IMPLEMENTING AN EFFECTIVE REGULATORY SCHEME FOR CLIMATE CHANGE IN NIGERIA: THE ROLE OF LAW

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Introduction

The impacts of climate change as is being felt across the entire world will continue to influence how we live, our work, culture, health and environment, and in the years to come will affect future generations. Given this scenario, measures have been taken and are still ongoing at the global level under the United Nations Framework Convention for Climate Change (UNFCCC), the Kyoto Protocol (KP) and through further negotiations, prior to and aftermath of Copenhagen Conference, to mitigate the causes of climate change and adapt to some effects already being experienced.[1]

Mitigating the causes of climate change and adapting to its effects is important not only to protect human life and, natural resources, but also to aid nature's capacity to absorb or control impacts. This requires the application of global measures through a set of thoughtful preventive and adaptative actions, measures and investments at all levels of governance. The application

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1. There is a growing consensus that the prospect of adverse climate change is not going to diminish in the near future unless dramatic mitigation and adaptation measures are adopted and implemented. See Bagis Osman Elasha *et al.*, "Impacts, Vulnerability and Adaptation to Climate Change in Africa" - Background Work Paper for African Workshop on Adaptation Implementation of Decision IKP.10 of the UNFCCC Accra, Ghana 21- 23 September, 2006.

process will be more enhanced where there is established a domestic programme that can understand, predict and respond to human induced and natural processes of climate change through the conduct of national climate assessment and furtherance of the research and science necessary to support mitigation and adaptation. All of these can only be achieved through the instrumentality of law.

Law sets standards for acceptable behaviour in the society by creating regulations, policies and measures, and establishing agencies with responsibility for implementation.[2] If we acknowledge the overall vulnerability of Nigeria like other developing countries to climate change, it then becomes necessary for us to stimulate appropriate mitigation and adaptation measures through the instrumentality of law. Such laws will have their root in using best practices derived from science and the experience and knowledge of governments and stakeholder groups. It is only then that the laws would be capable of providing an effective regulatory framework. This is necessary in order to save man, natural resources and the environment. Consequently, this paper seeks to examine climate change and its impacts, and how law has been used and can be used to implement an effective framework to address climate change in Nigeria.

Climate Change and Its Impacts

Climate change is a change of climate which alters the composition of the global atmosphere in addition to natural climate variability observed over comparable time periods.[3] It is

2. R. Verheyen, "Adaptation to the Impacts of Anthropogenic Climate Change- The International Framework" 2002 RECEIL No. 2 p. 129.
3. Scientists claim that since creation there have been variations in climate pattern. From the Roman conquest, Greenland population to the medieval warm period up to the freezing of River Thames, there has been series of climate change. While some of the changes are predictable, some are not and this is due to the

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a change in the statistical distribution of weather over periods of time that ranges from decades to millions of years. It can be a change in the average weather or a change in the distribution of weather events. It may be linked to a specific region or may occur across the whole earth. The UNFCCC defines it as an alteration in the atmospheric temperature caused by greenhouse gases (GHGs) which are accumulating in Earth's atmosphere as a result of human activities.[4]

Climate change is perhaps the most important sustainability issue facing today's generation in the way it is impacting on every other aspect of human life. As has been noted, if left unchecked it will lead to more serious devastating effects in the coming years.[5] Scientists have explained that climate change is caused by the emission of GHGs as largely exacerbated through such human activities as the burning of fossil fuel, land use activities (e.g. deforestation), cattle and livestock rearing, rice agriculture, landfills, chemical industries, cattle feed lots and agricultural soils.[6] GHGs[7] are like blankets which absorb heat

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complex interactions between the Earth, the atmosphere and the sun which has not been completely understood. They claim that climate change has always existed even without human interference. See "Global Warming Environmental Disaster"@ *http://hubpages.com/hub/Global-warning-Environmental-Disaster. Accessed May 11th, 2010* and Olawuyi Damilola Sunday, "Detonating the Global Climate Change Time Bomb- The Role of Law" Faculty of Law: University of Calgary, Alberta, Canada, 2009.

4. Available *@http://www.eoearth.org/article/global_warming*, accessed May 6, 2010.
5. Michael Grubb, *The Kyoto Protocol: A Guide and Assessment* (London: Earth Scan 1999) 29.
6. B. Mckee, "Solutions for the 21st Century, Zero Emissions Technologies for Fossil Fuel" (2002) OECD / IEA 1.
7. GHGs that contribute to climate change include carbon dioxide (Coz), methane (CH4), nitrous oxides (Nzo), Chlorofluorocarbons (CFCs) and halocarbons. Sustained emissions of these gases will eventually result in an increase in the average temperature of the earth's atmosphere to a level sufficient to cause

radiation that should escape to the space, thereby occasioning atmospheric heat at a rate beyond normal. The developed countries have been identified as the major emitters, and with increase in levels of development, production and consumption; emissions of these gases have increased and will continue. [8]

The Intergovernmental Panel on Climate Change (IPCC), a group of 2,000 scientists tasked by the World Meteorological Organisation (WTO) and the United Nations Environment Programme (UNEP) to investigate the causes and effects of climate change warned that climate change is real as the world is already experiencing the effects of rising temperatures and extreme weather events. Among others, it has been attributed as the cause of disasters such as increased meteorological and hydrological extremes and their impacts (severity of floods, droughts, heat waves, increased wild fires and sea level rise[9] and storms). These impacts in turn pose threat to lives, livelihoods and socio-economic assets, and food security. Climate change also results in dislocation of millions of inhabitants of affected areas, ill health,[10] loss of forests and biodiversity,[11] social and

climate change. See James E. Hansen, "Defusing the Global Warming Time Bomb" (2004) 3 Sci. Amer. 68 - 77.

8. IPCC : The Third Report @ *www.ipcc.ch* Accessed September 3rd, 2010. See also, Williams Chandler et al., "Climate Change Mitigation in Developing Countries"*@http://www.pnl.gov/aisu/pubs/CCMitDevCo.pdf,* accessed September 3, 2010.
9. Sea level rise will cause migration of marine species, alteration of near shore currents, loss of coastal community livelihoods as a result of harmful tide events which cause mortality of fish, shell fish, marine mammals, sea birds and other animals.
10. Health impacts can be expected from increases in temperature and changes in rainfall patterns. This includes increase in the occurrence of strokes, skin rashes, dehydration and the incidence of melanoma skin cancers. Changes in ecosystem can also result in water-borne diseases, vector borne diseases and water unavailability.
11. Changes in rainfall pattern could cause acidification, affect crop yield and land availability. The loss of biodiversity may also result in substantial losses of

political instability and economic decline.[12] It has been identified that the impacts will be felt more by the poor as they have the least capacity to respond to the problems..[13] Small islands states in particular are vulnerable to climate change due to tropical cyclones and storm surges in addition to the limited availability of natural resources such as fresh water and land-use patterns. Though, there are still wide ranges of uncertainty especially in relation to the size of the impacts and their implications, it is obvious that climate change impacts are pervasive, wide ranging and affect the core systems of our society – transportation, ecosystems balance, agriculture,[14] business, water, energy infrastructure among others. The variability and multi-faceted nature of climate change impact also has a major effect on the performance of developing economies especially because of their high dependence on natural resources.

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species and their composition, extinction of species and changes in vegetation structure.

12. Climate change has three important economic dimensions especially in developing countries – these are: the direct costs / benefits to taking mitigation actions for climate change, the costs incurred in adapting to the physical changes that result from climate change and the indirect costs incurred in the loss of markets in the rest of the world as a result of their mitigation actions.
13. Sheila Cloutier, "Global Warming and Human Rights" @ *http://www.ceil.org/Climate/IACHR/nuit5Mar 07.html* Accessed September 1, 2010. See also Osborne, H., "Stern Report: the Key Points (2006)"@ *http://www.eia.doc.gov/emeu/cabs/South_Africa/pdf.pdf,* accessed September 5, 2010.
14. The crop lands, pastures and forests are progressively being exposed to threats from increased climatic variability. Abnormal changes in temperature and rainfall result in increases in frequency and intensity of droughts and flood events which affect climatic patterns, spatial distribution of agro-ecological zones, habitats, distribution patterns of plant disease and pests, fish population and ocean circulation patterns. This has significant impacts on agriculture and food production because species habitat will be lost leading to shift and changes in biodiversity and yields.

example in the way it undertakes its own activities.[15] Control and compliance governance is the use of traditional forms of authority such as using regulations and planning laws to promote activities that contribute to the reduction of GHG emissions.[16] Governance by provision is achieved through the delivery of particular forms of service or resource. It involves the ability to control the nature of infrastructure development in ways that influence practices of individuals and the trajectories of future development.[17] Governance by enabling takes place through facilitating, coordinating and encouraging actions through partnership with private and voluntary agencies and various community engagements. It involves promotional activities, public-private partnerships and the provision of financial incentives or subsidies to encourage action by other actors for particular policy ends. Governance by provision and enabling are critically important in the way they involve stakeholders and build local support base in developing solutions.[18] All these modes of governance influence the overall approach in the use of legal instruments in the context of multi-level governance.

In recognition of the role of law, governments all over the world, policy makers and international organisations have used law to address the challenges of climate change. In this regard, stemming from the fact that climate change is not the

15. It promotes the desire to improve energy efficiency in operations e.g. housing stocks and vehicle fleets, building integrated renewable energy systems or by switching to LPG as a type of fuel.
16. This can be done through increased use of renewable and decentralised energy generation in new developments.
17. For example, in relation to waste management, it is possible through infrastructure development to convert waste in such a way that it become useful both for the manufacturing industry and to generate renewable energy.
18. Heike Schroeder and Harriet Bulkeley, "Global Cities and the Governance of Climate Change: What is the Role of Law in Cities" FORDHAM URB L.J. Vol xxxvi available @ *http://www.tyndall.ac.uk/publications/working_papers/twp123.pdf,* accessed September 1, 2010.

Climate change causes the underperformance of investments because resulting uncertainties can be a powerful deterrent to investment, permanently reduce economic growth and compromise the sustainability and performance of economic and social infrastructure assets. The poor suffer disproportionately from climate change phenomenon due to loss of livelihoods which is a major trigger for population movements, thereby undermining the effectiveness of poverty reduction strategies. This is worse in Africa because the climate risk exposures is exacerbated by a range of endemic structural vulnerabilities such as widespread poverty, reduced yields of the main staples, entrenched inequalities in rights over land resources and lack of access to technology and information, corruption, inter-tribal and other conflicts, and lack of effective governance.

The Role of Law

As scientists continue to warn that the world stands the risk of witnessing an abrupt sea level rise, frequency of extreme weather events, the spread of diseases and loss of lives as a result of climate change if no drastic action is taken, municipal law, conventions, protocols, policies and treaties are also being developed and fine-tuned to deal with the problem. What this emphasizes is the importance of law in influencing the actions of governments, multinational corporations and individuals within the society with a view to protecting the environment and maintaining a balance in human activities. The role of law which is to set standards for acceptable behaviour in the society and to set sanctions for defaulters can be undertaken through different modes of governance namely, - self governance, control and compliance governance, governance by provision and governance by enabling.

Self- governance relates to the capacity of the government to shape its own activities. In this mode government seeks to lead by

responsibility of any one particular person but that of all,[19] the global approach pushed by the United Nations is one in which there is concerted effort at ensuring sustainability of the common heritage of mankind.[20] It was this approach that in 1998 informed the setting up of the IPCC which subsequently proffered the scientific evidence that led to the negotiation of the United Nations Framework Convention on Climate Change (UNFCCC) at the Rio Summit in 1992.

The stated objective of the UNFCCC was to stabilise atmospheric concentration of GHGs at safe levels with countries pledging to prevent dangerous anthropogenic interference with the climate system. To achieve this objective, all countries signatory to the Convention have a general commitment to address climate change, adapt to its effects and report their actions to implement the Convention.[21] Emphasis was placed on

19. Global problems seldom lend themselves to unilateral fixes.
20. UN General Assembly Resolution on Protection of the Global Climate for Present and Future Generations of Mankind 22 December, 1989 A/Res/44/207@ *http://www.unog.ch/library* accessed August 28, 2010.
21. Signatories to the UNFCCC and KP have to fulfil certain obligations such as: Prepare and periodically update a national inventory of GHG emission and sinks; Formulate and implement national and where appropriate regional programmes to mitigate climate change and facilitate adequate adaptation to climate change by undertaking National Adaptation Programmes of Action (NAPA); Promote and cooperate in the development, application and diffusion of technologies, practices and processes that control, reduce or prevent anthropogenic emissions of GHGs; Promote sustainable management and promote and cooperate in the conservation and enhancement of sinks and reservoirs of all GHGs; Cooperate in preparing for adaptation to the impacts of climate change; Take climate change considerations into account in the relevant social, economic and environmental policies and actions with a view to minimising adverse effects on the economy, public health and on the quality of the environment; Promote and cooperate in scientific, technological, technical, socio-economic and other research, systematic observation and development data activities related to climate system and intended to further the understanding and to reduce or eliminate uncertainties; Promote and cooperate in full open and prompt exchange of relevant scientific, technological, technical, socio-economic and legal information related to climate system and climate

the need for parties to protect the climate system on the basis of equity and in accordance with common but differentiated responsibility and respective capabilities. Developed countries were expected to take the lead by reducing their aggregate levels of emissions.

The Convention also established the Conference of Parties (COP) with responsibility to oversee the progress towards achieving the objectives of the Convention while parties were mandated to periodically develop and publish to the COP their national inventories of GHGs sources and sinks. The objective of the Convention was transformed into legally binding agreement between parties in 1997 at the meeting of the COP3 in Kyoto, Japan in what is called the Kyoto Protocol (KP). The KP sets the framework for the acceptance of legally binding emission reduction targets for each country included in Annex 1 of the UNFCCC with 38 industrialised countries and 11 countries in Central and Eastern Europe being obliged to return their emissions to an average of approximately 5.2% below their 1990 levels over the commitment period 2008 - 2012. The KP also allowed for the implementation of these obligations by providing developed countries with opportunity to utilise its flexible mechanisms- the Clean Development Mechanism (CDM),[22]

change; Promote and cooperate in education, training and public awareness related to climate change.

22. The CDM of the KP was created to allow the conversion of GHG emission reductions in developing countries into carbon credits that industrialised countries can use for complying with the emission targets set under KP. Under the CDM, projects that reduce GHG emissions and contribute to sustainable development can earn a saleable Certified Emission Reduction Credits (CERs) and countries with a commitment under KP can purchase the CERs to meet portion of their obligations under the KP. This has consequently generated a huge carbon market. There is a very large and currently untapped potential for mitigation in the agricultural and forestry sectors in Africa through activities that are not allowed under the CDM such as avoided deforestation, sustainable agriculture and forestry practices and soil carbon sequestration.

Emissions trading (EI) and the Joint Implementation (JI). The decisions on the implementation of these mechanisms were later taken in Marrakesh in November 2001 at the meeting of COP 7.

To comply with the UNFCCC and the KP, countries are to regulate forest use and management by limiting harvesting and instituting immediate reforestation of logged areas with greater priority for carbon sequestration, regulate the production and use of forest products as well as the disposal of waste, regulate producers of GHG and promote investment in carbon sinks. Every country seeking to implement this must conduct and update inventories on emissions and removal of GHG including deforestation, plantations and forest regeneration, burning or decomposition of wood, develop programmes for mitigating the effects of climate change including measures in sequestration and sinks, promote emission reducing technologies, prepare sustainable management of sinks and reserves, prepare for adaptation to the impacts of climate change and develop appropriate plans for areas that could be affected by flooding, drought and desertification processes.[23] To be sustainable the projects must be consistent with national development priorities, strategies and any existing plans and targets for sustainable development.

23. A CDM Executive Board consisting of 10 members are appointed to approve proposed projects under the CDM and a number of rules have been established to apply to CDM projects in general. The advisory bodies within the COP, namely – Subsidiary Body for Scientific and Technological Advise (SBSTA) and the IPCC have been actively involved in preparing advice and guidance. The established rules and guidelines have been criticised because the definition for reforestation and afforestation are narrow and liable to eliminate many projects aiding forest rehabilitation, regeneration, revegetation and enrichment planting. Further, that there is no discrimination between small scale and large scale projects and in addition units may be pure, mixed or multi-purpose arrangements which may include different management systems such as forestry and farming.

In 2007, a new sense of urgency was injected into the United Nations climate change negotiations aftermath of the IPCC publication of its fourth assessment report. Parties at the end of the Conference in Bali, agreed to enhanced national and international actions including the consideration of measurable, reportable and verifiable nationally appropriate mitigation commitments or actions by developed countries, and nationally appropriate mitigation actions by developing countries that are parties to the Convention. Such developing countries are to be supported and assisted with technology, finance and capacity-building that is measurable, reportable and verifiable. Other subjects covered at Bali include the use of approaches that can enhance the effectiveness of mitigation actions including market mechanisms and the issue of reducing emission through curbing of deforestation and forest degradation in developing countries. Parties were also encouraged to support capacity-building and undertake efforts including demonstration activities to address drivers of deforestation in order to address the needs of local and indigenous communities who depend on forest resources for their livelihoods. All of these decisions that were adopted made up the Bali Road Map.[24] Regrettably, the accord reached at the

24. The UNFCCC SBSTA Five Year Programme of Work on Impacts, Vulnerability and Adaptation to Climate Change UNFCCC/SBSTA/2006/5 now renamed Nairobi Work Programme on Impacts, Vulnerability and Adaptation to Climate highlighted the need for action in the following priority areas for the coming five years – methods and tools, data and observation, climate modelling scenarios and downscaling, climate related risks and extreme events, socio-economic information, adapting planning and practices, research, technologies for adaptation and economic diversification. All these measures are to integrate the response to climate change into national risk strategies by requiring that specific programmes and projects include strategies and measures to manage risks arising from climate change variability and change and knowing that reducing GHG emissions will take many decades, it is necessary to help societies adapt themselves to the realities of changing and changed climate

Copenhagen Conference in Demark in 2009, did not further advance this cause.

It is significant to note that law making in relation to global issues is generally at one extreme managed by fully integrated institutions that impose regulations through comprehensive hierarchical rules and at the other end by a highly fragmented collection of institutions with no identifiable core or characterised by weak or non-existent linkages between regime elements. In between is a wide range that include regimes with identifiable core and non-hierarchical but loosely coupled institutions.[25] Consequently, in addressing climate change at international level, the use of law have been criticised as not capable of yielding sufficient meaningful result. Some of the arguments that have been put forward can be highlighted as follows:

(1) The first relates to the impossibility of agreeing an integrated comprehensive law on climate change. An integrated comprehensive regime is possible where there is a common objective to yield a single institution. Here, the

economies, production processes and technologies, livelihoods, consumption patterns, value systems, organisation and governance etc in order for the planet earth to be sustainable.. Adam, R. A. et al., "Economic Effects of Climate Change on United States Agriculture" in Mendelssohn R and J. E. Neumann (eds), *The Impacts of Climate Change on the United States Economy* (Melbourne: Cambridge University Press, New York, 1999). See also Elizabeth Kolbert, "A Reporters' Field Notes on the Coverage of Climate Change, Environment 360 @ *http://e360.yale.edu/content/feature. msp?1d=2130,* accessed September 2, 2010

25. It is increasingly recognised that mitigation and adaptation to climate change have become unavoidable as the precautionary principle and common sense of preservation makes mitigation and adaptation wise decisions. See Roger N. James et al., "The Relationship Between Adaptation and Mitigation in Managing Climate Change Risks: A Regional Response for North Central Victoria", Australia Mitigation Adaptation Strategies Global Change (2007) 12: 685 -712. The precautionary principle and common sense of preservation makes mitigation and adaptation wise decisions.

interest of all the actors must be similar across a broad issue area. In relation to climate change, however, the existence of conflicts between individual parties as a result of their different interest, power, information and beliefs results in fragmentation and is a major challenge for the achievement of a comprehensive regime. Further, international law making evolve through the process of converging expectations or tacit bargaining. The result is that international regimes vary in membership[26] leading to the existence of different forums which frequently leads to forum-shifting, abandoning organisation or pursuing the same agenda in more than one organisation. Therefore, there is always the dire need to link issues in related fora in order to achieve the objectives of the law. [27] Although the UNFCCC was designed to be universal in membership with the aim of thickening into a comprehensive regime, it invariably did not achieve this goal. What has emerged is a situation whereby world leaders have continued in their bid to construct institutions that will suit their purposes and interests. Structural interest diversity is inherent due to contemporary world politics, high uncertainty settings of climate change impacts and the varieties of problems that are addressed by regulatory action on climate change implying different tasks competing for pressing contemporary actions.

26. Institutional design may also favour fragmentation when patterns of interests shaped by beliefs, constrained by information and weighted by power diverge to a greater or lesser extent or when it is administratively difficult to create extensive links between distinct regulatory elements.
27. Keohane Robert O. and David G. Victor "The Regime Complex for Climate Change" Discussion Paper 2010-33, Cambridge, Mass,: Harvard Project on

(2) The second relates to the lack of effective implementing and enforcement authority. Both the Convention and Protocol have no effective implementing and enforcement authority. This loose arrangement is what a number of the Parties have consistently favoured.[28]

(3) Third criticism of law in addressing climate change at global level relates to the Protocol's heavy reliance on sinks and flexible mechanisms which were incorporated after the insistence of the United States and most of the OECD countries during negotiations. It is argued that the flexible mechanisms may lead to short-term results in that attention of parties may shift from the real focus of emission reduction to cost savings and investment gains.[29]

(4) There is also the challenge of the principle of territorial sovereignty pursuant to which a state can decide to act in only its best interest. It is in furtherance of this principle that a country like the United States has refused to ratify the Kyoto Protocol notwithstanding the fact that it is a major emitter of GHGs. This is a major obstacle to any meaningful progress in the fight against climate change using legal regimes.

(5) A fifth criticism is the existence of differences in the distribution of technology, natural and financial resources among and within nations and regions as well as differences to them in relation to mitigation and adaptation costs. These are important considerations in the analysis of climate change options and have raised serious challenge for the law on the extent to which nations should bear

28. This situation is referred to as the concept of Planetary Trust adjudged as the most realistic approach to solving climate change. See R. Nanda, "The Public Trust Doctrine: Viable Approach to International Environmental Protection" (1976) 5 Ecol, L.Q. 291.

29. F. Yamin, "Climate Change Negotiations: An Analysis of the Kyoto Protocol" (1998) 10 International Journal of Environmental Pollution 428.

obligations of the impacts of climate change and mitigation and adaptation policies.

Imperatives of an Effective Regulatory Scheme

The need for a regulatory framework to support mitigation and adaptation policies is very vital. As earlier indicated, the focus of law is to stipulate measures towards reducing causes of climate change and more importantly the most appropriate responses to climate change in case the predicted impacts manifest.[30] Already, there are identified and defined global measures that an effective regulatory framework must be able to respond to i.e. preparation of an inventory of sources and sinks of GHGs; elaborate assessment of potential impacts of climate change, analysis of potential measures to abate the increase in GHGs emissions and adapt to climate change; designing an action plan to address climate change and its adverse impacts; preparation of national communication to the COP; enhancing general awareness and knowledge on climate change and related issues and strengthening dialogue, information exchange and cooperation among the relevant stakeholders including government, non-governmental, academic and the private sector agencies.

In structuring any regulatory framework, there are two policy perspectives- technical policy design (that seeks to meet goals of efficiency, cost effectiveness and equity) and international / political economy perspective (that tempers technical perspective with the notion that states will only make, participate and comply with agreements that are in their own self interest). The best policy design is one that meets the combination of both technical policy decision and international political economy perspective.

30. Houghton, J. J *et al.*, *Climate Change 1995: The Science of Climate Change* (Contribution of Working Group 1 to the 2nd Assessment Report of the IPCC)(Cambridge: Cambridge University Press, 1996).

In this regard, the design rules of any framework must be incentive compatible in order to elicit on-going participation and implementation. The range of policies and agreements should be designed to be sensitive to political needs, promote cooperation, encourage changes in behaviour and be able to assess environmental effectiveness (on short-term, medium term, and long-term).

For Nigeria, as is the case with other countries, the impacts of climate change is beginning to manifest in the different phases of the economy Therefore, the need to strengthen mitigation and adaptation strategies has become an imperative. This will involve the development and mainstreaming of policies and measures that can address climate change in ongoing and new development policies, while also encouraging continuity of initiatives that are directed at reducing climate change-related risks.

An effective framework requires an enabling environment i.e. institutions with knowledge and skills which must prioritise[31] climate risks, and be imbued with capability for continuous improvement using appropriate indicators to monitor and review. It must have the capacity to address multi-layered environmental problems and factor in such critical components as individual lifestyles, business consensus, public opinion, market opportunities and environmental advocacy. It must also have a clear understanding of the two responses to climate change, namely mitigation and adaptation.

Understanding the Place of Mitigation and Adaptation

Mitigation is a response measure aimed at reducing GHGs emission into the atmosphere or enhance their sinks. The need for mitigation stems from the observations of the IPCC's work which stated that if no mitigation of GHGs emission is done, the

31. When you prioritise, you are able to make decision based on information, understanding and available technology, skills and methods.

negative effects of climate change will be difficult to reverse. Mitigation focuses on how to achieve renewable energy supply, develop fuel efficient vehicles, and design buildings in ways that will require less of energy use among others.

Adaptation on the other hand is a process whereby policies, actions and other initiatives are structured to minimise the effects of climate change. Thus, while mitigation primarily involves reduction in the concentration of GHGs, adaptation involves acting to minimise the effects of global warming Adaptation is often reactive i.e. induced by observed extreme weather events and their impacts. It requires international cooperation, risk management, risk reduction strategies and disaster reduction strategies including mechanisms such as insurance. The UNFCCC provides for adaptation in Article 4 and lists specific domains in particular need of adaptation. These are coastal zones, water resources, agriculture and areas affected by drought, desertification as well as floods. Article 8 complements the list with its reference to small island countries, countries with forest areas liable to forest decay, countries prone to natural disasters and countries with fragile ecosystems including mountain ecosystems.

Adaptation involves long-term measures that proactively analyse real and potential risks and prepare communities for expected and unexpected threats that may emerge. The significance of adaptation is underscored by the fact that climate change will still occur even when emission reductions have proved successful. Adaptation actions help to boost the resilience of the communities and the confidence and skills of those living within them so that they can better protect themselves against hazards. The objective of adaptation is to offset vulnerability.

In order to mainstream mitigation and adaptation, the regulatory framework must underscore the nature and content of the different governances of law which include issues like

imposition of obligations, partnerships, promotions and incentives to innovate and invest in new and cleaner forms of energy that will shape the economy mode towards a development pattern respectful to the environment. Also, realising that adaptation is inherently local as the direct impacts of climate change are felt locally, response measures must be tailored to local circumstances such that every stakeholder will be carried along. Furthermore, because climate change is connected with many aspects of economic development, the mainstreaming process must be embedded within broader developmental efforts and complemented by the effort of everyone.[32] It must cut across relevant sectors and sector policies and involve a broad range of players.

The following have been found as capable of mainstreaming practical mitigation and adaptation strategies:

1) Establishment of a national group to give focus to climate change initiatives;
2) Establishment of series of policies and measures to strengthen mitigation and adaptation. This includes ways of reducing GHG emissions and the development of renewable energy sources, supported financially and technologically to protect vulnerable people and places;
3) Establishment of long-term plans towards a shift in the national economic / industry base away from dependence on natural resources export and primary minerals to manufacturing and other value-adding activities;

32 For example, replacing one normal light bulb with a compact fluorescent bulb could result in savings of money. Money can also be saved by the production and promotion of environmentally-friendly biodiesel and bio ethanol fuels from crops such as soya, sunflower, sugar beet, maize, sorghum, wheat, sugarcane. See Lucky Khumalo, "Bio fuels to Power", Eastern Cape South Africa. Info @ *http://www.southafrica.info/business/investing/opportunities/biofuels-080307.htm,* accessed September 2, 2010.

4) Development of new strains of drought –resistant crops livestock that are better suited to changes in farmi conditions;
5) Evolvement of new technical and social standards for t siting of human settlements and the construction individual dwellings to maintain ambient temperature a humidity with minimum energy consumption per capita;
6) Institutionalisation of behavioural changes in the directi of greater energy efficiency, water conservation a greater social valuation of natural ecosystems; and
7) Emphasizing win-win opportunities[33] for both econor recovery and the environment. For instance, in development of cleaner technologies,[34] policies wh support economic and social development innovation su as job creation, the provision of basic amenities a infrastructure development, the reduction of poverty a the provision of housing are most appropriate.[35]

33. Some of the win-win policies are removal of subsidies in fossil fuel b energy production and consumption. This would reduce GHG emissions w increasing the efficiency of the economy. Also, cutting trade barriers to clim friendly goods (e.g. on energy efficient equipment technologies for genera electricity, energy efficient light bulbs), addressing market failures that pre improvements in the energy efficiency of buildings and transport systems (through building codes and household electrical appliances) and embrac policies that could achieve given environmental objectives more cost effectiv
34. E.g. wind power turbines, low carbon transport and energy systems, "sm electricity grids and energy efficiency buildings.
35. These priorities are compatible with the principle of sustainable developmen defined in the Rio Declaration of 1992. The objective is to create a syne between national government objectives, sustainable development and clin change in order to include climate change issues in sustainable polic indicators and criteria. The process calls for holistic screening and examina of projects and proposals to ensure they promote national developn objectives while serving climate change prevention orientation.

Further, by way of practical example, a price can be placed on carbon emissions to encourage greater efficiency in the use of energy.[36] The diversification of energy mix is also encouraged by investment in lower carbon emitting technologies as they become available and meet feasibility requirements. For the transport sector, the highway networks are modernised to accommodate systems such as mass rapid transport systems[37]. In the area of agriculture, conditions to adapt are appropriately supported by government strategies aimed at autonomous and planned adaptation.[38] Focus is also on critical factors such as water management (including new dams, distribution channels and irrigation strategies) and new crops adapted to stress factors.

Adaptation can be undertaken at the community level by using seed varieties and technologies, adjusting times of sowing and harvesting and moving spatially. A reduction of reliance on industrialised mono-cropping and diversification of the range of crops will ultimately reduce vulnerability and potentially reduce

36. Price based approaches such as carbon taxes and auctioned permits in cap-and-trade schemes can also help to bring revenues. Energy efficiency depends on the type of fuel used and the characteristics of particular appliances. Potential energy savings can be achieved from the use of available efficient technologies for cooking, heating, lighting, electrical appliances and building insulation. Attempts must be made to get them available at the cheapest costs. Also, energy efficiency should be encouraged in the activities which have tax implications in order to reduce harmful emissions while incentives should be introduced for investments in energy efficient equipment.

37. Implementing a transport sector mitigation programme requires the control of exhaust emissions as the transport sector is the most rapidly growing source of GHG emissions due to the extensive use of synthetic fuels. There is need for urban and semi-urban planning to improve public transport system significantly enough to retain more commuters through public transport initiatives e.g. the introduction of BRT buses initiative of Lagos State.

38. Autonomous adaptation is the reaction to changing precipitation patterns e.g. changing crops or using different harvest and planting / harvesting dates while planned adaptation measures are conscious policy options or response strategies often multi -sectoral aimed at altering the adaptive capacity.

irrigation needs.[39] In the health sector, adaptation can also be undertaken by encouraging health protection and health promotion measures,[40] water resources management and contingency plans.[41] Adaptation in forestry require changes in forestry practices e.g. genetic engineering could be used to develop more heat and drought resistant hybrids which will allow the forestry industry to counter the threat of climate change and maintain current production areas. Also, community based forestry and use of indigenous species and knowledge which has demonstrable benefits can be encouraged and incorporated. For plant biodiversity, existing plant covers are being managed using sensitive indicator species to serve as warning entities, while for animal biodiversity, species inventory are being established with distribution monitoring networks. Potential detector species aid to indicate point of departure and highlight areas that are most vulnerable.[42] In the area of land use, national policies that can

39. Julia Laukkonen et al., "Combining Climate Change Adaptation and Mitigation Measures at the Local Level" Habitat International 33 (2009) 287 – 292. Adaptation strategy in agriculture includes change in topography of land, use of artificial systems to improve water use / availability and protect against soil erosion, change farming systems and timing of farming operations, use of different crop varieties, conservation tilling, furrow dying, terracing, contouring and planting vegetation act as wind breaks and protect fields from water and wind erosion. In soil and land management, a key element is soil organic matter which improves and stabilises the soil structure which ensures that the soil can absorb higher amounts of water without causing surface run-off in order to maintain permanent soil cover.
40. E.g. monitoring and forecast systems to warn of disease outbreaks as well as treatment facilities.
41. Flexibility in water use allocations, water demand management and conservation measures.
42. For biodiversity, the concept would need to build in resilience in ecosystems, coherent ecological networks, large reserve areas, connectivity and ecological models to predict shifting ranges of species. Therefore, all its components- genes, species and ecosystems has to be considered in order to increase resilience to changing environmental conditions. This can be done with the use

guide sustainable development and efficient allocation of land use in an open and transparent manner are being developed. This is of particular importance in hosting CDM projects because investors would like to minimise their risk by being assured that the project will be rewarded if the land allocation system is efficient and transparent.

In addressing climate change, there clearly must be a synergy between mitigation (which is global and long-term) and adaptation (which is local and short-term involving major structural changes) as different activities have various blends of mitigation and adaptive capacity. Both mitigation and adaptation manage different components of climate related risks. The challenge[43] is to put in place the right incentives within the right regulatory frameworks. Whichever way one looks at it, ambitious climate change regulatory frameworks are achievable and affordable compared to the costs of inaction. What is required is the appropriate linkage of all government sectors and the total involvement of the private sector and NGOs. The regulatory framework must also meet the standards of coherence, effectiveness, determinacy, sustainability, accountability and epistemic quality to effectively address the issue of climate change. The starting point is to conduct a comprehensive assessment of existing policies and their relative effectiveness to guide the design and development of future policy programmes. The key challenges that will be faced in mainstreaming mitigation

of indigenous and locally adapted plants and animals, and multiplication of crop varieties with tolerance to biotic stresses.

43. Harrison, P.A. *et al.*, "Modelling Climate Change Impacts on Wheat, Potato and Grapevine in Europe" in Downing et al (eds) *Climate Change, Climate Variability and Agriculture in Europe: An Integrated Assessment, Research Report No. 21* (Oxford: Environmental Change Institute, University of Oxford, 2000) 367. See also, Shaun Benton, "South Africa Adopts 'bold' Climate Change Policy" South Africa Information July 30, 2008 @ *http://www.southafrica.info/about/sustainable/climate-300708.htm,* accessed September 5, 2010.

and adaptation policies into development planning, policy and investments can be outlined as follows:

1) Absence of a unified vision and approach;
2) Lack of understanding of the challenges of climate change at different levels of government;
3) The issues related to climate change are plagued with substantial uncertainties making mitigation and adaptation strategies difficult to sell[44];
4) Lack of comprehensive and localised risk and vulnerability assessments;
5) Absence of coherent research programmes to identify and describe impacts associated with near term, long term and abrupt global climate change;
6) Absence of organised and coordinated efforts across local, state and federal agencies as well as absence of a strong link between indigenous communities and other local partners;
7) Absence of strategies for evaluating and applying lessons learned;
8) Limited availability of reliable, useful and usable climate information. In planning for adaptation, information is very critical as such there must be capacity and resources to track meteorological patterns, forecast impacts and assess risks in order to target investments and develop policies that can reduce vulnerability.[45] Africa of which

44. The fact that we have partial knowledge of future climate change is itself a challenge.
45. There is need for knowledge generation and capacity building in order to use climate information and adaptation best practices for further climate risk management. This entails the building of climate information systems, support negotiating capacities to post-KP discussions especially in the area of tapping into new available resources and benefits.

Nigeria is a part is believed to be the world's lowest density of meteorological stations with one site for every 25,460km.[2] This is one- eighth of the minimum level recommended by the World Meteorological Organisation (WMO). In contrast is a country like Netherlands that has one site for every 716[2]. (This is four times above the WMO minimum;

9) Post institutional capacities to provide competent Climate Change Risk Management and Adaptation (CRMA) and champion long-term adaptation – Exposure to risk is sometimes a function of post human development and current public policy and institutional capacity.[46] Same event can produce different outcomes in different countries due to governance problems, low levels of finance and a limited disaster planning and response capacity by public agencies. Two institutional problems to mainstreaming CRMA into developmental processes are lack of appropriate institutions at all levels and chronic dysfunction of existing institutional arrangements;[47]

46. Studies have linked poverty to lack of sustainable adaptive capacity. There is need to ensure progress towards eradication of poverty by reducing vulnerability and promoting climate resilience in development investments.

47. The guiding principles in CRMA strategy is strengthening internal capacity and undertaking comparative approach in collaborations in order to draw lessons to ensure that it is aligned to the strategies in the national development plans. The states have to be integrated by extensive cross-state collaboration and monitoring in the interest of protecting global, national and state policy goods. Also, in order to provide adequate support and maximise knowledge generation, there is need to build synergies with the intervention of other agencies, private sector, Non-governmental organisations and civil society organisations. This way collaboration, harmonisation and the distribution of labour with a range of developmental partners will be achieved in dealing with long-term trends of adaptation which are beyond the capacity of any single bilateral, multi-lateral and non-governmental agreements. Also, pilot projects can be launched with the potential to affect future emissions. To achieve these, there must be climate-proofing of investments in order to ensure that investments are implemented as planned by adapting infrastructural facilities to be more resilient to climate

10) Limited integration among sectoral agencies – Climate change affects wide-ranging sectors as such, it is important to engage relevant agencies at all levels from national to local. Many sectoral agencies operate in isolation and it is not uncommon to find more than one agency being responsible for specific responsibilities making the integration of climate change planning difficult;

11) Limited financial resources – Finance poses one of the greatest limitations to management of climate risks and adaptation and the ability to mainstream them into national development planning. Estimates of costs are usually tentative depending on the climate change scenario and how ambitious the adaptation regimes are expected to be. A list of donor agencies with specific donor country interests and potential funds available must be maintained;[48]

12) Lack of due diligence procedures – There is need for due diligence procedures comprehensively to incorporate climate change risks and to pay attention to multiple vulnerabilities. This will culminate into environmental

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change through designing, construction, operating and maintaining them to serve under such changed conditions. This calls for policy and legal reforms in many areas e.g. in the area of land degradation to promote afforestation and sustainable land practices, development of land tenure reforms, fishery sector regulation, climate risk insurance, establishing anti-pollution standards for rivers, basins and lakes as well as strengthening trans-boundary cooperation in the management of fresh water resources. It should be extended to strengthening regulatory over-sight over extractive industries particularly in the case of oil and gas and precious stones industries and include strict monitoring of the industries to ensure compliance with international safeguards, standards and codes.

48. The UNFCCC created in addition to existing Global Environment Facility (GEF) Trust Fund, the Special Climate Change Fund (SCCF) and the Least Developed Country Fund (LDCF) to provide funding to assist developing countries that are particularly vulnerable to the adverse effects of climate change in meeting the costs of adaptation to those adverse effects.

climate and social impact assessment guidelines which will ensure that project endorsement is given on the grounds of non-duplication, economic and social benefits and overall feasibility according to the severity of the required adaptation;

13) Absence of strong political will on the part of government to fight climate change - Many countries view climate change as a serious problem that must be addressed but national support by government does not always translate into concrete action. The greatest challenge here relates to the dichotomy between developed and developing countries. Developing countries are not under obligation to meet specific targets, while the industrialised countries want to reduce emissions in the most cost effective way. The difficulties in underlying interests pose a difficult diplomatic issue.

Despite the above enumerated challenges, mainstreaming of mitigation and adaptation strategies will create substantial opportunities. First, much of the accumulated rich and extensive indigenous knowledge of local communities which have been used in dealing with climate change over the years would be improved upon. Secondly, developing countries with clear vision and who understands what they are doing are likely to enjoy goodwill from the international community in addressing climate change in relation to the threats faced. Third, there is opportunity for green development by charting a sustainable path towards a low carbon development.[49]

49. E.g. outlawing development at certain areas in order to avoid huge impact - see Jekwu Ikeme, *Climate Change Adaptation Deficiencies in Developing Countries: The Case of Sub-Saharan Africa* (Kluwer: Academic Publishers, 2003).

The Need for a Viable Institutional Structure

Implementing an effective regulatory framework requires appropriate institutional arrangement within national government departments set-up to address climate change issues. The appropriate institution must possess the requisite capacity to carry out their assigned functions such as proper procedure for registration, coordination and reporting. The functional operational component starts with the Ministry of Environment as the national focal umbrella point assisted by other administrative bodies or agencies (working groups) to interface with international institutions and engage in international negotiations regarding policy analysis, capacity-building and technical support. Such an institution must also be able to coordinate with other government departments, industry, NGOs, and research institutes.

Among others, an appropriate institutional framework must be able to deliver on the following:

1) Facilitate the development of CDM proposals for approval;
2) Perform a comprehensive technology need analysis that builds on and integrates existing knowledge;
3) Set-up a data base of climate change related research, development and demonstration projects;
4) Extend health protection and promotion measures to counter climate change impacts;
5) Develop and maintain an investment friendly climate to attract developed country partners to invest in climate change related projects;
6) Develop protection plans for plants, animal and marine biodiversity;

7) Accelerate the process of education, training and awareness of climate change and its impacts to speed up the implementation of response actions;
8) Ensure the cooperation and buy in of all stakeholders to climate change response to facilitate a coordinated national programme;
9) Harness the efforts of all stakeholders to achieve the objectives on renewable energy and the energy efficiency strategy to promote a sustainable development path through coordinated government policy;
10) Implement sustainable industry development through coordinated policies, strategies and incentives;
11) Accelerate water resources management and contingency planning;
12) Adapt agricultural, rangeland and forestry practices appropriately;
13) Maintain appropriate attendance at UNFCCC and related meetings;
14) Sharpen the connection between project activities and climate change vulnerability and change;
15) Strengthen monitoring of and reporting on mainstreaming climate change;
16) Strengthen support to policy and other reform interventions related to climate change;
17) Set a time frame for action with specific achievable milestones and responsibility to formulate appropriate national policies and measures for climate change action and implementation;
18) Integrate science into decision-making, improving information about risks and opportunities, enhancing communication and capacity building among relevant stakeholders, defining process of coordination and collaboration among stakeholders, identifying priorities for

a coordinated government response, promoting flexibl framework that will enable government and entities t understand, analyse and respond to climate change and commitment to dynamic engagement, interactiv understanding of results and rigorous evaluation.

Furthermore, a viable institutional structure must also ensu that implementation strategies are guided by the followin principles:

1) Ensure that the strategy is consistent with nation development priorities including poverty alleviatio access to basic amenities including infrastructu development, job creation, rural development, foreig investment, human resource development and improve health leading to sustainable economic growth;
2) Ensure alignment with the need to consistently use locall available resources;
3) Ensure compliance with international obligations;
4) Recognise that climate change is a cross-cutting issue th demands integration across the network of programmes several government departments and stakeholders, ar across many sectors of industry, business and t community;
5) Focus on areas that promote sustainable development;
6) Promote programmes that will build capacity, rai awareness and improve education in climate change relate issues;
7) Encourage programmes that will harness existing nation technological competencies;
8) Recognise that Nigeria's emissions will continue increase as development is realised; and

9) Ensure that the strategies are such that can constantly be reviewed in the light of national priorities and international trends.

Conclusion

Climate change is at the moment the most important menace to earth's biodiversity, natural resources, agriculture and access to food, poverty eradication and water availability. The increasing threats to livelihoods and poverty reduction have reinforced the need for management of risks as well as proactive actions in addressing climate change issues. Presently, the existing legal and institutional framework for regulating climate change is in a fragmented form. There are several incoherent laws and implementing agencies for environmental protection in relation to climate change. The lack of infrastructure for regular monitoring and enforcement and the non-deterrent nature of penalties for violations are critical challenges.

Addressing climate change is beneficial, both financially and economically and fighting it through global concerted effort makes sense. This is why nations and governments are expected to make the best possible use of the different available tools. The role of law is very critical in meeting commitments and actions to mitigate GHG emission and adapt to its effects if progress is to be made globally in addressing climate change. The nature and content of an effective and implementable regulatory framework is the focus of this paper. From what we have seen, the challenge is complex but solving it is unavoidably the responsibility of all.