licence (Note 72). Fishing vessel that are intended to be used for fishing or shrimp trawling shall not exceed, in the case of a fishing vessel, 25.3 meters in dimension and 150 gross tonnage and, a shrimp trawler, 23.2 meters in dimension and 130 gross tonnage (Note 73). These measures do not apply to inshore fishing fleets that were in existence before the enactment of SFA during their lives span (Note 74). In order to ensure compliance with these measures, all fishing vessels must be surveyed and their tonnage measured (Note 75).

Section 2 of the Fishing Regulations prohibits trawlers from using cod-end with stretch mesh size of less than 76 mm (3 inches) when trawling for fish in the inshore waters or less than 44 mm ($1^3/_4$ inches) when trawling for shrimps in areas approved for shrimp trawling. Even where a topside charter is used to reduce wear and tear of the mesh (Note 76), no opening on each mesh in any part of a trawl net shall be obstructed or diminished (Note 77). Shrimping vessels must install TED and BRD to the cod-end of shrimp nets (Note 78). Lastly, no explosive substances or any noxious or poisonous matter shall be used for fishing or shrimping within the Nigerian maritime waters (Note 79). It is prohibited to catch, land, retain, sell, expose or offer for sale or be in possession for the purpose of sale of sea fish of any

description that is smaller in size than prescribed (Note 80). The minimum catchable size for lobster and crab shall be 7 cm and 6 cm in length measured from the tip of the beak to the end of the flap of the tail when spread as flat as possible (Note 81). No person shall keep on board either dead or alive or offer for sale any lobster or crab less than 7 cm or 6 cm, respectively (Note 82). Concerning finfish, the Nigerian Institute for Oceanography and Marine Research may determine, before 31 January of every year, the minimum total length of fish catchable during the year, for each of the commercial species, taking into consideration the 5% retention length of the legal cod-end mesh (Note 83), the demand and supply situation, and the health of fish species (Note 84).

All fish caught by motor fishing vessels in Nigeria's territorial waters and EEZ must be landed at a Nigerian port, and no part of it may be exported or shipped away from Nigeria at sea (Note 85). Fishing vessels licensed to fish either in the territorial waters, or the EEZ of Nigeria shall not dump or discard edible and marketable sea products at sea (Note 86). In order to avoid dumping of spoiled and contaminated edible and marketable sea products, the Quality Assurance Regulations require industrial fishermen to adhere strictly to guidelines and standards on fishing vessel certification, fish handling, storage, preservation, processing, transportation and marketing, including export and import. As a way of further strengthening these provisions, the Licensing Officer shall issue a fishing licence only after he is satisfied that the fishing vessel is constructed and equipped to the standard that is fit for fishing. More so, no person shall be allowed to use a vessel for fishing or shrimping except the vessel is certified by Fish Inspectors to have met requirements of protection of catch, construction of storage areas, preservation of catch, freezing facilities and practices etc. prescribed in the First Schedule of the Inspection and Quality Assurance Regulations (Note 87).

There shall be no fishing activity by any motor fishing boat within the first five nautical miles of the waters of Nigeria's continental shelf (Note 88) and trawling or pair trawling within this zone is prohibited (Note 89). Trawlers that are less than 20 gross tonnages are prohibited from trawling for shrimps within Nigerian inshore waters (Note 90). No motor boat is allowed to trawl for shrimping in waters shallower than 18 meters (Note 91).

In order to ensure compliance of industrial fishers with the prescribed CMMs, the SFA makes violation of any of the CMMs an offence, and prescribes sanctions, including fines, imprisonment, blacklisting of vessels Captain, revocation of licence, forfeiture and confiscation of equipment used for commission of the offence. The procedure to enforce compliance with CMMs includes boarding, inspection, arrest and use of judicial procedure (Note 92). In practice, the MARD has delegated his power to enforce compliance with the NMFL to the FDFA under his Ministry. The MARD is also empowered to authorise certain senior officers of the Armed Forces, Police Force, Customs, and Surveyor or Examiner appointed under the Merchant Shipping Act to enforce any the provision of SFA (Note 93).

From the above statutory analyses, one may rush to conclude that the NESREA Act and the NMFL regimes regulate the marine fisheries sector. Regrettably, notwithstanding the overarching nature of the NESREA Act and the CMAP Regulations, it is difficult to import their full force into marine fisheries

management. Obviously, the actual regulation of the marine fisheries is completely under the Federal Ministry of Agriculture and Rural Development and the MARD has the overriding power to enforce compliance with the NMFL. Meanwhile, the Agency, which has the power to implement and enforce the NESREA Act and the CMAP Regulations, is under the supervision and control of the Federal Ministry of Environment. To worsen the situation, there is no serious collaboration between the Agency and the FDFA.

Does NMFL incorporate

Sustainable Development and its elements?

The substantive and procedural elements of sustainable development deduced from the literature reviewed under the conceptual clarification are:

i. integration of development into environmental protection;
ii. inter-generational equity;
iii. intra-generational equity;
iv. sustainable use and conservation of natural resources;
v. right to development;
vi. precautionary approach;
vii. ecosystem approach;
viii. polluter pays principle; and
ix. common but differentiated responsibility.

The procedural elements of sustainable development include:

i. cooperation between states;
ii. environmental impact assessment;
iii. public participation; and
iv. access to information.

These elements of sustainable development underpin the principles entrenched in the Rio Declaration of 1992, which ushered in a new revolution into environmental management. In the context of marine fisheries management, the most important aspect of the new revolution is the call for jettisoning the reactive and single or community approach to fisheries management. This approach merely encouraged implementation of CMMs on single specie or multi-species basis and after a particular or community of fish stocks had collapsed or become depleted. Indeed, the uncertainty involved in marine fisheries management due to the interdependency of fish stocks, the interrelationship between the stocks and the aquatic environment as well as the insatiable human demand for fish protein provided the bases for emphasising sustainable use of fisheries resources, precautionary approach and ecosystem approach in marine fisheries management. The fundamental nature of sustainable use of marine fisheries is evidenced in its being expressed as the overarching objectives in the core binding (Note 94) and soft (Note 95) international fisheries instruments, which Nigeria is a state party. The Precautionary approach and ecosystem approach are expressed as principles in the FSA (Note 96) and the FAO Code

(Note 97). Indeed, these three elements of sustainable development overwhelmed the United Nations General Assembly Resolutions A/RES/62/177 of 18 December 2007 on how to achieve sustainable fisheries (Note 98) and A/RES/66/288 of 27 July 2012 on the Future we want (Note 99). What do these elements of sustainable development entail and have they been integrated into NMFL are questions addressed in the next part?

5. Sustainable Use of Marine Fishery Resources

Although "sustainable use" has emerged as a standard approach to exploitation of MFS (Note 100), the term is not defined in the core hard or soft law international fisheries instrument (Note 101). Sustainable use means the use of components of biological diversity in a way and at a rate that does not lead to the long-term decline of biological diversity, thereby maintaining its potential to meet the needs and aspirations of present and future generations (Note 102). The NMFL does not specifically provide for the sustainable use of marine fishery resources as one of the CMMs. CMMs such as prohibition of dumping and transhipment at sea and reducing by catch through the use of TED and BRD prescribed in the NMFL predominantly promote optimum utilisation of MFS, which is the hub of the traditional CMMs (Note 103). Unfortunately, the NMFL does not prescribe optimum utilisation of MFS. Although biologically and economically, optimum utilisation means a level of utilisation less than full and maximum utilisation (Note 104), its major weakness is taking into consideration only the present generation. No doubt, sustainable use of MFS recognises the need to ensure optimum utilisation of fish stocks, but they must be used in a manner that maintains their availability for present and future generations. Indeed, sustainable use of MFS as envisaged within the context of sustainable development is not rooted in conservation of resources for conservation's sake, but rather to ensure continue availability of MFS of good quality, and in such diversity and quantity as to meet the demand of present and future generations (Note 105). The inter-generational equity element is the core point of divergence between sustainable use and optimum utilisation of MFS**.** The NMFL is completely lacking in this aspect.

6. Precautionary Approach

Precautionary approach requires that where there are threats of serious or irreversible damage, lack of scientific certainty shall not be used as a reason for postponing cost effective measures to prevent environmental degradations (Note 106). Its application prevents excessive stocks exploitation and degradation of their environment, as well as help restore depleted stocks (Note 107). It negates the traditional "permissive principle" of environmental law, which was based on the assimilative capacity of the environment (Note 108). It is based on new set of assumptions including impact assessments conducted prior to undertaking environmental activity (Note 109) and predetermined stock-specific reference points which must not be exceeded (Note 110). A precautionary reference point is an estimated value derived through an agreed scientific procedure which corresponds to the state of the

resource and of the fisheries, and which can be used as a guide for fisheries management (Note 111). Where reference points are exceeded, states must take appropriate actions immediately to implement already pre-determined CMMs that will restore the stocks (Note 112).

Regrettably, the NMFL is completely mute as far as precautionary approach is concerned (Note 113). Certainly, any marine fisheries regime which does not integrate precautionary reference points even on a provisional basis; fails to set the Total Allowable Catch (TAC) for each fish species and the fishing capacity of the sector is not based on scientifically established biomass of the stocks; where fishing is done all year round; and where there is dearth of real time data on the impact of fishing on the stocks and the marine ecosystem is not operating based on the precautionary approach.

7. Ecosystem-Based Approach

An Ecosystem approach is one of the ways ecologists address environmental problems. Individual, population, species and community are the other ways (Note 114). Ecosystem is more inclusive than others (Note 115). It encompasses a community or series of communities (both fish and non-fish species) and the abiotic environment in which they interact. It includes human activities which have altered the interrelationship among other components of the ecosystem in unprecedented ways (Note 116). But its hallmark lies in the interaction between aquatic, atmospheric and terrestrial ecosystems. According to the FAO, an ecosystem approach to fisheries management strive to balance diverse societal objectives, by taking into account the knowledge and uncertainties about biotic, abiotic and human components of ecosystems and their interactions within ecologically meaningful boundaries (Note 117).

The tendency is to argue that restriction on the mesh size that fishing and shrimp vessels are allowed to use, setting aside of non-trawling zone of first five nautical miles from the coast, and mandatory use of TED and BRD by shrimp vessels amount to either an obligation to apply an ecosystem approach in fisheries management (Note 118) or take into account the general issues of such an approach. Undoubtedly, ecosystem approach cannot be achieved in a fisheries system that promotes mainly shrimping and allows pair-trawling outside five nautical miles of Nigeria's territorial waters considering their destructive effects on the marine ecosystem. Also, addressing marine fisheries problems from a population context (Note 119) is not too different from applying a single-species approach, which focuses on specific species. At best, the present CMMs prescribed in the NMFL are akin to a community approach of fisheries management (Note 120). Such measures ignore the interaction between oceans, atmosphere, and terrestrial ecosystems and the effects of human activities on components of the ecosystem. Unfortunately, there is no specific provisions in the NMFL mandating the FDFA to undertake marine research on any area of fisheries, including the impact of increasing surface temperature of the Atlantic Ocean at Victoria Island on MFS or how fishing activities contribute to climate change and pollution of the ocean environment. NIOMR that is charged with such responsibilities does not have long-term primary data, adequate research facilities and

experts to discharge its responsibilities.

8. Associate Targets of Goal 14 and the Deplorable State of MFS?

Goal 14 of the Agenda itemises targeted activities that will enable states to conserve and sustainably use the oceans, seas and marine resources for sustainable development. The targeted activities are the factors responsible for the unsustainability of marine fisheries, which need to be addressed. Majority of the targeted activities have time limits while the achievement of others is left open, presumably to be achieved on or before the 2030 deadline set for the achievement of the Agenda as a whole. Interestingly, the Agenda adopts a holistic approach in solving the marine fisheries crisis by addressing fishing and non-fishing issues, which are inextricably interconnected with sustainability of MFS.

The Agenda sets one time limit and one open targeted activities that do not directly deal on conservation and sustainable use of MFS, but are extremely important as far as the sustainable development of MFS is concerned. The targeted activities are:

(i) Prevention of all kinds of marine pollution by 2025 (Note 121),

(ii) Minimise and address the impacts of ocean acidification (Note 122).

The Agenda urges states to address all types of marine pollution by 2025. It goes further to be more specific and in doing so by placing emphasis on land-based activities, including marine debris and nutrient pollution. Definitely, land sources of marine pollution, especially synthetic organic compound used (polychlorinated biphenyl (PCB)) in making plastic negatively affect fish (Note 123) and the aquatic environment, but data on pipeline product loss and pipeline crude oil loss already referred to in this article reveals that, presently, the major source of marine pollution in Nigeria is oil spills (Note 124). Indeed, one can hardly imagine the magnitude of damage done to fish biomass and the aquatic environment as a result of millions of barrels of pipeline products and crude oil losses that occurred in the coastal and marine environment (Note 125), which have not been accounted for or captured in the NPPC data.

The emission of excess greenhouse gases (GHGs) into the atmosphere through gas flaring (Note 126) and other sources is another major source of pollution of the marine environment because the oceans acts as a sink by absorbing excess carbon dioxide and more than 90% of the energy stored in the climate system (Note 127). The resultant rise in sea temperature and sea level constitute serious harm to marine fisheries and impair the quality of the aquatic environment (Note 128). A silent menace which regulators and managers of marine fisheries seem to ignore is the sea surface temperature range at Victoria Island, which is above the thermal limits of some MFS (Note 129). Scientific evidence abound showing that increase in the ocean temperature do cause changes in distribution and migratory pattern of MFS (Note 130). Such changes can render ineffective, if not completely useless, CCMs adopted by Nigeria (Note 131). Unfortunately, except for prohibition of the use of noxious or poisonous matter in fishing or shrimping, the NMFL is silent on marine pollution (Note 132).

The Agenda focuses on ocean acidification because of the global concern on the direct impact of increasing ocean pH on shellfish and coral reefs (Note 133). No doubt, considering the global nature of ocean acidification, Nigeria's shrimps and coral reefs will be affected negatively. Regrettably, neither the FDFA nor NIOMR has established the specific acidification tolerant limits of Nigeria's shrimps and coral reefs. The NMFL does not prescribe any CCM aimed at reducing the emission of GHGs from marine fisheries sector. Certainly, minimising and addressing the impact of ocean acidification is necessary, but sustainable management of the critical coastal environment against the impact of global warming and how MFS react to increasing warming of those habitats should be the immediate concerns of all stakeholders in the marine fisheries sector.

The Agenda sets two time limit and one open targeted activities aimed at improving the health and of aquatic ecosystems thereby enhance the sustainability of MFS. They targeted activities are:

(i) Sustainable management of marine and coastal ecosystem by 2020 (Note 134).

(ii) Conserve 10 per cent of coastal and marine areas as sanctuaries by 2020 (Note 135).

(iii) Increase marine scientific research and transfer of marine technology (Note 136).

It is true that no habitat, no fish (Note 137). Hence, the Agenda urges states to sustainably manage and protect coastal and marine ecosystems. Achieving a healthy and productive ocean ecosystems requires protecting them against significant adverse impact, strengthening their resilience and safeguarding their restoration (Note 138). Definitely, CMMs such as net size restriction, non-trawling zone within the first five nautical miles from the coast and use of TED and BRD devices can enhance sustainable management of marine and coastal ecosystem, but these measures are poorly enforced by the FDFA. More so, allowing pair-trawling outside five nautical miles of Nigeria's territorial waters has significant adverse impact on the marine ecosystems.

Coastal development aimed at providing basic infrastructures for 25% of the country's population that are located in the eight coastal states (Note 139) has significant adverse impact on the coastal environment. The resilience and restoration ability of the coastal ecosystems are weakened on daily basis as government and private investors engaged in coastal development without serious consideration of their environmental impact especially on ecologically sensitive coastal habitats that serve as spawning and nursery ground for fish (Note 140). Obviously, massive location of aquaculture farms in the mangrove swamps has similar effects. Because the focus of the Federal and State governments is on providing basic infrastructure for the teeming coastal population as well as promoting aquaculture and marine fish production in order to meet the nation's fish demand, conserving 10 per cent of the coastal and marine ecosystems as sanctuaries by 2020 is not the priority of the government. Indeed, the NMFL does not prescribe creation of marine sanctuaries as one of the CMMs (Note 141).

In order to improve ocean health and enhance the contribution of marine biodiversity to the development of developing countries, such as Nigeria, the Agenda urges states to increase their efforts on marine scientific research and ensure the transfer of marine technology taking into account the

Intergovernmental Oceanographic Commission (IOC) Criteria and Guidelines on the Transfer of Marine Technology (CGTMT) (Note 142). Having a reliable and comprehensive database on marine fisheries and aquatic ecosystems will enable the FDFA to prescribe appropriate CMMs that will boost fish landings, employment, income of marine fishers and the contribution of the sector to economic development of the country (Note 143).

Under the NMFL, marine research should be driven by private investors who are required when applying for a fishing or shrimping licence to satisfy the MARD that operating a fishing vessel is not likely to be prejudicial to sector's interest as well as support such applications with a feasibility report on the proposed fishing venture. Ordinarily, these conditions require private investors in the sector to show evidence of the state of the stocks and that a licence issued for the operation of a fishing vessel will not contribute to overfishing. Meeting these obligations requires investment in marine research by the investors. Unfortunately, these requirements are not enforced by the FDFA since NIOMR has the responsibility of conducting research on ocean and its resource. Sadly, NIOMR only acquired a research vessel, r.v.bayagbona in 2014 and does not have sufficient funding and expertise to generate the relevant data (Note 144), especially considering the complex and non-equilibrium nature of aquatic ecosystems. Generating such data by NIOMR requires Nigeria to seek cooperation with other countries and international organisations. Hopefully, the IOC CGTMT will serve as a useful template for NIOMR to explore.

The Agenda sets three time limit targeted activities and two open targeted activities that will directly enable coastal and fishing states to enhance sustainable development of their MFS. One of the time limit targeted activity, which concerns only small-island developing States and least developed countries, is not elaborated here because Nigeria is not classified as such (Note 145). The other two targeted activities to be achieved in 2020 are:

(i) Effective regulation of harvesting and end overfishing, IUU fishing and destructive fishing practices as well as implement science-based management plans.

(ii) Prohibit fisheries subsidies which contribute to overcapacity and overfishing. Eliminate subsidies that contribute to IUU fishing and refrain from introducing new such subsidies.

With the exception of fisheries subsidies, which the Federal Government does not give to the marine fisheries sector, these factors contribute to the deplorable of state MFS in Nigeria. The primary objective of implementing these measures is to restore fish stocks in the shortest time feasible, at least to levels that can produce MSY as determined by their biological characteristics. The regulation of marine fisheries under the NMFL is based on open fishing system subject mainly to net size restriction and licencing of vessels, but without a clear understanding of biological characteristics of the fishery; data on fish species' biomass are completely obsolete and the MSY of stocks are not known; total allowable catch is not fixed for any of the species; and contemporary CMMs are not applied. Certainly, this type of fisheries is not operating on a science-based fisheries management plan that will restore fish stocks to levels that can produce MSY.

The question of effective regulation of harvesting and end of overfishing of MFS in Nigeria is best addressed historically. The SFA was first promulgated in 1971 (Note 146). It was repealed and substantially re-promulgated in 1992 (Note 147) after Nigeria had ratified the UNCLOS on August 14, 1986. The primary aim of the new SFA was to vest in Nigeria its fishing rights in the territorial sea and EEZ. Meanwhile, the core CMMs prescribed in the UNCLOS (Note 148), particularly those applicable in the EEZ since Nigeria has territorial sovereignty in its territorial sea, were not implemented. Meanwhile, after the UNCLOS, international fisheries law has adopted CMMs aimed at effective regulation of harvest and overfishing. It is therefore apt that the Agenda called on Nigeria, as a coastal and fishing state, to effectively regulate harvesting and overfishing of MFS. However, achieving these targeted activities requires Nigeria enacting a new comprehensive marine fisheries law that incorporate sustainable development and contemporary CMMs.

As far as IUU fishing in the Nigerian waters is concerned, evidence are abound that it is a common phenomenon. Recently, it was reported that Nigeria loses as much as $70,000.00 to IUU fishing by Chinese fishing vessels (Note 149). It can only be imagined what the loss would have been if the data had captured the IUU fishing activities of other countries and Nigerian vessels.

Unfortunately, the FDFA does not have any patrol boat. Despite the Nigerian Navy claiming it has arrested some Chinese vessels involved in IUU fishing in Nigerian waters (Note 150), it is preoccupied with protecting oil and gas pipelines and other installations. Besides, the absence of effective on-the-sea MCS of fishing vessels by the FDFA and the Nigerian Navy, many of the sanctions prescribed in the SFA and the TED/BRD Regulations 2006 are paltry and may not deter marine fishers from violating the NMFL (Note 151). Sanctions such as forfeiture, confiscation of boats, catch, nets and other apparatus employed or derived from the offence as well as cancellation, withdrawal or suspension of licence for the remaining part of the year for which the licence was issued are not effective because the probability of apprehending, and timely and successful prosecution of the culprits is low (Note 152).

Worst still, Nigeria has not signed or ratified the 2009 Agreement on Port State Measures to Prevent, Deter and Eliminate IUU Fishing, which will enable it to target IUU fish principally at sea ports and implement other port state measures that are safe and cost-effective in preventing, deterring and eliminating IUU fishing than physical MCS of fishing vessels that are extremely prohibitive in remote and dangerous parts of outermost part of the EEZs where IUU fishing takes place (Note 153). Lastly, the decision of the FDFA to jettison court prosecutions for administrative enforcement may be difficult to implement considering the Court of Appeal's decision in *NOSDRA* v *ExxonMobil* (Note 154) that awarding a fine is a judicial act and it is the sole prerogative of a court of law under the 1999 Constitution. No other organisations or bodies can usurp that power (Note 155).

With regards to curbing destructive fishing practices, through the assistance of the United States and the European Union, the use of TED and BRD technology was made compulsory for industrial trawlers involved in shrimping. The TED/BRD Regulations 2006 was made to ensure the enforcement of this

measure (Note 156). However, other destructive fishing practices such as pair trawling within five nautical miles of Nigeria's territorial waters and the use of explosive, noxious or poisonous matter to catch fish, especially by artisanal marine fishers, persists in the sector (Note 157).

Lastly, the Agenda recommends two open targeted activities that will respectively enhance the sustainable development of small-scale marine fishers and compliance by Nigeria with international fisheries law. The open targeted activities urge states to:

(i) Provide access for small-scale artisanal fishers to marine resources and markets,

(ii) Implement the conservation and sustainable use of MFS prescribed in UNCLOS as recalled in paragraph 158 of "*The Future We Want*" (Note 158).

Access for small-scale artisanal fishers to MFS is an integrated approach that can resolve the unbalance and unhealthy competition between artisanal fishers and industrial fishers. It creates a balance between economic factors and social sustainability, on the one hand, and biological and ecological sustainability, on the other hand. This measure is already implemented under the Fishing Regulation 2010 by the establishment of a non-trawling zone of five nautical miles from the coast where artisanal fishermen have exclusive fishing rights (Note 159). The extent artisanal fishers enjoy this right is inextricably tied to the capability of the FDFA to perform its MCS functions, which is seriously lacking.

The "framework" nature of UNCLOS informed its state parties' decision to make more specific rules concerning straddling and highly migratory species in the Fish Stock Agreement. It is also the basis for the FAO Code and the 2009 Agreement on Port State Measures. On Nigeria's implementation of CMMs prescribed in the UNCLOS, as recalled in paragraph 158 of *The Future We Want*, it is pertinent at least to identify the core measures in question. Due to Nigeria's territorial sovereignty in her inland waters and territorial seas, the UNCLOS only prescribes CMMs that are applicable in the EEZ and the high seas. In the EEZ, where Nigeria has sovereign rights for the purpose of conserving and managing fisheries resources (Note 160), Articles 61 and 62 of the UNCLOS prescribes the following core CMMs:

i. Total allowable catch.

ii. Maintain or restore fishery resources to levels that can produce Maximum Sustainable Yield (MSY).

iii. Ensure that populations of species associated with or dependent upon harvested species are maintained or restored above the level at which their reproduction may become seriously threatened.

iv. Promote the objective of optimum utilisation of the living resources.

Paragraph 158 of *The Future We Want* reiterates the importance of the UNCLOS and goes further to recommend the following CMMs, which constitute the substratum of the Fish Stock Agreement and the FAO Code.

i. Sustainable use of marine fishery resources for present and future generations, and application of:

ii. Ecosystem approach

iii. Precautionary approach

Certainly, the NMFL prohibits dumping and transhipment at sea by industrial trawlers (Note 161). It also places restrictions on mesh size that can be used in fishing and shrimping (Note 162) as well as mandates the use of TED/BRD by shrimp vessel (Note 163). These measures aim at reducing by catch, promote sustainable use and optimum utilisation of the MFS, and protect species associated with or dependent upon shrimps. No other CMMs prescribed in the UNCLOS or recommended in para 158 of *The Future We Want* has been specifically implemented in the NMFL. As a matter of fact, the CMMs in para 158 of *The Future We Want* were first introduced into international fisheries law in the FSA and the FAO Code in 1995 (Note 164). Unfortunately, notwithstanding the fact that Nigeria has adopted and ratified these instruments, neither the SFA nor any of its regulations have been amended or a new comprehensive marine fisheries law enacted to reflect the current development in conservation and management of marine fisheries.

There is no doubt that the Agenda has addressed the core factors responsible for the deplorable state of marine fisheries in Nigeria. However, there are other factors, some of which are unique to Nigeria, contributing to the deplorable state MFS that the Agenda does not address. The factors are increasing population, traditional open-access fishing, shift in focus of industrial fisheries from finfish to shrimps, government policies particularly exchange rate and export incentive for exporters of shrimps, lack of funds and shortage of competent and experienced manpower by the FDFA; foreign direct investment in the form of fishing vessels in an already over-capitalised fishery; concentration of fishing and shrimping activities along the West inshore waters due to frequency of piracy and militant activities along the Niger Delta inshore waters, and non-enforcement of the Inland Fisheries Act. Failure to address these factors is the major weakness of the Agenda, but the truth remains a global instrument addressing a global problem may not be able to reflect the peculiarity and dynamics of all countries as far as the problem is concerned.

9. Conclusion

Certainly, the Agenda reflects the global perspective on the major causes of the deplorable state of marine fishery resources and how best to address the problem. Whether the Agenda makes a positive difference in the achievement of sustainability of MFS in Nigeria depends on the level of its implementation in Nigeria, especially when some of its timelines are months away. Although the Agenda does not address some of the factors causing the deplorable state of MFS in Nigeria, poor implementation is the most important factor hindering it from making significant contribution to the achievement of sustainability of MFS. Obviously, the NMFL is completely obsolete and devoid of contemporary CCMs and enforcement mechanism. If the Agenda is to make any difference in the achievement of sustainability of MFS in Nigeria, the NMFL must be repealed and a new comprehensive law on conservation and sustainable use of marine fisheries should be enacted. The new

NMFL must incorporate contemporary CCMs that are rooted in the principles and elements of sustainable development. The enforcement mechanism in the new NMFL should include port state measures, sea food certification/labelling, and vessel monitoring system. Lastly, private sectors stakeholders, who will constitute the major compliance targets, should be seriously engaged in the new marine fisheries law making and enforcement processes.

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Notes

Note 1. Food and Agriculture Organisation (FAO), *The State of World Fisheries and Aquaculture: Understanding the Sustainable Development Goals*, (FAO 2018) 40. Hereinafter referred to SOFIA 2018.

Note 2. Federal Department of Fisheries, Fishery Files, (Federal Department of Fisheries 1992-1994); Federal Department of Fisheries, *Fishery Statistics of Nigeria* (4th ed., Federal Department of Fisheries 1995-2007) 8; Department of Fisheries and Aquaculture, *Fishery Statistics of Nigeria* (5th edn, Department of Fisheries and Aquaculture 2008-2015) 16.

Note 3. Department of Fisheries and Aquaculture, *Fishery Statistics of Nigeria* (5th ed., Department of Fisheries and Aquaculture 2008-2015) 16.

Note 4. ibid.

Note 5. Federal Department of Fisheries, *Fishery Statistics of Nigeria* (4th ed., Federal Department of Fisheries 1995-2007) 27. The ratio of shrimping vessels to actual fishing vessels 1999-187/31; 2000-177/39; 2001-184/34; 2002-212/30; 2003-204/48; 2004- 182/37; 2005-203/35; 2006-176/32; 2007-161/28. ibid.

Note 6. Department of Fisheries and Aquaculture, *Fishery Statistics of Nigeria* (5th ed., Department of Fisheries and Aquaculture 2008-2015) 38 and 39.

Note 7. ibid.

Note 8. Data published by the FDFA shows an increased in the prices of fish products in almost all the states of the federation. In 2008, the average prices of fresh, smoked and frozen fish in Nigeria were N492.77, N915.32 and N292.07 respectively. By the year 2015, the average prices of fresh, smoked and frozen fish products had increased to N737.13, N1161.21 and N723.65 respectively. ibid 41-44. Market survey in Shoprite Supermarkets in Maryland, Ikeja, Victoria Island and Lekki areas of Lagos shows that local consumers of shrimps pay as much as N6000.00 per kilo of shrimp.

Note 9. Food and Agriculture Organisation (FAO), *The State of World Fisheries and Aquaculture: Contributing to Food Security and Nutrition For All* (FAO 2016) 71.

Note 10. Edet EE and Williams AB, "Overview of the Nigerian Fisheries Sector" A Paper presented at the FAO-EAF Workshop, Accra, Ghana from 23- 26 October 2007, 3.

Note 11. Hunter D, Salzman J and Zaelke D, *International Environmental Law and Policy* (2nd ed., Foundation Press 2002) 674.

Note 12. Worldometers, *Countries in the World by Population (2019)*<https://www.worldometers.info/world-population/population-by-country/> accessed 19th August 2019; United Nations Populations Fund (UNFPA) State of World Population 2019, Unfinished Business: the Pursuit of rights and choices FOR ALL (UNFPA 2019) 161 <https://www.unfpa.org/sites/default/files/pub-pdf/UNFPA_PUB_2019_EN_State_of_World_Population.pdf> accessed 9 September 2019.

Note 13. United Nations Development Program, *Human Development Report 1994: New Dimensions of human Security* (Oxford University Press 1994) 1-3.

Note 14. United Nations General Assembly Resolution A/RES/70/1 of September 25, 2016. Hereinafter referred to as the Agenda or Agenda 2030.

Note 15. See the third paragraph of the Preamble and Para 5 of the introduction to the Agenda. For example, Goal 12 on ensuring sustainable consumption and production patterns in para 2 urges states to strive by 2030 to achieve the sustainable management and efficient use of natural resources, which, of course, include MFS.

Note 16. Slaughter A and Burke-White W, "The Future of International Law is Domestic (or, The European Way of Law)" 2006 47(2) Harvard International Law Journal 327, 327-328.

Note 17. The NMFL is the totality of all the legislation dealing directly on exploitation, conservation and management of marine fishery resources. They are the Sea Fisheries Act Cap S4 Laws of the Federation of Nigeria 2010 (SFA 2010) and its supplementary regulations: Sea Fisheries (Licensing) Regulations-(Licensing Regulation 2010), Sea Fisheries (Fishing) Regulations-(Fishing Regulation 2010), Sea Fisheries (Fish Inspection and Quality Assurance) Regulations-(Inspection and Quality Assurance Regulation 2010) and Use of Turtle Excluder Devices (TED) and other By-Catch Reduction Device (BRD) on Shrimp Trawl Nets Regulations 2006-(TED/BRD Regulations 2006). Where it is necessary these laws will be specifically referred to.

Note 18. Cap N164 LFN 2010. Hereinafter refer to as NESREA Act or NESREA Act 2007.

Note 19. Okon EE, "The Legal Status of Sustainable Development in the Nigerian Environmental Law" (2016) 7(2) Journal of Sustainable Development Law and Policy 104-134; Patricia Birnie, Alan Boyle, and Catherine Redgwell, *International Law and the Environment* (3rd ed., Oxford University Press 2009) 54.

Note 20. The World Commission on Environment and Development, *Our Common Future* (Oxford University Press 1987) 43.

Note 21. Magraw DB and Hawke LD, "Sustainable Development" in: Daniel B, Brunnée J and Hey E (Eds.) *The Oxford Handbook of International Environment Law* (Oxford University Press, 2007) 613-632, 619-620 and 637.

Note 22. Sands P and others, *Principles of International Environmental Law* (4th ed., Cambridge University Press 2018) 219, 222-225; Birnie, Boyle and Redgwell (n 19) 119

Note 23. Sands P and others (n 22) 217-229.

Note 24. Birnie, Boyle and Redgwell (n 19) 118-119.

Note 25. Birnie, Boyle and Redgwell (n 19) 116-123 particularly 118-119.

Note 26. ibid 123.

Note 27. According to Magraw and Hawke, the environmental protection tools which have been used to support the attainment of sustainable development are corporate responsibility mechanisms, transparency, public participation and access to justice, impact assessment, education, monitoring and

verification. Magraw DB and Hawke LD (n 21) 633.

Note 28. Ellis, J. "Sustainable Development as a Legal Principle: A Rethorical Analysis" (2008) in Hélène Ruiz Fabri, Rüdiger Wolfrum and Jana Gogolin, Eds., *Selected Proceedings of the European Society of International Law*, 2 (Oxford, Hart 2010) 642 The other elements identified by Ellis are inter-generational equity, intra-generational equity, common but differentiated responsibility and the polluter pays principle.

Note 29. Ene, Charlotte, "The Precautionary Principle—Key Element of Sustainable Development" (2014) 6(2) Knowledge Horizons—Economics 150.

Note 30. Garcia, SM and Cochrane, KL (2005) Ecosystem Approach to Fisheries: A Review of Implementation Guidelines (2005) 62(3) ICES Journal of Marine Science 311-318.

Note 31. Simone, S and others, "Sustainability and Sustainable Development: A Taxonomy in the Field of Literature" (Jan/Mar 2014) 17(1) Ambient Soc., São Paulo 1.

Note 32. Tisdell, C. "Sustainable development: differing perspectives of ecologists and economists, and relevance to LDCs" (1988) 16(3) World Development 373.

Note 33. Simone, S and others (n 31) 1 and 2.

Note 34. ibid 5.

Note 35. Tobor JG, Fish Resources of Coastal Waters of the Gulf of Guinea: Natural and Man-Made Factors Influencing their Distribution, Abundance and Capacity for Development and Sustained Exploitation. in: *Proceeding on the Coastlines of Western Africa, Coastal Zone 93, the Eight Symposuim on Coastal and Ocean Management.* Held in New Orleans, Louisiana, July 19-23 1993, 169 and 179.

Note 36. ibid.

Note 37. Amire AV, "Monitoring, Measurement and Assessment of Fishing Capacity: The Nigerian Experience" in Pascoe, S and Gréboval, D (Eds.) *Measuring Capacity in Fisheries, FAO Fisheries Technical Papers No. 445*, (FAO 2003) 143 and 144.

Note 38. Okude AS and Ademiluyi IA, "Coastal Erosion Phenomenon in Nigeria: Causes, Control and Implications" (2006) 1(1) World Applied Science Journal 44, 47 and 49.

Note 39. Overfishing occurs when so many fish are taken from a population such that the stock's capacity to produce maximum sustainable yield (MSY) on a continuous basis is diminished. Ludicello S, Weber M and Wieland R, *Fish Markets, and Fishermen: The Economics of Overfishing* (Earthscan Publications Ltd 1999) 8.

Note 40. Department of Fisheries and Aquaculture, *Fishery Statistics of Nigeria* (5th ed., Department of Fisheries and Aquaculture 2008-2015) 16.

Note 41. Fisheries Committee for the West Central Gulf of Guinea, Nigeria Fisheries Statistic—2016 Summary Report <http://www.fcwc-fish.org/fisheries/statistics/nigeria/901-nigeria-fishery-statistics-2016-summary-report> accessed 20 October 2016.

Note 42. Nigeria Meteorological Agency (NIMET), *Year 2006 Rainfall Prediction and Socio-Economic Implications for All States in Nigeria*, (NIMET 2006) 41.

Note 43. Oppenhiem AJ, "The Plight of the Patagonian Toothfish: Lessons from the Volga Case" (2004) 30(1) Brooklyn Journal of International Law 293, 302 and 305.

Note 44. Automatic Identification System (AIS) is a tracking system that automatically transmits a vessel's identity, speed and GPS location. Instances of fishing turning off their AIS have been reported Oceana. See Lacey Malarky and Beth Lowell (2018) Avoiding Detection: Global Case Studies of Possible AIS Avoidance, *Oceana*, March 2018 1 <file:///C:/Users/PROF%20OKON/Downloads/http___usa.oceana.org_sites_default_files_ais_onoff_report_final_5.pdf> accessed 12 September 2019.

Note 45. Data from the Federal Department of Fisheries shows the following numbers of vessels actually operated during the reviewed period: 1995 315, 1996 254, 1997 249, 1998 199, 1999 211, 2000 208, 2001 220, 2002 243, 2003 260, 2004 221, 2005 239, 2006 210, 2007 191, 2008 216, 2009 177, 2010 156, 2011 154, 2012 143, 2013 136, 2014 143 and 2015 135) Federal Department of Fisheries, Marine Fisheries Files (2007); Federal Department of Fisheries, Marine Fisheries Files (2017); See generally Ezenwa, BI and Ebonwu, B, Propagation and Culture of Marine Shrimp, Peneaus notialis and New Entrant in Nigeria Coastal Waters, Peneaus Monodon' (2002) *2002 Annual Report*, Nigerian Institute for Oceanography and Marine Research, Lagos, 22.

Note 46. Department of Fisheries and Aquaculture, *Fishery Statistics of Nigeria* (5th ed., Department of Fisheries and Aquaculture 2008-2015) 39.

Note 47. See generally the Export (Incentive and Miscellaneous Provisions) Act LFN 2010.

Note 48. Mullen, T "The Convention on Biological Diversity and High-Seas Bottom Trawling: The Means to an End" (2007) 14 University of Baltimore Journal of Environmental Law 135, 136.

Note 49. The Standard Sorting System for Fishes Caught in Nigeria's Marine Waters Policy which took effect from May 1, 2006 approved 14 cm as the minimum size for grading of fishes in Nigeria. See *Re: Standard Sorting System for Fishes Caught in Nigeria's Marine Waters*, FDM/C/L/24/S.4/I/193 of February 27, 2006.

Note 50. Department of Fisheries and Aquaculture, *Fishery Statistics of Nigeria* (5th ed., Department of Fisheries and Aquaculture 2008-2015) 50.

Note 51. Louka, E., *International Environmental Law: Fairness, Effectiveness, and World Order* (Cambridge University Press 2006) 245.

Note 52. Edet, EE and Williams, AB "Overview of the Nigerian Fisheries Sector" *A Paper Presented at the FAO-EAF Workshop*, Accra, Ghana. 23- 26 October, 2007 1, 18.

Note 53. From 2003 to 2008 the number of reported pirate incidents on fishing vessels was 4, 11, 34, 57, 55 and 72 respectively. Connors, W "Pirates Terrorised Nigeria's Fishing Fleet" (2008) *International Herald Tribune*, <http://www.nytimes.com/2008/06/12/world/africa/12lagos.html> (accessed November 1, 2016).

Note 54. Adeyemo, OK "Consequences of Pollution and Degradation of Nigerian Aquatic Environment on Fisheries Resources" (2003) 23(4) The Environmentalist 297; Isebor, CE "National Report Marine Biodiversity in Nigeria—the Known and the Unknown" *Proceedings of the Sub-Saharan African Marine Biodiversity*. Held in Cape Town, South Africa. 23-26 September, 2003 46, 58-59.

Note 55. Nigerian National Petroleum Corporation, 2014 Annual Statistical Bulletin (Nigerian National Petroleum Corporation 2014) Tables 25 and 28, 45 <https://www.nnpcgroup.com/NNPCDocuments/Annual%20Statistics%20Bulletin%E2%80%8B/2014%20ASB%202nd%20Edition.pdf> accessed 9 September 2019.

Note 56. Nigeria Meteorological Agency (NIMET), *Year 2006 Rainfall Prediction and Socio-Economic Implications for All States in Nigeria*, (NIMET 2006) 41.

Note 57. More than 60% of the net energy increase in the climate system is stored in the upper ocean (0-700 m) during the relatively well-sampled 40-year period from 1971 to 2010, and about 30% is stored in the ocean below 700 m. The increase in upper ocean heat content during this time period estimated from a linear trend is likely 17 [15 to 19] × 1022 Lisa V. Alexander, Summary for Policymakers. In: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, Stocker, TF and Others (Cambridge University Press 2013) 8.

Note 58. Ocean temperature affects all facets of fish lives including, spawning, egg development, growth, recruitment, distribution, abundance, predator-prey relationship, migration patterns and incidence of disease. Mcfarlane, GA and Others 'Climate Variability and Pacific Sardine Populations and Fisheries. In: McGinn, N. A. (Ed.) *Fisheries in a Changing Climate*, American Fisheries Society Symposium 32, Proceedings of the Sea Grant Symposium, *Fisheries in a Changing Climate*, Held at Phoenix, Arizona, USA, 20-21 August 2001 (American Fisheries Society, Bethesda, 2002) 19, 210.

Note 59. Data calculation from Monthly Mean Sea Surface Temperature of the Atlantic Ocean at Victoria Island, Lagos 1990-2012. Nigerian Meteorological Agency. Oshodi, Lagos.

Note 60. For instance, *Pseudotolithus senegalensis (croakers)* Spawn from November to March in waters of 22 to 25^{o}C; the water temperature preference of *Sardinella maderensis (*Sardine) is 24^{o}C while *Penaeus notialis (shrimps) prefers* 25^{o}C. The distribution of *Sardinella fimbriata (*Bonga Shad) corresponds to extreme northerly and southerly limits of the 25^{o}C isotherms throughout the year. Whitehead, PJP,FAO Species Catalogue, 7 FAO Fish Synop 125 (7/1): 1-303, In Froese, R and Pauly, D (Eds.) FishBase 2000: Concepts, Designs and Data Sources (ICLARM 1985) 344 <http://www.fishbase.org/Summary/SpeciesSummary.php?id=432> accessed 21 September 2019.

Note 61. Tobor, JG (n 35) 179.

Note 62. For example, *Sardinella aurita* prefers water with a minimum temperature below 24^{o}C. Whitehead, PJP (n 60)

Note 63. Indeed, s 2(1) of the Exclusive Economic Zone Act Cap E17 LFN 2010 vests in the Federal government of Nigeria the ownership and control of natural resources in the EEZ.

Note 64. NESREA Act 2007, s 2. Sustainable development lacks precise meaning. Its original conceptualisation is defined in *Our Common Future* (otherwise known as the Brundtland Report) as "...development that meets the needs of the present without compromising the ability of future generations to meet their own needs.The term contains within it two key concepts: the concepts of "needs," in particular the essential needs of the world's poor, to which overriding priority should be given; and the idea of limitations imposed by the state of technology and social organisation on the environment's ability to meet present and future needs". The World Commission on Environment and Development, *Our Common Future* (Oxford University Press 1987) 43; P Birnie, A Boyle and C Redgwell, *International Law and the Environment*, (3rd ed., Oxford University Press 2009) 54; EE Okon, "The Environmental Perspective in 1999 Nigerian Constitution" (2003) 5(4) Environmental Law Review 256.

Note 65. NESREA Act 2007, s 8(o).

Note 66. NESREA Act 2007, s 7(e).

Note 67. Hereinafter referred to as the CMAP Regulations 2011 or CMAP Regulations.

Note 68. CMAP Regulations 2011, reg 2 (i)(i).

Note 69. CMAP Regulations 2011, reg 3.

Note 70. CMAP Regulations 2011, reg 8(1) and (4).

Note 71. SFA 2010, s 1(1) and 3(1)(a); Licensing Regulations 2010, reg 1(1),.

Note 72. SFA 2010, s 4(2).

Note 73. Licensing Regulations 2010, reg 8 (a) and (b).

Note 74. Licensing Regulations 2010, reg 14.

Note 75. SFA 2010, s 4(1) and (2); Licensing Regulations 2010, reg 7(3).

Note 76. See generally Fishing Regulations 2010, reg 13.

Note 77. Fishing Regulations 2010, reg 13(1).

Note 78. TED/BRD Regulations 2006, reg 1.

Note 79. SFA 2010, s 10(1)(a) and (b).

Note 80. Fishing Regulations 2010, reg 11.

Note 81. Fishing Regulations 2010, reg 12.

Note 82. Fishing Regulations 2010, reg 19.

Note 83. Fishing Regulations 2010, reg 14(1)(a).

Note 84. Fishing Regulations 2010, reg 14(1)(b) and (c).

Note 85. Fishing Regulations 2010, reg 6.

Note 86. Fishing Regulations 2010, reg 4.

Note 87. Inspection and Quality Assurance Regulations 2010, reg 1.

Note 88. Fishing Regulations 2010, reg 1.

Note 89. Fishing Regulations 2010, reg 10(a).

Note 90. Fishing Regulations 2010, reg 10(b).

Note 91. Fishing Regulations 2010, reg 10(c).

Note 92. SFA 2010, ss 1(2), and 9-13.

Note 93. See specifically SFA 2010, s 9(6)(a-f).

Note 94. Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 Relating to the Conservation and Management of Straddling and Highly Migratory Fish Stocks 1995 (FSA). See Art 2.

Note 95. See Articles 7.1.1 and 7.2.1 of the 1995 FAO Code of Conduct for Responsible Fisheries (FAO Code); *The Future We Want* (particularly paragraph 158).

Note 96. For precautionary approach see Articles 5(c) and 6 as well as Annex II of the FSA. For ecosystem approach see Articles 5 (d) (e) and (g) and 7 of the FSA.

Note 97. For precautionary approach see Articles 6.5 and 7.5 of the FAO Code. For ecosystem approach see Articles 6.1, 6.2, 6.4, 6.6, 6.8, 7.2.2(d), 7.2.3 and 7.3.2 of the FAO Code.

Note 98. United Nations General Assembly Resolutions A/RES/62/177, [1] and [6].

Note 99. *The Future We Want* specifically urge states to facilitate conservation and sustainable use of marine fisheries for present and future generations and effective application of ecosystem approach and precautionary approach in the management of marine fisheries. See specifically [158] 30.

Note 100. Philippe Sands and others (n 21) 222.

Note 101. This perspective is limited to the United Nation Convention on the Law of the Sea 1982, FSA and the FAO Code.

Note 102. Convention on Biological Diversity 1992, Art 2.

Note 103. Fishing Regulations 2010, regs 4 and 6; TED/BRD Regulations 2006, reg 1. UNCLOS 1982, Art 62(1) of the UNCLOS mandates coastal states to promote the objective optimum utilisation of the living resources in their exclusive economic zones.

Note 104. Walker GK, Defining Terms in the 1982 Law of the Sea Convention IV: The Last Round of Definitions Proposed by the International Law Association (America Branch) Law of the Sea Committee (2005-2006) 36(1) California Western International Law Journal 133, 180.

Note 105. Rayfuse, R and Wilder, M "nternational Fisheries and Sustainability: Dealing with Uncertainty" in Borgese, EM and others (Eds.) *Ocean Yearbook* 14 (The University of Chicago Press (2000) 114, 116.

Note 106. See *Rio Declaration on Environment and Development*, June 14, 1992 Reprinted in 31 I.L.M. 874, 879 (1992).

Note 107. González-Laxe, F "The Precautionary Principle in Fisheries Management" (2005) 29(6) Marine Policy 496, 497.

Note 108. McIntyre, O and Mosedale, T "The Precautionary Principle as a Norm of Customary International Law" (1997) 9(2) Journal of Environmental Law 221, 222.

Note 109. Tickner, JA and Geiser, K "The Precautionary Principle Stimulus for Solutions and Alternatives-based Environmental Policy" (2004) 24(7-8) Environmental Impact Assessment Review

801.

Note 110. Tickner, JA and Geiser, K "The Precautionary Principle Stimulus for Solutions and Alternatives-based Environmental Policy" (2004) 24(7-8) Environmental Impact Assessment Review 801; Hilborn, R and Others "The Precautionary Approach and Risk Management; Can they Increase the Probability of Successes in Fisheries Management?" (2001) 58 (1) Canadian Journal of Fisheries and Aquatic Sciences 99; Marr, S 'The Southern Bluefin Tuna Cases: The Precautionary Approach and Conservation and Management of Fish Resources' (2000) 11(4) European Journal of International Law 815; Gullett, W "The Precautionary Principle in Australia: Policy, Law and Potential Precautionary EIAs" (2000) 11(2) *RISK: Health, Safety and Environment,* 93; McIntyre, O and Mosedale, T (n 106); FAO, FAO Technical Guidelines for Precautionary Approach to Capture Fisheries and Species Introduction (FAO 1996); Earll, RC "Commonsense and the Precautionary Principle-An Environmentalist's Perspective" (1992) 24(4) Marine Pollution Bulletin 182.

Note 111. Annex II of the FSA 1995 [1] and [3].

Note 112. See generally FSA 1995 art. 6(3)(b) FSA and Annex II of the FSA 1995 [5]; Paulde Bruyn, Hailario Murua and Martìn Aranda, The Precautionary Approach to Fisheries Management: How this is Taken into Account by Tuna Regional Fisheries Management Organisations (RFMOs) (2013) 38 Marine Policy 38.

Note 113. While the CMAP Regulations do not prescribe precautionary reference point for MFS, the NESREA Act is also mute on precautionary approach.

Note 114. Graham, CT and Harrod, C "Implications of Climate Change for the Fishes of the British Isles" (2009) 74(6) Journal of Fish Biology 1143.

Note 115. For instance, a population is a group of individuals of the same species living in a given place while a community comprises populations of a number of different species living together.

Note 116. Lubchenco, J "Entering the Century of the Environment: A New Social Contract for Science" (1998) 279 (5350) Science 491- 492.

Note 117. Food and Agriculture Organisation, *The Ecosystem Approach to Fisheries: FAO Technical Guidelines for Responsible Fisheries* No 4 Suppl. 2 (FAO 2003) 6.

Note 118. Proponents of this argument also rely on the requirement that conservation measures shall take into consideration the effects on species associated with or dependent upon harvested species with a view to maintaining or restoring populations of such associated or dependent species above levels at which their reproduction may become seriously threatened. See Schiffman, HS "CCAMLR Fisheries: Challenges to Effective Conservation and Management" (2009) 12(3) Journal of International Wildlife Law & Policy 180, 182 particularly n 15.

Note 119. A population is a group of species in the same geographical area. For example, finfish and shell fish in the marine environment.

Note 120. It takes into account multiple populations of different species in a given area and how they interact between different species, but not counting abiotic factors.

Note 121. Agenda 2030, Goal 14 [14.1]. Marine pollution is the introduction by man, directly or indirectly of substances or energy into the marine environment including estuaries, which has or is likely to have a deleterious effects or hinder marine activities, including fishing or impairment of quality of the aquatic environment. UNCLOS Art 1(4); Sands P (n 22) 466.

Note 122. Agenda 2030, Goal 14 [14.3]. Ocean acidification is the ongoing decrease in the pH of the oceans. It is cause by the uptake of carbon dioxide (CO_2) from the atmosphere. Since the beginning of the industrial era, oceanic uptake of CO_2 has resulted in acidification of the ocean; the pH of ocean surface water has decreased by 0.1 (high confidence), corresponding to a 26% increase in acidity, measured as hydrogen ion concentration. IPCC, *Climate Change 2014 Synthesis Report: Summary for Policymakers* (IPCC 2014) 4 <https://www.ipcc.ch/pdf/assessment-report/ar5/syr/AR5_SYR_FINAL_SPM.pdf> accessed 9 September 2019.

Note 123. This compound reduces the growth rate of phytoplankton, the prime fish-food and are the major contaminants of MFS. Qiqing Chen and Others, "Quantitative Investigation of the mechanism of microplastic and manoplastic toward zebrafish larvae locomotor activity" (2017) 584-585 Marine Pollution Bulletin 99; Daniela de A Mirand and Gustavo Freire de Carvalho-Souza, "Are we eating plastic-ingesting fish?" (2016) 103 Marine Pollution Bulletin 109.

Note 124. Nigerian National Petroleum Corporation, Annual Statistical Bulletin 1999-2014 <https://www.nnpcgroup.com/Public-Relations/Oil-and-Gas-Statistics/Pages/Annual-Statistics-Bulletin.aspx> accessed 10 September 2019.

Note 125. For data already referred to on pipeline product loss and pipeline crude oil loss see (n 55) 10.

Note 126. No doubt, gas flaring in Nigeria has reduced drastically from 60.11% in 1999, 42.54% in 2004, 27.72% in 2009, 18% in 2013 to 11.47% in 2014. Nigerian National Petroleum Corporation, Annual Statistical Bulletin from 1999 to 2014 <https://www.nnpcgroup.com/Public-Relations/Oil-and-Gas-Statistics/Pages/Annual-Statistics-Bulletin.aspx> accessed 10 September 2019.

Note 127. RK Pachauri and other, *Climate Change 2014 Synthesis Report: Summary for Policymakers* (IPCC 2014) 3.

Note 128. Burns, WCG "Potential Causes of Action for Climate Change Damage in International Fora: The Law of the Sea Convention" (2006) 2(1) McGill International Journal of Sustainable Development Law and Policy 27, 38 and Burns, WCG. "Potential Causes of Action for Climate Change Impacts under the United Nations Fish Stocks Agreement" (2006-2007) 7 Sustainable Development Law & Policy 34, 36.

Note 129. Froese R and Pauly D (eds.) n 10, 10 and 11.

Note 130. G Huse and I Ellinggsen, "Capelin Migrations and Climate Change – a Modelling Analysis" (2008) 87(1-2) Climate Change 177, 178 and 185; EH Sissener and T Bjorndal, "Climate Change and the Migratory Pattern For Norwegian Spring-Spawning Herring – Implications for Management" (2005)

29(5) Marine Policy 299.

Note 131. ibid; Emmanuel E. Okon, Achieving Sustainability of Nigeria's Marine Fisheries Resources in the Era of Climate Change: Lessons from the Fraser River Sockeye case (2018) 2(1) Obefemi Awolowo University Law Journal 17-40.

Note 132. SFA 2010, s 10(1)(a) and (b).

Note 133. The level of ocean acidification due to increasing CO_2 concentrations associated with global warming of 1.5°C is projected to amplify the adverse effects of warming, and even further at 2°C, impacting the growth, development, calcification, survival, and thus abundance of a broad range of species, for example, from algae to fish. Valérie Masson-Delmotte and others, *Global Warming if 1.5oC; An IPCC Special Report on the impacts of global warming of 1.5oC above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty. Summary for Policymakers* (IPCC 2018) 11; Cooper, TF and Others, Declining Coral Calcification in Massive Porites in Two Nearshore Regions of the Northern Great Barrier Reef (2008) 14(3) Global Change Biology 529.

Note 134. Agenda 2030, Goal 14 [14.2].

Note 135. Agenda 2030, Goal 14 [14.5].

Note 136. Agenda 2030, Goal 14 [14.a].

Note 137. DJ Dankel, DW Skagen and Ø Ulltang, "Fisheries Management in Practice: Review of 13 Commercially important Fish Stocks" (2008) 18(2)Reviews of Fish Biology and Fisheries 201, 226.

Note 138. Agenda 2030, Goal 14 [14.2]

Note 139. Nigeria Meteorological Agency (NIMET), *Year 2006 Rainfall Prediction and Socio-Economic Implications for All States in Nigeria* (NIMET 2006) 41.

Note 140. Meanwhile, reg 6(l) of the CMAP Regulations prohibits construction activities in areas close to breeding and spawning grounds of fish and other marine life. In fact, reg 10(3) of the CMAP Regulations specifically states that construction of beach resorts or hotel shall not be permitted in breeding and spawning grounds of fish.

Note 141. Regulation 5(a)(i) of the CMAP Regulations lists sanctuaries among the areas under Coastal Regulation Zone I (CRZ I) that are ecologically sensitive and important but fails to specifically create any sanctuary in the coastal and marine environment.

Note 142. Criteria and Guidelines on the Transfer of Marine Technology (CGTMT) drawn up by the Advisory Body of Experts on the Law of the Sea and adopted in 2003 at the XXII Session of the Assembly of the Intergovernmental Oceanographic Commission. The guiding principle of the CGTMT is that the Transfer of Marine Technology must always be conducted on fair and reasonable terms and conditions, and should enable all parties concerned to benefit on an equitable basis from developments in marine science related activities, particularly those aiming at stimulating the social and economic contexts in developing countries. The IOC CGTMT is a non-binding tool for potential suppliers and

institution; essentially operational, project-oriented; complimentary to other mechanisms; and subject to periodic revision at the request of the IOC Assembly. Intergovernmental Oceanographic Commission of UNESCO, (IOC) Criteria and Guidelines on the Transfer of Marine Technology<http://www.scor-int.org/SCOR_CB/CB-Bremen/IOC_Tech_Transfer.pdf>accessed 10 September 2019.

Note 143. The areas which the database should cover include, but limited to the biomass of at least the commercial fish stocks, predator-prey relationship of the stocks, levels at which the stocks can produce MSY, precautionary reference points that are stock-specific and takes into account the state of each stock, how marine fishing activities affect the aquatic ecosystems, the impact of land-based pollution and climate change on MFS, and the socio-economic characteristic of the fishers.

Note 144. SFA 2010, s 4(1)(d); Licensing Regulations 2010, regs 2(a) and 7(2)(c).

Note 145. Para 14.7 of the Agenda states that by 2030, there should be an increase economic benefits to small island developing states and least developed countries from the sustainable use of marine resources, including through sustainable management of fisheries, aquaculture and tourism.

Note 146. Sea Fisheries Act Decree No. 30 0f 1971.

Note 147. Sea Fisheries Act Decree No. 71 of 1992.

Note 148. See SFA 2010, ss 1 and 2.

Note 149. Chiemelie Ezeobi, “Nigeria: How Nigeria Loses $70m to Illegal Fishing by Chinese Vessels” This Day, 7 March 2018 <https://allafrica.com/stories/201803070060.html> accessed 10 October 2019.

Note 150. ibid.

Note 151. For instance, violation of the NMFL that have the highest sanctions are: fishing without registering or licencing the vessel attracts imprisonment of 5 years or a fine of N250,000.00 or both (SFA s.1(2)); using of explosive substance or any noxious or poisonous matter attracts 2 years imprisonment or a fine of N50,000.00 (SFA s. 10); and operating a shrimp trawl without a TED and a BRD attached to its cod-end attracts a fine of ₦100,000 and confiscation of nets (TED/BRD Regulations 2006, regs 1 and 8(a);. Non-compliance with other provisions or requirements of the SFA, condition(s) endorsed on a licence or breach of any regulation made under the SFA, which no penalty is prescribed shall attract a fine of N50,000.00 (SFA s. 11).

Note 152. SFA 2010, s 13. The specific examples are: fishing with expired licence attracts N50,000.00 fine and forfeiture of catch (SFA 2010, s. 5); making false statement for the purpose of procuring a licence attracts a fine of N50,000.00 (SFA 2010, s. 12); operating a shrimp trawl with an improperly rigged TED as specified under the regulation attracts a fine of ₦50,000 and confiscation of the net used (TED/BRD Regulations 2006, reg 8(d)); using a particular shrimp vessel twice to contravene section 1 of the Regulation more than once shall have its licence withdrawn for the remaining part of the year for which the licence was issued (TED/BRD Regulations 2006, reg 8(d)); See general SFA 2010, s. 13 (1) and (2); TED/BRD Regulations 2006, regs 1 and 8.

Note 153. Okon EE, "The Changing Nature of the Rules on Port State Measures: Implications for Sustainability of Marine Fisheries Resources in Nigeria" (2012) 2 NIALS Journal of Environmental Law 67, 75; Aqorau, T "Illegal Fishing and Fisheries Law Enforcement in Small Island Developing States: The Pacific Islands Experience" (2000) 15(1) The International Journal of Marine and Coastal Law 37, 42.

Note 154. *NOSDRA* v *ExxonMobil*(2018) LPELR-44210 (CA).

Note 155. ibid, per Adah JCA [B-F] 10. Relying on the Supreme Court of Nigeria judgment in *MFA* v. *Inongha* (2014) 4 NWLR (Pt 1397) 343, 375 Nwosu-Iheme JCA held that such administrative power will violate the principle of *Nemo Judex in causa sua* meaning no judge should preside over a matter in which he has personal interest or involvement. [E-C] 5-9.

Note 156. TED/BRD Regulations 2006, regs 1 and 8(a).

Note 157. The non-environmentally friendly way of fishing is prohibited under s 10 of the SFA 2010.

Note 158. United Nations General Assembly Resolution A/RES/66/288 on the future we want of 11 September 2012, [158] 30.

Note 159. Fishing Regulation 2010 reg 1.

Note 160. Article 56 UNCLOS; Exclusive Economic Zone Act 2010 s 2; SFA 2010 s 1.

Note 161. Fishing Regulation 2010, regs 4 and 6.

Note 162. Fishing Regulation 2010, reg 2.

Note 163. TED/BRD Regulations 2006, reg 1.

Note 164. The Future We Want in paragraph 169 urges states to implement the FSA and the FAO Code as well as the international plan of action and technical guidelines made pursuant to the FAO Code.