THE RISKS OF CLIMATE CHANGE INDUCED INTER-STATE CONFLICT OVER THE WATER RESOURCES OF THE NIGER RIVER BASIN OF WEST AFRICA

BY

DAIYABU MUHAMMAD HASSAN
BSc. (UJ), MSc (ABU)
(PHD/SOC-SCI/10011/2007-2008)

DISSERTATION SUBMITTED TO THE SCHOOL OF POST-GRADUATE STUDIES AHMADU BELLO UNIVERSITY, ZARIA IN PARTIAL FULFILMENT OF THE REQUIRMENTS FOR THE AWARD OF THE DEGREE OF DOCTOR OF PHILOSOPHY IN POLITICAL SCIENCE

OCTOBER, 2014

DECLARATION

I declare that the work in this Dissertation entitled: The Risks of Climate Change Induced Inter-State Conflict over the Water Resources of the Niger River Basin of West Africa has been carried out by me in the Department of Political Science and International Studies. The information derived from the literature has been duly acknowledged in the text and a list of references provided. No part of this Dissertation was previously presented for another degree or diploma at this or any other Institution.

Daiyabu Muhammad Hassan

Name of Student Signature Date

CERTIFICATION

This Dissertation entitled: The Risks of Climate Change Induced Inter-State Conflict over the Water Resources of the Niger River Basin of West Africa by Daiyabu Hassan MUHAMMAD meets the regulations governing the award of the degree of Doctor of Philosophy in Political Science of the Ahmadu Bello University, and is approved for contribution to knowledge and literary presentation.

Prof. P. P. Izah
---------- ----------
Chairman Supervisory Committee (Signature) Date

Prof. K. Omojuwa
---------- ----------
Member Supervisory Committee (Signature) Date

Dr. U. M. Ka'oje
---------- ----------
Member Supervisory Committee (Signature) Date

Dr. Yusufu Yakubu
---------- ----------
Head of Department (Signature) Date

Prof. Hassan Zoaka
---------- ----------
Dean School of Post Graduate Studies (Signature) Date

DEDICATION

This work is dedicated to the memory of my late father and to my mother, my wife and my children.

ACKWOLEDGMENTS

First my gratitude is to Allah for everything. Secondly I owe the team of my supervisory committee a huge debt of gratitude. The chairman of the committee; Prof. P. P Izah has been more than a supervisor to me; he has not only guided me, but he encouraged and motivated me from the start of the work to end. Only Allah can reward him. Also Prof. Kayode Omojuwa encouraged and guided me all through, I am very grateful for all his help. The same goes to Dr. Umar Ka'oje who was very supportive during his Headship and afterwards; I owe him many thanks. My gratitude also goes to all members of my family. The love and constant prayers of my mother kept me going, my brothers and sisters; Yaya, Sani (Dan'Azimi), A'isha, Binta, Mal. Isa, Salihu, Maijiddah, Hajara, my uncles and aunties late Alhaji Idi, Alhaji Muhammadu, Mal. Aminu, Mama Talatu, Ladi, Ashafa Garba and the numerous cousins, nephews and nieces, may Allah reward you for your love and supports.

I am also very grateful to all members of staff of the Department for their supports and encouragements. Particularly, I must mention the encouragements and supports I received from Prof. Ayo Dunmoye, Prof. Ejenbi Unobe and especially the prayers and motivation I got from Dr. Isma'ila Shehu who not only kept me on my toes but alohas been very kind and supportive all through, may Allah reward him abundantly. The same goes to the H.O.D Dr. Yusufu Yakubu for immeasurable support, Dr. Saddiq Muhammad from whom I also received a lot of help and also to Dr. Isah Mohammed Abbass, Dr. Muhammed Faal for his constructive criticisms and guidance. Many thanks also go to the former Head of Department Dr. Hudu A. Abdullahi, Mal. Sa'idu Adamu, Mal. Garba Aminu, Dr. Edgar Aguabamah.

Habibu Bappah, Mal. Tanko Umar, Dr. Aliyu Yahaya, Dr. David Moveh, Malama Halima Adamu, Ms Rahila Yakubu and all the remaining members of staff too numerous to mention here both academic and non-academic, thank you all.

I must also mention the help and cooperation I received from the Executive Secretary of the Niger Basin Authority, Major General Collins Ihekire (rtd) and all the staff of the Authority. Particularly I am thankful to Mohammed Umate for making my stay in Niamey a memorable one and for his readiness to attend to me at any time I need help. Also, the help of Alhaji Ibrahim M. A. Kusfa, Mr. Drissa Naman Keita, Mr. Ibraheem Olomoda, Dr. Henri-Claude Enoumba, Dr. Abdou Guero, Engineer Dessouassi Y. Robert, Mr. Habibou Liman, Mr. Gerard Kabore, Ms. Ramatou, Mal. Rufa'i (the driver) and several others, I am very grateful for the help they rendered. To my research assistants particularly Laouali Elhadji Abdou (our former student) and Assao Bachir I am very grateful for their help. I am also thankful to Prof. E.M Abdurraham, Dr. Khalid Aliyu (JNI), Prof. Sani Usman Kunya, Prof. Lawal Aminu, Prof. Sule Bello, Mal. Tanimu Haruna, Mal. Dalhatu Yola, Mal. Aliyu Dalhatu, Mal. Abdulqadir Bala, Abbass Ibrahim (Sabbas) and others which the limited space here will not allow me to mention for the encouragements I received.

Last but not the least is my wife Zahatu, without her this journey would have been almost impossible to accomplish. Her love, patience, constant prayers and support gave me the energy to carry on; words cannot express how grateful I am. The same goes to my lovely children Zainab (Mama), Mariya (Hajiya), Maryam, Hafsatu, Ummu-Salma and Muhammad Muntasir for their patience and constant prayers may Allah bless you all.

TABLE OF CONTENT

Title Page----------i

Declaration----------ii

Certification----------iii

Dedication----------iv

Aknowledgements----------v

Table of Content----------vii

List of Figures, maps and tables----------xii

List of Appendices----------xiii

Abbreviations----------xiv

Abstract----------xvi

CHAPTER ONE: GENERAL INTRODUCTION

1.1 Background----------1

1.2 Statement of the Research Problem----------5

1.3 Objectives of the Study----------8

1.4 Propositions----------9

1.5 Justification and Significance of the Study----------9

1.6 Focus and Scope of the Study----------10

1.7 Limitations of the Study----------11

1.8 Definitions of Key Terms and Concepts----------11

1.9 Organization of the Study and Chapter Summary----------15

CHAPTER TWO: LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 Introduction----------17

2.2 The 'Securitization' of Environmental Challenges----------18

2.2.1 The Concept of Human Security----------24

2.2.2 The Concept of Environmental Security----------29

2.2.3 Criticisms of the Concept of Environmental Security----------30

2.3 Global Concerns on the Link between Water Scarcity and International Water Conflicts----------33

2.4 The Origin of Hydropolitics Research----------38

2.4.1 The Empirical Literature on Some Specific Case Studies----------42

2.5 Critique of the Literature----------44

2.5.1 Shortcomings in the Two Main Research Perspectives on Water and International Conflict----------47

2.6Theoretical Framework----------56

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction----------61

3.2 Research Design----------62

3.3 Construction of the Instrument of Data Collection----------66

3.4 Validity of the Instrument----------67

3.5 Types and Sources of Data----------71

3.6 Pre-field Preparation----------71

3.6.1 Recruitment and Training of Research Assistants----------71

3.7 Data Collection ----------75

3.7.1 Challenges Encountered in the Process of Data Collection----------76

3.8 Method of Data Analysis----------77

CHAPTER FOUR:

THE CLIMATE SCIENCE DEBATE AND THE PROTRACTED NEGOTIATIONS ON THE REDUCTIONS OF GREENHOUSE GASES EMISSIONS

4.1 Introduction----------78

4.2. The Science of Climate Change: The Issues Contention ----------80

4:3 Global Negotiations on Reducing the Emissions of Greenhouse Gases----------90
4:3:1 The Kyoto Protocol----------92

4:4 Implications of the Protracted International Climate Negotiations on the Water Interactions of Niger River Basin Countries----------96

4:4:1 Climate Change and Water Security in West Africa----------97

CHAPTER FIVE:

OVERVIEW OF THE RIPARIAN STATES, THE WATER CHARTER AND THE CONVENTION ESTABLISHING NIGER BASIN AUTHORITY

5.1 Introduction----------100

5.2 The Physical Geography and Hydrological Zones of the Niger Basin----------101

5.3 Profiles of the Riparian States of the Niger River Basin----------105

5.3.1 Vulnerabilities and Capacities of the Riparian States----------111

5.4 The Niger Basin Water Charter----------112

5.4.1Overview of the Niger Basin Water Charter----------113

5.5 The Establishment of the Niger Basin Authority----------115

5.5.1 Post Colonial Development: The Establishment of the Niger Basin Commission---------116

5.5.2 The Convention Establishing the Niger Basin Authority (NBA) ----------118

5.5.3 The Structure of the Niger Basin Authority----------120

5.6 Assessment of the Niger Basin Legal Instruments----------122

CHAPTER SIX:

DATA PRESENTATION, ANALYSIS AND FINDINGS

6.1 Introduction----------125

6.2 The Impacts of Climate Change on Rainfall and River Discharge over the Niger River Basin----------126

6.3 Responses of the Riparian States of the Niger River Basin----------129

6.4 Comprehensiveness of the Niger Basin Water Charter----------131

6.5 Climate Change Projections and the Trends in Water Availability over the Niger River ----------135

6.6 Competitions over the Water Resources of the Niger River Basin and the risks of inter-riparian Disputes and Conflicts----------140

6.7. Findings----------147

CHAPTER SEVEN: SUMMARY, CONCLUSION AND RECOMMENDATIONS

7.1 Introduction----------148

7.2Summary----------149

7.3Conclusion----------153

7.4 Recommendations----------155

REFERENCES----------158

LIST OF FIGURES, MAPS AND TABLES

Table 2.1 A 2/2 matrix of security studies----------27

Table 3.1The procedure for developing the research instrument----------69

Table5.1 Countries and their land areas in the Niger Basin---------- ----------105

Fig. 3.1 Model of Climate Change Induced conflict over Shared/international Water Courses--63

Fig. 6.1. Decadal rainfall record at the Kolikoro observatory station in (Mali) from

1950-2000---------- 127

Fig. 6.2. Hydrograph of 1945-2005 decadal rainfall ----------128

Fig. 6.3. Comparative hydrograph at Koulikoro (Mali) ----------137

Fig. 6.4. Comparative hydrograph at Dire (Mali) ----------139

Fig. 6.5. Comparative hydrograph at Niamey (Niger Rep.) ----------140

Fig. 6.7. Comparative hydrograph at Lokoja (Nigeria) ----------141

Map 1-showing the areas of the Niger Basin----------101

Map 2- showing the tributaries and land areas of the Niger Basin----------104

Map 3- showing the riparian states of the Niger Basin----------110

Map 4- showing the Member countries of the Niger basin Authority----------117

LIST OF APPENDICES

APPENDIX 1 Letter of permission from the NBA----------168

APPENDIX 2 Summary of fieldwork activities ----------169

APPENDIX 3 United Nations Framework Convention on Climate Change-UNFCCC 1992---172

APPENDIX 4 The Kyoto Protocol----------202

APPENDIX 5 The Water Chater and Convention of the NBA----------230

APPENDIX 6 Summary of Data on Surface and Ground Water in the Niger basin----------276

APPENDIX 7 Interview with NBA's Technical Director (Dr. Abdou Guero)---------- ---280

APPENDIX 8 Interview with the Head of NBA's Observatory (Engineer D. Y. Robert)-- ----282

APPENDIX 9 Interview with the Head of NBA's Planning and Studies (Dr. H. C Enoumba)-284

APPENDIX 10 Interview with an NBA's Hydrologist (Ibraheem Olomoda) ----------287

APPENDIX 11 Interview with the Legal Advisor of the NBA (Mr. Drissa N. Keita)----------289

APPENDIX 12 Interview with the Executive Secretary of the NBA (Maj. Gen. C , Ihekire)---295

APPENDIX 13 Letter of the Nigerian Minister of Environment to the ES of the NBA----------298

ABBREVIATIONS

AGHYMET- AGrometeology, HYdrology, METeorology

AR4- Forth Assessment Report

AU- African Union

CO2- Carbon-Dioxide

COP- Conference of the Parties

ES- Executive Secretary (of the Niger Basin Authority)

ECOWAS- Economic Community of West African States

FAR- First Assessment Report (of the Intergovernmental Panel on Climate Change-IPCC)

GE- Greenhouse Effect

GHG- Greenhouse Gas

HS- Human Security

ICJ- International Court of Justice

ILA- International Law Association

IPCC- Intergovernmental Panel on Climate Change

KP- Kyoto Protocol

LBC- Lake Chad Basin Commission

NBA- Niger Basin Authority

NBC- Niger BasinCommission

NPCC- Nongovernmental Panel on Climate Change

PRB- Population Reference Bureau

SAR- Second Assessment Report (of the Intergovernmental Panel on Climate Change-IPCC)

TAR- Third Assessment Report (of the Intergovernmental Panel on Climate Change-IPCC)

TCCR- Tydall Centre on Climate Research

UN- United Nations

UNCED- United nations Conference on the Environment and Development

UNCHE- United Nations Conference on Human Environment

UNDP- United Nations development Programme

UNEP- United Nations Environmental Programme

UNFCCC- United Nations Framework Convention on Climate Change

WMO- World Meteorological Association

ABSTRACT

Climate change has been recognized as one of the most important global challenges of the 21st Century in several ways: climate change poses threats to the availability of environmental resources like cropland and water which sustain the livelihoods of billions of people across the world. According to the reports of the Intergovernmental Panel on Climate Change, West Africa is one of the regions that are highly susceptible to the impacts of adverse climate change (translated as big increases in the intensity and frequency of extreme events like droughts and floods). This is in addition to the recognition by the UN that water will become the critical resource of the twenty-first century due to growing demands in many regions in the world. Given the presence of nearly all the conditions that engender transboundary water conflicts in West Africa, there is therefore the risk of climate change induced disputes arising from competitions to have greater access to/and control of the water resources of the Niger River Basin between the riparian states. Our work attempts to assess and analyse these risks. The theoretical arguments of the two main research perspectives on water and international conflicts (i.e. the Realist/water war/neo-Malthusian perspective and the Liberal Institutionalist/ Water Cooperation/Cornucopian perspective) are both persuasive and also suffer from some important shortcomings. Consequently, in order to eliminate these limitations and to have a comprehensive assessment of the risks of climate change induced inter-riparian conflicts over the Niger River basin, the environmental conflict model as represented by Nils P. Gleditsch was adopted and modified Both primary and secondary sources of data were used and the interpretation of the data was done qualitatively. In conclusion, the study has highlighted the significance of the climate change factor as an important threat to the livelihoods of millions of people in the Niger basin area and consequently a threat to the stability of the West African sub-region. The findings reveal that the climate change factor has generated anxiety and consequently triggered competition to secure greater access to/and control of water resources between the riparian states of the Niger River basin. Secondly, the treaty rules that govern the behavior of the riparian states of the Niger River basin (as currently constituted) are not comprehensive and therefore cannot prevent the onset of disputes if the current trends of global warming, climate change and the decline in water availability continued in the basin.

CHAPTER ONE

GENERAL INTRODUCTION

1.1. BACKGROUND

The problematic of this study emanates from two major global concerns. The first was the realization by some international institutions particularly the United Nations Organization and the World Bank that, because of growing demands water will become the critical resource of the twenty-first century, and may well generate conflicts between some states that share international watercourses in the coming decades in many regions of the world. The second was the warning statement issued by some climate scientists, particularly the group of scientists that produced the reports of the Intergovernmental Panel on Climate Change (IPCC), that the globe is warming; climate change is happening and that unless the emissions of the greenhouse gases that are responsible for global warming are cut and stabilized at certain levels (especially carbon-dioxide CO_2), climate change will generate environmental resources security challenges, like the depletion and scarcity of water and cropland among other consequences in many regions across the globe including the West African sub-region. Although the two trepidations are separate, they have a common underlining denominator; that environmental security problems have international security implications.

West Africa is one of the regions that are regarded as highly vulnerable to inter-state disputes and conflicts over transboundary water resources. According to Niasse (2005)- a leading expert on West Africa's transboundary water issues, the region is predisposed to international water disputes and conflicts due to its peculiar characteristics. There are 25 transboundary water

courses in West Africa shared by two or more countries; with a very high water dependency ratio, for example Niger Republic has about 90% water dependency ratio. Water dependency ratio is defined as the share of a country's total renewable freshwater that is generated outside its borders (Niasse: 2005: 4). According to Libiszewski (1999), a dependency of 30 per cent is high, especially in regions that experience water shortages (Libiszewski: 1999: 120). The major international basins of the region are the Lake Chad basin, Niger River basin and the River Senegal basin. Nine countries share the water resources of the Niger River basin; Benin, Burkina Fatso, Cameroon, Chad, Cote d'Ivoire, Guinea, Mali, Niger and Nigeria (though the main river passes through only five of them).

In addition to vulnerability due to physical characteristics, West Africa also has one of the highest rates of population growth in the world. The Population Reference Bureau report of 2012, states that the population of West Africa will reach 450 million people by the year 2025. By the year 2050, it will hit 774 million people (PRB 2012). If these projections of population increase for West Africa become manifest then it will necessarily lead to greater demand for water in the region in the coming decades.

Yet again, majority of the countries in the region are big importers of food, especially rice (Lançon and Benz: 2007) the region's growing staple food. And given the volatility of the prices of commodities like rice in the international markets, (due largely to the activities of speculators and partly due to export restrictions by the surplus producing countries), it is highly likely that, with growing population the subsidies which some governments in the region are providing for the importation of such commodities will become increasingly unsustainable. This will spur the

quest to attaining food security through food sufficiency by the states in the region and one strategy which would most certainly be adopted is shifting food production from the traditional rain-fed agriculture to the more reliable irrigation agriculture. This indicates further the likelihood for increase demand for water and the quest for greater water security by the states in the region.

As alluded to above, the Intergovernmental Panel on Climate Change, (IPCC Assessment Report 4 -AR4), indicate that West Africa is one of the regions that are at high risk of adverse climate change, based on projections that there will be big increase in ecological events in the region due to climate change. The projection by the IPCC on West Africa is supported by the forecasts of other reputable organizations such as the United Kingdom Met Office's, Hadley Centre, 2010 (Heinrigs: 2010: 13-15), which suggests that, there is the high probability that the West African sub-region will face severe impacts of climate change based on models' projections of global warming trends; which could generate environmental resources security challenges in terms of big increases in ecological disasters that could consequently aggravate environmental resources scarcity problems in the region. On the one hand, this indicates that climate change is an ominous threat to the availability of water resources in West Africa, and on the other hand climate change is a source of fear and uncertainty. And unlike demand induced scarcity because of population increase, which can be fairly accurately projected, the impacts of climate change on environmental resources as climate scientists pointed out, is difficult to predict.

However, the global efforts through the international climate change negotiations under the auspices of United Nations Conference of the Parties (COP) of the United Nations Framework Convention on Climate Change (UNFCCC), that are expected to bring about the cutting down of

the emissions of the greenhouse gases that cause global warming appears to be protracted. Yet, the emissions of these gases are said to be increasing globally. In other words, the trend towards the dreaded global warming and irreversible climate change which some climate scientists warn against is becoming more likely by the day.

In addition to these conditions, the region's capacity to mitigate and/or cope with the effects of climate change can be described as weak. Some studies that assessed the socio-economic and security environment of West Africa indicate that, majority of the countries in the region are poor and fragile. For example the UNDP Human Development Report 2011 shows that, the region still retained the position of being home to the largest concentration of the poorest countries in the world; of the 187 countries on the 2011 ranking list, five of the bottom seven are in West Africa (UNDP/HDR 2011:184).

Furthermore, many of the states in the region are prone to instability and in some cases the states are characterized as failing, (Ann-Sofi, 2008, Oli and Robert 2009). This indicates that beside the high physical vulnerability of the region, majority of the states also have very low capacity to deal with new and important security challenges like the threats to the security of environmental resources which climate change poses.

Given the presence of all the above conditions in West Africa, it can be argued that, it is highly likely that water security will become an increasingly important aspect of the national security of West African states, no riparian state (for example in the Niger River Basin) can afford to be complacent in its response to the climate change threats whether such threats materialize or not. Hence, the chances of an ensuing competition to acquire more of the water resources of the Niger River Basin is high: because an attempt by an upstream riparian state to increase its water

security from the basin's water resources will invariably generate the fear of decrease share for the downstream countries.

This study is therefore an attempt to examine the impacts of climate change on the water resources of the Niger River Basin and its implications (as a potent risk factor for generating transboundary water resource disputes) on the water interactions of the countries that share the water resources of Niger River Basin.

1.2. STATEMENT OF THE RESEARCH PROBLEM

In view of the threats posed by climate change to the security of environmental resources in West Africa, this study examines the risks of inter-riparian conflict over the water resources of the Niger River basin.

Although the problematic of water security and conflict is not new, two broad theoretical perspectives have emerged in response to the renewed concerns on conflicts over shared international water resources: the Realists-Water War /neo-Malthusian perspective and the Liberal Institutionalists/Cornucopian/Water Cooperation perspective. The Realists-water war /neo-Malthusian theoretical position holds that conflicts over shared/international water resources are inevitable fundamentally because of the anarchical nature of the international system; which predispose international water interactions to disputes and conflicts. The realists also emphasize population pressure on environmental resources as the most important source of environmental resource scarcity and consequently a precursor to international water conflict.

On the other hand, the Liberal Institutionalists/Cornucopian/Water Cooperation School rejects the water war argument as inconsistent with historical data on the water interactions of countries that share international waters; which shows that not all international water disputes lead to conflicts; states tend to cooperate rather than fight wars over shared water resources. Hence, they maintained that, the key to strengthening cooperative behavior between states that share international waters is in the establishment of River Basin Organizations (RBOs) and International Water Treaties (IWTs).

However, against the fact that international treaties are difficult to enforce or maintain because of the problem of cheating or defection, partly due to the weakness of international law and also because of the emergence of new and formidable sources of threats to the security of water resources like the climate change threat (which could weaken the effectiveness of international water agreements) the position of the Liberal Institutionalists/Cornucopian/Water Cooperation School appear to be over optimistic consequently, the apprehension over water and international conflict is valid even within international institutions that traditionally identify with the ideas of Liberal Institutionalists. Hence the pertinent question which hydro-politics and international relations scholars are still considering is- what combination of principles and mechanisms could enhance the resilience of international water treaties (where they exist) and consequently maintain long term cooperation between riparian states in spite of the threats of water scarcity in some regions of the world.

This study therefore posits that, unless the critical mechanisms thus far identified by some researchers (as the bulwark against water conflict) are present in the treaty agreement that guide

the behavior of the riparian states of the Niger River Basin, the threat posed by climate change is likely to trigger unhealthy competition or cheating and/or defection among the riparian.

In spite of the shortcomings of international treaties and international law, the Liberal Institutionalists/Cornucopian/Water Cooperation School's framework offered the best theoretical framework for this study. This is mainly because of the existence of a treaty agreement between most of the riparian states of the Niger River Basin and also because of the existence of a River Basin Organization (i.e. the Niger Basin Authority NBA) which oversees the affairs of the parties.

RESEARCH QUESTIONS:

The following research questions guided the study:

1. What is the extent of the impacts of climate change on the water resources of the Niger River Basin?

2. How has the projection on climate change impacts for West Africa affected the behavior of the riparian states of the Niger River Basin in terms of veering towards disputes generating behavior?

3. How comprehensive are the Convention and the Water Charter of the Niger River Basin countries for example on the presence of the principles and mechanisms that indicate the potency for resilience?

4. What is the capacity of the Niger Basin Authority in terms of the management of inter-state disputes and enforcement of compliance to agreed rules of behavior among Member states?

5. What is the rate of compliance to the rules governing the behavior of the riparian states of the Niger River before the first IPCC climate change report of 1990 and after, up to the year 2011?

1.3. OBJECTIVES OF THE STUDY

The objectives of the study are:

1. To assess the extent to which climate change has generated water security challenges within the Niger River Basin.

2. To determine the impacts of the climate change projections for West Africa on the behavior of the riparian states of the Niger River basin (i.e. terms of their response to the climate change threat).

3. To assess the comprehensiveness of the Convention and Water Charter of the River Niger Basin as instruments of conflict prevention and settlement of disputes in view of the threats posed by climate change.

4. To assess the capacity of the Niger Basin Authority in the management of inter-state disputes and enforcement of compliance to agreed rules of behavior among Member states.

5. To assess the degree of compliance to the rules governing the behavior of the riparian states of the Niger River basin before the first IPCC climate report of the 1990 and after up to the year 2011.

1.4. PROPOSITIONS

1. The likelihood of inter-riparian conflicts over the water resources of the Niger River Basin is contingent to the comprehensiveness and effectiveness or otherwise of the Convention and Water Charter of the Niger River Basin in preventing conflicts and managing inter-riparian disputes.

2. The compatibility of the responses of the riparian states of the Niger River basin to the climate change threat with the provisions of the Convention and Water Charter of the Niger River basin is contingent to the extent to which the cost of defection to the rules outweighs the benefits that may accrue to the defecting state.

1.5. JUSTIFICATION AND SIGNIFICANCE OF THE STUDY

In view of the growing importance of the security implications of climate change as a source of threats to environmental resources (such as cropland and water resources) and consequently to international security and regional stability, this study has the potential to contribute towards a clearer understanding of all the factors that predispose states to international conflicts over shared/international natural resources. Also, an assessment of all the risk factors that could generate tension over the water resources of the Niger River basin may contribute in enhancing the cordial relationships between all the states that share the water resources of the Niger basin.

1.6. FOCUS AND SCOPE OF THE STUDY

The scope of this study is the Niger River basin. The study focused on the compatibility of the policy responses of the riparian states to the threats of climate change (i.e. via their adaptation measures) with the provisions of the Convention and Water Charter of the Niger River basin between 1991 and 2011. The justification for the time frame is because IPCC 1st Assessment Report of 1990 was the most authoritative assessment as yet; which explicates the potential impacts of climate change to the various regions of the world.

The rational for focusing on the responses of the states is because, unlike unofficial adaptation measures for example the migration of herder and farming communities, states' sponsored adaptation strategies are the official policy responses of the states whose potentials for generating inter-state conflicts are greater. However, this does not underestimate the potential of unofficial adaptation measures in generating tension between states. There are examples of several instances in which such adaptation measures such as mass immigration of people (which can be classified as environmental refugees) have generated conflicts between states in the region. For example the 1983 exchange of gun fire between Nigerian and Cameroonian soldiers which was as a result of the migration of some Nigerian fishing and farming communities along the Lake Chad who inadvertently followed the receding waters of the Lake into the Cameroonian part of the Lake (Metz: 2010).This example of "unofficial" measure to adapt to the impacts of environmental resource scarcity demonstrates the potential of search such measures to also generate tension between states.

1.7. LIMITATIONS OF THE STUDY

There are a number of constraints which the researcher encountered in the course this study. However, the most important shortcoming is the lack of an up to date (even at the headquarters of the Niger Basin Authority) data on the number of all projects both major projects and minor ones by all the riparian states to secure the water resources of the Niger River in the form of dams, weirs or any other form of water reservation over the Niger River.

1.8. DEFINITIONS OF KEY TERMS AND CONCEPTS

The following definitions of terms are adopted from the Fourth Assessment Report: (Climate Change 2007- The Physical Science Basis) of the Intergovernmental Panel on Climate Change (IPCC A4R), where otherwise it is indicated. The definitions are adopted from the IPCC Climate Change 2007 Report (The Physical Science Basis) because it is the most authoritative document on the Physical Science of climate change. This researcher comes from a different disciplinary background hence the adoption of the terms.

Climate: Climate in a narrow sense is usually defined as the average weather, or more rigorously as the statistical description in terms of the mean and variability of relevant quantities over a period of time ranging from months to thousands or millions of years. The classical period for averaging these variables is 30 years, as defined by the World Meteorological Organization. The relevant quantities are most often surface variables such as temperature, precipitation and wind. Climate in a wider sense is the state, including a statistical description, of the *climate system*.

Climate Change: Climate change refers to a change in the state of the *climate* that can be identified (e.g., by using statistical tests) by changes in the mean and/or the variability of its

properties, and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or *external forcings*, or to persistent *anthropogenic* changes in the composition of the *atmosphere* or in *land use*.

While in Article 1 of the UN *Framework Convention on Climate Change* (UNFCCC) climate change is define as a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.

Climate projection A *projection* of the response of the *climate system* to *emission or concentration scenarios* of *greenhouse gases* and *aerosols*, or *radiative forcing* scenarios, often based upon simulations by *climate models*. Climate projections are distinguished from *climate predictions* in order to emphasize that climate projections depend upon the emission/concentration/radiative forcing scenario used, which are based on assumptions concerning, for example, future socioeconomic and technological developments that may or may not be realized and are therefore subject to substantial *uncertainty*.

Greenhouse gas (GHG) Greenhouse gases are those gaseous constituents of the *atmosphere*, both natural and *anthropogenic*, that absorb and emit radiation at specific wavelengths within the spectrum of *thermal infrared radiation* emitted by the Earth's surface, the atmosphere itself, and by clouds. This property causes the *greenhouse effect*. Water vapor (H2O), *carbon dioxide* (CO_2), nitrous oxide (N_2O), methane (CH_4) and *ozone* (O_3) are the primary greenhouse gases in the Earth's atmosphere. Moreover, there are a number of entirely human-made greenhouse gases in the atmosphere, such as the *halocarbons* and other chlorine- and bromine-containing substances, dealt with under the *Montreal Protocol*. Beside CO_2, N_2O and CH_4, the *Kyoto*

Protocol deals with the greenhouse gases sulphur hexafluoride (SF6), hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs).

Greenhouse effect *Greenhouse gases* effectively absorb *thermal infrared radiation*, emitted by the Earth's surface, by the *atmosphere* itself due to the same gases, and by clouds. Atmospheric radiation is emitted to all sides, including downward to the Earth's surface. Thus, greenhouse gases trap heat within the surface-*troposphere* system. This is called the *greenhouse effect*. Thermal infrared radiation in the troposphere is strongly coupled to the temperature of the atmosphere at the altitude at which it is emitted. In the troposphere, the temperature generally decreases with height. Effectively, infrared radiation emitted to space originates from an altitude with a temperature of, on average, –19°C, in balance with the net incoming *solar radiation*, whereas the Earth's surface is kept at a much higher temperature of, on average, +14°C. An increase in the concentration of greenhouse gases leads to an increased infrared opacity of the atmosphere, and therefore to an effective radiation into space from a higher altitude at a lower temperature. This causes a *radiative forcing* that leads to an enhancement of the greenhouse effect, the so-called *enhanced greenhouse effect*.

Industrial revolution A period of rapid industrial growth with far-reaching social and economic consequences, beginning in Britain during the second half of the eighteenth century and spreading to Europe and later to other countries including the United States. The invention of the steam engine was an important trigger of this development. The industrial revolution marks the beginning of a strong increase in the use of fossil fuels and emission of, in particular, fossil *carbon dioxide*. The terms *pre-industrial* and *industrial* refer, somewhat arbitrarily, to the periods before and after 1750, respectively.

Carbon dioxide (CO_2) A naturally occurring gas, also a by-product of burning fossil fuels from fossil carbon deposits, such as oil, gas and coal, of burning *biomass* and of *land use* changes and other industrial processes. It is the principal *anthropogenic greenhouse gas* that affects the Earth's radiative balance.

Kyoto Protocol The Kyoto Protocol to the *United Nations Framework Convention on Climate Change* (UNFCCC) was adopted in 1997 in Kyoto, Japan, at the Third Session of the Conference of the Parties (COP) to the UNFCCC. It contains legally binding commitments, in addition to those included in the UNFCCC. Countries included in Annex B of the Protocol (most Organization for Economic Cooperation and Development countries and countries with economies in transition) agreed to reduce their *anthropogenic greenhouse gas* emissions (*carbon dioxide*, methane, nitrous oxide, hydro fluorocarbons, per fluorocarbons, and sulphur hexafluoride) by at least 5% below 1990 levels in the commitment period 2008 to 2012. The Kyoto Protocol entered into force on 16 February 2005.

The following definitions of terms are adopted from the United Nations document: On Better Terms (United Nations Working Group on Climate Change).

Adaptation: Adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities.

Adaptive Capacity: The ability of a system to adjust to climate change (including climate variability and extremes) to moderate potential damages, to take advantage of opportunities, or to cope with the consequences.

Coping capacity: The means by which people or organizations use available sources and abilities to face adverse consequences that could lead to a disaster. In general, this involves managing resources, both in normal times as well as during crises or adverse conditions.

Vulnerability: The degree to which a system is susceptible to, and unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate change and variation to which a system is exposed, its sensitivity and its adaptive capacity.

Mitigation: Structural and non-structural measures undertaken to limit the adverse impact of natural hazards, environmental degradation and technological hazards. Mitigation is a human measure to reduce the sources or enhance the sinks of greenhouse gases.

Risk: The probability of harmful consequences, or expected loss of lives, people injured, property, livelihoods, economic activity disrupted (or environment damaged) resulting from interactions between natural or human induced hazards and vulnerable conditions.

1.9. ORGANIZATION OF THE STUDY AND CHAPTER SUMMARY

The study consists of seven chapters in all:

Chapter one is the general introduction; it outlines the nature of the problem by establishing the basis for assessing the risks of the impacts of climate change on interstate relations over the shared water resources of the Niger River basin in terms of competition, the potential for conflict and political stability in West Africa.

Chapter two covers the review of the general literature on environmental security as well as the literature on water war and water cooperation. The chapter also examined the literature on

environmental security in relation to the West African sub-region. The conceptual and theoretical issues are also reviewed as well as empirical case studies. The last part of the chapter is the critique of the literature.

Chapter three covers the methodology of the study; the research design, sources of data, method of data collection and analysis are discussed.

Chapter four examined the links between climate science, the intractable international climate negotiations over the cutting down the emissions of greenhouse gases and the threats posed by climate change to environmental security of West Africa.

Chapter five provides an overview of Niger River Basin: examined the treaty agreement of the Niger River basin as overseen by the management organizations: the Niger Basin Authority. Also the chapter provides the ecological overview of the Niger basin area.

Chapter six consists of data presentation, analysis and report of the findings of the study.

Chapter seven is the summary and conclusion chapter.

CHAPTER TWO:

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1. INTRODUCTION

The general literature on environment-conflict (including the 'water war' and water cooperation) is vast and diverse both in terms of chronology and themes. However the thematic approach is adopted in this review in order to have a comprehensive evaluation of the relevant part of the literature. The chapter is divided into five parts: in part one an overview of the securitization process of environmental challenges is provided i.e. focusing on the first strand of the literature: works of the pioneer writers who recognized the importance of the threats to the environment in terms of environmental degradation due to over exploitation and thus created the awareness in both the academic and policy making circles and consequently stir up the debates over the inadequacy of the main framework on which the concept of security and threats to security (which was predominantly based on the Realists-traditional-military-state centric) was derived.

In part two the empirical literature is evaluated; works that focus on the systematic study of the link between environment and conflict in response to the theoretical and methodological questions which the debates over the concept of environmental security raised as well as the literature in relation to the West African sub-region. In part three the issues that dominate the debates on global warming and climate change are examined. While in part four, the theoretical issues in contention in the 'water war' literature are examined, followed by the general critique of the literature: focusing on the weakness in both the neo-Malthusian cum

Realists and the water cooperation schools. In Part five an exposition of and justification for the theoretical framework adopted and the model that guides the study is provided.

2.2. THE 'SECURITIZATION' OF ENVIRONMENTAL CHALLENGES

Except for the United Nations Conference on Human Environment, held in Stockholm in 1972, which according to Bæchler (1999), created for the first time broad awareness on international and global environmental problems, the majority of the earlier works that attempted to draw attention to the security implications of environmental degradation are mainly analysts of the neo-Malthusian persuasion: the view point that establishes a relationship between population pressure on the earth's limited carrying capacity of environmental resources, environmental degradation and resources insecurity. The most notable work in this category of the Malthusian perspective was Garrett Hardin's essay "The Tragedy of the Commons" which was published in the journal- *Science,* in 1968. Hardin's thesis posits that, an unchecked population growth would lead to the scarcity of natural resources which human life depends on. The essence of Hardin's (1968) argument is captured in the following statements:

> Picture a pasture open to all. It is to be expected that each herdsman will try to keep as many cattle as possible on the commons… As a rational being, each herdsman seeks to maximize his gain….Since, however the effects of overgrazing are shared by all herdsmen…the rational herdsman concludes that the only sensible course for him is to add another animal. And another; and another… therein is the tragedy. Each man is locked into a system that compels him to increase his herd without limit- in a world that is limited…Freedom in a commons brings ruins to all (Hardin: 1968: 1244).

Hardin's (1968) essay is generally regarded as the pioneer work which first brought awareness to the growing problem of environmental degradation due to the over exploitation of environmental resources (especially to the American public).

According to Del Rosso (1995), Robert McNamara (former US Defense Secretary and later President of the World Bank), who in the same year as Hardin's (1968) published his book titled, *The Essence of Security;* was one of the first prominent personalities within the policy making circle to draw attention to the potential of environmental challenges as a source of new threats to the US national security. In Rosso's view (1995: 184), McNamara's "apostasy" in calling for a new way of thinking was rather surprising because the dominant view was that threats to national security were essentially military threats; non-military sources of insecurity were not considered to be the concerns of national security both amongst academics and within the policy making arena of the United States of America.

Another important contribution to the early calls for attention over the importance of other sources of threats than the traditional military type threats was that of Richard Ullman whose paper titled, *Redefining Security* (1983) challenged the dominant view that defined US national security. Ullman argued that, the assumption on which national security is defined only in military terms conveys a false image of reality and that this assumption is misleading on two grounds: firstly, it causes states to concentrate on military threats to the detriment of even greater dangers, and secondly, this leads to the widespread militarization of international relations which ultimately only increases global insecurity (Ullman: 1983: 129). Furthermore Ullman contends that, at the root of the violent conflicts in history has been

competition for territory and resources; thus he envisaged the shrinking of overt conflict over territories but the increase and intensification of conflict over resources (Ullman: 1983: 139). He therefore called for a redefinition of security; also challenging the fact that, the culture of American leaders in defining national and global security problems and their solutions in military terms is deeply ingrained (Ullman: 1983: 152).

These two examples (i.e. Robert McNamara's book and Richard Ullman's paper) represent the category of pioneering literature that made the earliest call to attention over the changing landscape of the security environment and highlighted environmental security challenges which the then definition of security did not take into consideration of within the security studies circles. The call by Ullman and others spark off a debate on many fronts: questions about what constitute security; what environmental security entails etc., were raised which as a result questioned the underlying ontological and epistemological assumptions on which the sub-field of international security studies are rested on: a contention raged on all through much of the years preceding the end of the Cold War period and the years after.

One notable and significant contribution to the debate in the immediate Post Cold War period was the article of Jessica Mathews-1989, (The former Vice President of the World Resources Institute), also titled: *Redefining Security* is considered by many writers as the seminal work that reinvigorate the debate for the 'securitization' of the environmental challenges. Drawing from the prevailing condition of the fast changing security environment after the Cold War, which the then Director of the Central Intelligence Agency (CIA) James Woolsey characterized "as a jungle filled with a bewildering variety of snakes" (quoted in Rosso, p.

179), Mathews attributed the confused state of affairs in that period on the weakness of the underpinning precept on which the traditional definition of security was based on. She argued that, "the assumptions and institutions that have governed international relations in the Post-Cold War era are a poor fit with these new realities" (Mathews: 1989: 162). Adding that, "…environmental strains that transcend national borders are already beginning to break down the sacred boundaries of national sovereignty" (Mathews: 1989: 162). Consequently, she stress the importance of the benign sources of threats to national security that have their roots in environmental problems and which are equally as important as military threats to the security of the United States, particularly on finite and renewable natural resources both within the United States and in other parts of the world.

Mathews further argued that, the linkages between natural resources scarcity (whether it is caused by the direct impacts of human activity or by increased demands due to demographic changes or the combination of both), with political instability in many parts of the world are becoming apparent and they pose threats to the national security of the United States: that, distant environmentally induced political crises (which do not seem to pose any direct threats to the United States' national security or other national interests of the United States), would ultimately affect the United States. Hence, she called for a redefinition of the concept of security and ultimately for a paradigm shift in thinking and practice as well as policy. Drawing a clear analogy with Albert Einstein's response when atomic energy was discovered that, "everything changed", Mathews concluded that, "…in the same sense, the driving force of the coming decades may well be environmental change. Man is still utterly dependent on the natural world but now has for the first time the ability to alter it, rapidly and on a global

scale, [and] because of that difference, Einstein's verdict that "we shall require a substantially new manner of thinking if mankind is to survive" still seems apt (Mathews: 1998: 177).

The criticisms leveled against the idea of a new definition of security varied, ranging from the trivial to the important ones. For example, according to David A. Baldwin those who seek for a redefinition of security "…are more concerned with redefining the policy agendas of nation-states than with the concept of security itself" (Baldwin: 1997:5). And that, such calls for issues like environment, epidemics and social justice are just calls for these issues to be given high priority positions (Baldwin: 1997:5). On his part Lawrence Freedman argued that, "military force does not lend itself to coping with such problems; diplomatic, multinational frameworks are better suited for dealing with economic and environmental hazards". And that, once everything which generates anxiety or threatens the quality of life in some respect becomes labeled a security problem, the field risk losing all focus" (Freedman: 1998:53). Stephen J Del Rosso Jr. on his part maintain that, " in their quest for relevance, the scholar activists failed to explicitly link nonmilitary phenomena to a prevailing notion of security still largely perceived in more conventional terms. (Del Rosso: 1995: 185). Also, Daniel Deudney quoted in Bæchler, states that, it is completely misleading to think of environmental degradation as a national security threat, and that "the traditional focus of national security-namely interstate violence-has little in common with either environmental problems or their solution" (Bæchler: 1999: Pp79-8).

Furthermore Soroos contend that, "The term environmental security encounters little resistance if it is interpreted narrowly to refer to situations in which environmental and

resource conflicts heighten the probability of armed conflict. Such a definition is consistent with the conventional notions of military security". However, "there is less acceptance of broader conceptions of environmental security which acknowledge the ways in which environmental degradation directly threatens human welfare, even without the immediate prospect of armed conflict" (Soroos: 1999: 319).

Given the trajectory of the debates that ensued, it appears that not many converts were made by the proponents of an enlarged concept of security at the early stage of the debates. There were stiff resistances from the old guard (both within the academic and policy making circles particularly in United States of America). Although those who specifically promote the concept of environmental security seem to have gained more converts than those who included other sources of threats to security. Yet, the literature suggests that, the process of 'securitizing' environmental challenges did not terminate until the 1990s, when considerable attempts at systematic research were made to establish the causal links between environmental degradation and conflicts, and consequently the debate for the redefinition of security was reinvigorated.

However, as mentioned above, what appeared to have changed the direction of the earlier debate was the end of the Cold War. The Post-Cold War era heralded the beginning of a new way of thinking in international relations and security studies: some new ideas about the whole global security infrastructure began to manifest. One of such ideas was the notion of Human Security, which is examined in the following section.

2.2.1 The Concept of Human Security

Reminiscent of the idea of environmental security, the justification for the notion of human security is also anchored on what Alkire describe as "the altered security environment" across the world and which safeguard mechanisms to address some of these new security threats do not exist. Some of the empirically observable changes which she cited include Population pressures together with consumerism which have contribute to environmental insecurity, increase immigration, and the heighten importance of water and energy resources etc., (Alkire: 2003: pp.10-11).

The evolution of the concept of Human Security gave impetus to the quest for the recognition of/and the incorporation of environmental security into the mainstream concerns of security studies. In relation to the concept of environmental security, Human Security is broader and more encompassing of other security concerns in which environmental security is only one of its seven components.

There are several definitions of the term Human Security competing for space; definitions by the United Nations agencies such as United Nations Development Programme (UNDP), United Nations University, etc., by Governments such as that of Norway, academic definitions and others. However, according to Alkira, "The objective of human security is to safeguard the vital core of all human lives from critical pervasive threats, in a way that is consistent with long-term human fulfillment" (Alkire: 2003: 2). (Pervasive threats are defined as large-scale, recurrent dangers; p.9)

According to Amartya Sen, Obuchi Keizo' human security is "the keyword to comprehensively seizing all of the menaces that threaten the survival, daily life and dignity of human beings and to strengthening the efforts to confront these threats" (Sen: 2000: 2). This in contrast to the traditional notion of security encompasses the absence of threats or fear from all other sources. Yet again, Sen and Ogata recognized the central place traditional notion of security that focuses on the state still occupies. They maintained that, Human security complements state security because it enhances human rights and strengthens human development. "It also seeks to protect people against a broad range of threats to individuals and communities and further empower them to act on their own behalf" (Ogata and Sen: 2003: 2).

On the other hand, much of the attacks on the concept of human security centered on the utility of the concept. One of such criticisms is that the concept is vague and therefore its usefulness is restricted. While some of the scholars that support the idea of human security conceded that the concept is vague therefore impossible to translate into policy instrument, others like Alkere insist that, its utility lies in its vagueness: "that any normative definition that aspires to be genuinely useful must be vague enough to include the diverse specifications (Alkire: 2003: 12)."

However, in spite of the criticisms of the concept of human security, the idea seems to have gain grounds across a wide range of spectrum and some countries most notably that of Japan, Norway and Canada have incorporated the concept in their foreign policies (King and Murray:2002: 589): largely because of the conviction that, new global reality of a changing security environment which the end of the Cold War heralded requires a multi-dimensional

approach which Cold War period conception of security is ill equipped to address. As the idea of human security grow among scholars, international agencies, and governments the concept of environmental security also gained acceptance among some international security analysts as well as development agencies and some governments.

Yet, in spite of this the field of international security remained divided over the new issues. However, the exposition which Roland Paris provided appears to be the current state of the field of international relations and security studies in respect of the contention over the broadening of the concept of security. Paris contends that, since the end of the Cold War, in particular, the subject matter of security studies has undergone both a "broadening" and a "deepening." By broadening, he is referring to the consideration of non-military security threats, such as environmental scarcity and degradation, the spread of disease, overpopulation, mass refugee movements, nationalism, terrorism and other threats. And by deepening, he suggests that the field is now more willing to consider the security of individuals and groups, rather than focusing narrowly on external threats to the states (Paris: 2001: 97).

Table 2.1 is a 2/2 matrix of security studies developed by Roland Paris which elaborate on all the sources of security threats both new and old representing the major areas of focus of the field of Security Studies in the post-Cold War era:

Table 2.1a 2/2 matrix of security studies by Roland Paris

Cell 1 National security	Cell 2 Redefined security

(conventional realist approach to security studies)	(e.g. environmental and economic security)
Cell 3 Intrastate security (e.g. , civil war, ethnic conflict and democide)	Cell 4 Human security (e.g., environmental and economic threats to the survival of societies groups and individuals)

Source: Paris (2001:98)

The first cell represents works that represent the traditional area of focus of security studies; mainly works based on the realists' perspective: this category of the literature focuses on security threats to the state; military threats.

The second cell contains the 'new' emerging works that also present threats to the national security of states but from non-military/traditional source. For example threats to the states from environmental degradation and scarcity.

The third cell contains works that represent military threats to the security of societies, groups and individuals within the state, such as civil wars and democide.

The fourth cell contains works that are concerned with other forms of societal conditions (both military and non-military) which pose threats to the security of societies, groups and individuals. According to Paris these other forms of conditions that pose threats to the survival of groups or individuals fall into the human security research category.

Also the UNDP 1994 Human Development Report states that, the focus of Human Security should be "freedom from fear and freedom from want" hence; global security should include threats in seven key areas of human development. These areas are:

- Economic security
- Food security
- Health security
- Environmental security
- Personal security
- Community security
- Political security

Based on UNDP definition, the human security perspective differs in four key areas from the traditional perspective of the concept of security. These are;

1. Referent- that is while traditional security is state centered, human security is people centered.

2. Scope- traditional security seeks to defend states from external aggression, while human security expands the scope to include areas such as environmental security, infectious diseases.

3. Actor(s) while the state is the only actor in traditional security, human security broaden participation to include other actors such communities and organizations.

4. Means- traditional security depends on military power, while human security includes peoples' contributions in identifying and implementing solutions to security.

2.2.2 The Concept of Environmental Security

As mentioned above, the earliest attempts at securitizing environmental challenges stir up the call for the broader conceptual redefinition of the term security. In other words, it sought to establish how environmental changes become a source of risk or danger to the national interest of the state beyond the security of individuals and communities. The concept of environmental security has acquired numerous connotations. Different writers define the concept differently, depending on the discipline or perspective of the writer. For example, according to Braden R. Allenby, environmental security may be defined as "the intersection of environmental and national security considerations at a national policy level" (Allenby: 2000: 5). On the other hand, Græger contends that, "environmental security may best be defined by reference to its converse - environmental *in*security, defined as a situation where an environmental problem is likely to lead to violent conflict" (Græger: 1996: p113). Obi also states that, "environmental security deals with the containment of a range of 'threats', or contradictions emanating from the interaction between human beings and nature" (Obi: 2000 pp. 47-62).

In his article, *Global Change, Environmental Security, and the Prisoner's Dilemma,* Marvin Soroos (1994), identified four broad categories on which the rationale for adopting the term security in referring to threats to the environment is anchored. These are the conceptual argument, the theoretical argument, the political and the normative reasons. The conceptual argument advances that, because in a generic sense, security implies freedom or protection from serious threats to human well-being, for conceptual consistency, it follows that,

whatever poses such a threat, be it in military, economic, resource, food, or the environmental realms, it becomes a security problem. While the theoretical argument focuses on empirical cause-and-effect relationships, in particular the potential of major environmental changes to generate and intensify conflict between and within states. On the other hand, the political rationale seeks to advance environmental causes of threats by taking advantage of the potency of the term security 'to legitimize exceptional measures of collective action'. Because referring to environmental change as a security threat may bestow the problematique with a greater sense of urgency which will elevate it to the realm of high politics and a place near the top of national and international agendas along with military priorities, which have until now had a virtual monopoly on the use of the concept. On the other hand, Soroos added that, the normative case presumes the primacy of environmental values and the threat that modern civilization poses to them. And consequently, failure to preserve life-supporting ecosystems undermines the realization of all other human values (Soroos: 1994: 318-319).

2.2.3 Criticisms of the Concept of Environmental Security

Much of the criticisms against the concept of environmental security at the early stage of the debates over the quest for an elaborate concept of security mainly fall under the conceptual, political and normative categories as identified by Soroos. This is because the first strand of the literature that sought the redefinition of security and a paradigm shift in the focus of the mainstream realist's perspective, and much of the works that rejected the concept of environmental security are from the United States of America. The US is the heartbeat of the Realists' worldview: the perspective which defined much of the US governments' foreign

policy direction in their pursuits of national/international security. Realists are not in tune with questions that do not to pose direct threats to the state. One of the cardinal assumptions of Realism is that the state is the main actor in international politics; hence 'threats' that do not represent direct and obvious danger to national security in military terms are not considered as serious threats. Hence, the idea of a broaden conception of security which sought to include non-military threats met with intense resistance from the old guard (Rosso; 1995).

However subsequent criticisms focus on the theoretical and the methodological difficulties which the early proponents of the concept of environmental security and the research thesis of the environment-conflict encounter. According Græger, "The environmental conflict perspective; [which focuses] on the circumstances under which environmental degradation or change may lead to violent conflict, represents an effort to overcome some of the methodological problems of the security-environment linkage" (Græger: 1996:109).

In his article titled *Armed Conflict and the Environment: A Critique of the Literature*, Gleditsch attack the empirical literature that attempted to establish a relationship between environment and conflict in a nine point criticism. Gleditsch argued that, most scholarship on the relationship between resources, the environment, and armed conflict suffers from one or more of the following problems: first, they identified what he called a lack of clarity over what is meant by 'environmental conflict' in much of the literature. Secondly, Gleditsch accuse the researchers in engaging in definitional and polemical exercises rather than analysis of what is under the microscope. Also, important variables are neglected in some of the research designs or models developed to guide investigation; notably political and

economic factors which have a strong influence on conflict and mediate the influence of resource and environmental factors. In addition Gleditsch observed that, some models become so large and complex that they virtually cannot be tested. Again he noted that, cases are selected on values of the dependent variable, while the causality of the relationship is reversed in some models. Furthermore he asserts that, postulated events in the future are cited as empirical evidence, and that the studies fail to distinguish between foreign and domestic conflict; therefore confusion reigns about the appropriate level of analysis. In the end, Gleditsch maintains that, while no publications are characterized by all of these problems, many have several of them (Gleditsch: 1998: P. 381).

Generally, the basic causal chain that ran through most of the research models as reviewed and presented by Gleditsch run as follows:

Population growth→ high resource consumption per capita→ deteriorated environmental conditions→ increasing resource scarcity → harsher resource competition → greater risk of violence

Source: Gleditsch: 1998:383

According to Gleditsch, the argument which the above simple causal chain to conflict over shared environmental resources represents runs as follows: population growth leads to higher resource consumption per capita. This in turn will bring about the deterioration of the environment (the source of the resources like crop land and water) thereby generating the scarcity of these resources and consequently the condition of scarcity will create harsher

competition between users of the resource and this will ultimately lead to violence because each of the users will do what it takes to preserve their source of the resources.

Although many studies have been conducted based on the above argument, the most notable ones are the research programmes conducted by the two research groups namely the Toronto Group led by Homer-Dixon (Project on Environment, Population and Security), and the Zurich Group (ENCOP) led by Bæchler which confronted both the empirical and the methodological challenges posed to the environment-conflict thesis.

According to Metz, while both groups came to the same conclusion; that the degradation of renewable resources contributes to armed conflict in different parts of the world yet, they differ on their approaches or research design. While the Homer-Dixon group developed a simple causality model, the Bæchler group took a more complicated approach involving several other mediating or intervening variables (Metz: 2010).

2.3 GLOBAL CONCERNS ON THE LINK BETWEEN WATER SCARCITY AND INTERNATIONAL CONFLICTS

The article- *Water Wars* written by Joyce R. Starr (a specialist on the Middle East and water security) published by *Foreign Policy* in 1991 is believed by many analysts of resource conflicts to be the paper that made the biggest impact in highlighting the implications of the link between water scarcity and international conflict to the international community and consequently placed the water war thesis before both the policy making and the academic cycles as an issue of strategic priority. Although the focus of Starr's article was the Middle

East, the paper generated interests in many parts of the world; frequent references were made to the article in subsequent papers on water and international conflict. Starr began her article by highlighting the imminent water scarcity facing the Middle East and lamenting the lack of attention by Western leaders to the approaching water wars in the Middle East. The following statements are quoted from her opening paragraph:

> The Middle East water crisis is a strategic orphan that no country or international body seems ready to adopt. Despite irrefutable evidence that the region is approaching dangerous water shortages and contamination, Western leaders have so far failed to treat the issue as a strategic priority. Yet when the current Persian Gulf War ends, the water crisis could erupt. This intensifying security issue requires sustained policy actions as well as new bureaucratic and consultative structures (Starr: 1991:1).

In the article Starr painted a clear picture of the situation in the Middle East and North Africa: the growing need for water in the region and the fast depletion of reserved water resources in most of the aquifers of the region, which are responsible for the growing tensions between Israel and her Arab neighbors. Although she made reference to several projects which many countries of the region were undertaking to address the water crises which include the big desalination projects that Saudi Arabia was/is and also Israel as well as the proposed water transfer projects from Turkey to Israel, Syria and Saudi Arabia, she lamented that, "the middle East and north Africa are failing to confront overall water shortages" (Starr: 199: 24). Starr's assessment of the situation indicates that not enough effort is put to addressing the enormous water scarcity crisis that confronts the Middle East hence she concluded that, "When the current Persian gulf war ends, the water crisis could

erupt" (Starr: 199: 17). To Starr preventing the eminent water wars confronting the Middle East and other parts of the world Western countries must recognize the strategic importance of the crisis of global water scarcity and incorporate same into their foreign policies; because water security is becoming at par with traditional national security issues in many countries.

On the other hand, one of the earliest well publicized public expressions of the concerns over the international security implications of water scarcity by an international figure was made by the former World Bank Vice-President for Sustainable Development Ismail Serageldin in an interview with New York Times on August 10, 1995. In the interview Serageldin stated that "the wars of the next Century will be fought over water." Given his position, this warning to the international community by Serageldin indicates that the looming global water scarcity has attracted the attention of world leaders and the global public across the world. In a later interview with the editors of *World Policy Journal* titled: "Water War? A talk with Ismail Serageldin", which was published in the 2009/2010 edition of the Journal, Serageldin reiterated the warning he gave in 1995 and further elaborated on the eminent water scarcity facing the world by emphasizing that,

> [i]n general, over the past century, there has been a three-fold increase in population, but a six-fold increase in water consumption. So, though population is increasing, the amount of water consumed per person is accelerating. As a result, demand for water is very high (Serageldin: 2019/10: 26).

Consequently water will increasingly become the critical resource and on the top of the list of the national security agenda of many nations in the world. Serageldin admitted that, although only a few regions particularly the arid and semi-arid regions are prone to inter-

state water conflicts, growing needs due to population increase and climate change will strengthen the link between demands for water and conflicts in many more regions of the world. To buttress his point he cited the example of the Darfur conflict which was due partly to the movement of people (environmental refugees-because of prolonged drought) from one part of the region to another. To emphasize the growing strategic importance of water Serageldin contend that, "water is already mankind most valuable resource. For me, water is more valuable than oil today". He concluded with the grim warning that, "if the wars of this century were fought over oil, the wars of the next century will be fought over water-unless we change our approach to managing this precious and vital resource" (Serageldin: 2019/10: 29).

The call to attention to the apprehension over water security and international conflict continued to be echoed by several other international statesmen. For example the former Secretaries-General of the United Nations- Kofi Annan and Boutros Boutros Ghali at different fora called attention to the water war trepidation. In a speech he gave at the 97th Annual Meeting of the Association of American Geographers in March 2001, Kofi Annan added to the warning of the impending global water crisis when stated that, "Fierce national competition over water resources has prompted fears that water issues contain the seeds of violent conflict." However, he added that, "If all the world's peoples work together, a secure and sustainable water future can be ours" (Annan; 21st March 2001).

Earlier, the former UN Secretary-General, Boutros-Ghali gave a stern warning in a BBC Radio 4 interview in February 2 2005. Ghali's comments also re-echoed the apprehension over the prospects of international conflicts over shared water resources. In the interview Mr. Ghali stated that competition for water resources would provoke wars in Africa and the Middle East. In particular reference to the contention between Egypt and Ethiopia over the waters of the Nile River Ghali maintains that "military confrontation between countries of the Nile basin was almost inevitable." Ghali's views on the Nile situation hinged on his rather skewed diagnosis in terms of Egypt's national security when he contends that, "the real problem is that we need an addition quantity of water and we will not have it unless we find an agreement with the upstream countries which also need water and have not used the Nile water until now" (Boutros-Ghali BBC Radio 4 interview in February 2 2005).

The common underlying denominator of all of these expressions of concerns and warnings by international statesmen cited above is the recognition that the quests for water security in some regions of the world are a source of threat to international security. However Starr's diagnosis of the sources of water scarcity is population increase on the other hand, while Serageldin recognized the importance of scarcity due to population increase, he mentioned the importance the scarcity due to dwindling supply which climate change generates.

2.4 THE ORIGIN OF HYDRO-POLITICS RESEARCH

According to Schmeier, the field of hydro-politics can be defined as "the systematic study of conflict and cooperation between states over water resources that transcend international borders" (2010: 4). This definition suggests that different fields of study can lay a claim (at least in part) to the field of hydro-politics. As water security began to take position of importance at different international fora, scholars from diverse disciplinary backgrounds whose disciplinary concerns touch part of the water conflict problematic began to postulate and provide answers to the complex questions surrounding shared/transboundary water resources and international conflicts. These study areas include International Relations and Security Studies, International Law, Political Geography, Physical geography, Hydrology and several other disciplinary backgrounds.

However, the different fields ask different questions or at least the fields frame questions to the same problem in different ways. Even within the same discipline, different paradigms as ask different questions. An issue area that a particular paradigm sees as very important to the problem under consideration may be considered by another paradigm as not too important and therefore ignores it.

Within the sub-field of International Relations and Security Studies two broad (and contending) perspectives emerged. These are the Water Wars/ neo-Malthusian/Realist School and the Water Cooperation/Cornucopian/Liberal Institutionalist School. These two perspectives provide different theoretical analysis of the water war apprehensions. The

'water wars' perspective which is in line with the environment-conflict thesis, sees water as the next crucial natural resources that would lead to inter-states conflicts or wars in many regions of the world. This perspective is essentially prognostic and is based on the underpinning theoretical assumptions of the realists paradigm, that is because of the anarchical nature of the international system and the important place water security is progressively occupying in the national security of many nations; the current state of knowledge over existing conditions and global population explosion in many regions across the world and with it the increase in demand for water resources etc. Consequently, if all these factors are put together, then water wars are apparently inevitable at least in some regions of the world.

The representative of the causality path to resource conflict models constructed to represents the theoretical position of the environment-conflict thesis (cited on page 33)reflects the argument of the causal paths to the water war construct: a simple causal connection between scarcity and competition for water and tension or conflicts are usually described to indicate the likelihood of conflict over shared water resources in much of the literature (Kliot, Shmueli, Shamir, 2001; Giordano, Giordano, Wolf, 2005; Tir and Stinnett: 2010, Metz: 2010).

On the other hand the position of the water cooperation school stands is the direct contrast to the position of the water wars school. They reject the water conflict postulations by citing overwhelming historical evidences that refute the water conflict argument. And, in contrast provided vast instances of cooperation between states that share transboundary watercourses

which by far outnumber instances of conflicts across the world, even in situations where the stakes are very high between the riparian states, such as in the Middle-East (Gleick's *Water Conflict Chronology; 300BC-2008*). Another example of a study which supports the water cooperation argument is Wolf's examination of historic international water conflicts across the world in which he found that only seven instances qualified to be classified as conflict situations. Thus, he concludes that,

> "[t]he actual history of armed conflict is somewhat less dramatic than the "water wars" literature would lead one to believe: a total of seven incidents, in three of which no shots were fired. As near as we can find, *there has never been a single war fought over water."* (Emphasis in original) (Wolf: 1998: 255).

Other arguments put forward in support of the Water Cooperation School's position in addition to the historical evidence against the water wars argument (as presented by Wolf) include the Strategic Argument; the Shared Interest Argument and the Institutional Resiliency Argument (Wolf: 1998: 6-8).

The strategic argument centers on stressing the futility of wagging war over water. Answering the question; if one were to launch a war over water, what would be the goal? Wolf suggests that, "the aggressor would have to be both downstream and regional hegemon- an upstream would have no cause to launch an attack and a weaker state would be foolhardy to do so" (Wolf: 1998: 6). On the other hand, the shared interest argument point to the benefits accruable to the stakeholders which conflicts will diminish. While the institutional resilience position points to the fact that, institutions play a very important role in mediating the interests of riparian states over shared international water courses because as the

historical evidence indicate inter-riparian cooperation take precedence over conflictive tendencies in most international water-ways where treaties are signed.

Another important factor that determine the likelihood of conflict over shared water resources which the water cooperation perspective point to is the political relationship and tradition of conflict in the basin area. That water conflict usually occurs in situations where unresolved historic conflicts exist between riparian states and "water becomes sucked into the spiral of conflict" (Libiszewski: 1999: 127).

The position of the Water Cooperation School is developed from the both the cornucopian and the Liberal Institutionalists' theoretical assumptions. The cornucopian view is that if waste and mismanagement of resources can be eliminated in addition to the development of new technologies the problem of scarcity can be ameliorated. On the other hand, Liberal Institutionalists are convinced that, states can overcome the problem imposed by international anarchy; because some of the conditions that generate international conflicts provide states with the incentives to cooperate. Hence conflict over shared water resources can be avoided if riparian states chose to cooperate and resolve the problem of scarcity.

The position of the water cooperation school is that if history would serve as a guide to the future then cooperation between sates that share international waters has been the norm. And consequently the argument of the water war scholars of the inevitability of future water wars cannot be sustained. Hence they argue that the focus of hydropolitics research should be on identifying those institutional principles and mechanisms that have help the riparian states of

the most successful international water basins to achieve cooperation and avoid conflicts with the view to infuse and fortify these principles and mechanisms in the institutional arrangements of international water basins that may be vulnerable to international water conflicts.

2.4.1The Empirical Literature on some specific Case Studies

There are few works that focus on the international water interactions of West African states. In much of the mainstream literature in relation to the African continent, the attention has mainly been on the Nile River.

At the heart of the ongoing disputes over the water resources of the Nile River, particularly between Ethiopia and Egypt is the question of how to equitably share the waters of the Nile. The current arrangement in which Egypt has the exclusive right to veto any project which it feels will reduce the flow of the Nile to its territory and which Ethiopia and the other upstream countries (except Sudan) seek to replace was based on the Anglo-Egyptian agreement of 1902. According to Kendie (1999),

> Article III of the Anglo-Ethiopian Treaty, affirms that His Majesty the Emperor Menelik II of Ethiopia, engages himself towards the Government of His Britannic Majesty not to construct or allow to be constructed, any works across the Blue Nile, Lake Tana or the Sabot, which would arrest the flow of their waters into the Nile except in agreement with His Britannic Majesty's Government and the Government of the Sudan (Kendie: 1999:146)

While Ethiopia maintains that it is not bound by this colonial agreement (because Ethiopia was never a colony of Britain), it also seeks to uphold its right of absolute territorial sovereignty over the water resources that originate from its territory. On the other hand, the position of Egypt remains that sharing the waters of the Nile must be on the basis of absolute territorial integrity and on the agreement of 1959 between Egypt and Sudan which allocated 85% of the water to Egypt and the remaining 25% to Sudan. Although there have been efforts to reconcile the two positions not much progress has been made. In 2010 the upstream counties of the White and Blue Nile signed a new agreement known as the Nile Basin Initiative which both Egypt and Sudan refused to be party to. The situation over the Nile has remained tensed; Ethiopia with help of the Chinese government is currently building the Grand Renaissance Dam over the Blue Nile.

The works that focus on the West African sub-region only concentrate on highlighting and creating the awareness to the implications of climate change on the water resources of West Africa. The leading author in this regard is Madiodio Niasse. In both his main work; *Climate Induced Water Conflict Risks in West Africa: Recognizing and coping with Increase Climate Impacts on Shared Watercourses* and the one he edited with other authors; titled; *Reducing West Africa's Vulnerability to Climate Impacts on Water Resources, Wetlands and Desertification,* Niasse provided broad assessments on the level of threats posed by climate change to all the major water bodies of West Africa. However, the main shortcoming of the papers are that they are not systematic case by case empirical studies of the main water bodies of the region in which the dynamics and the interactions of all the factors are investigated. Hence they fail to provide fact based predictions of the likelihood of

international water conflicts over the water courses of the region. It is therefore hoped that this study will fill in this gap on the Niger River basin.

On the other hand, the report of a more recent study which focused on climate change and intra-state or inter communal conflicts over the water resources of the Niger River, conducted by some researchers from the Tyndall Center for Climate Change Research in the US in collaboration with some Nigerian scholars from the University of Nsukka, titled; *Climate Change, Water and Conflicts in the Niger River basin* led by Marisa Goulden and Roger Few was released in December 2011. The study examined the links between environmental stress, climate change, human security, conflict and adaptation at different scales along the Niger River. Two local communities were selected for the study; Selingue in Mali and Lokoja in Nigeria.

The focus of the study as mentioned above is on the internal dynamics of the climate change factor over the Niger River, while the focus of this study is on inter-state water interactions of the riparian states of the Niger River basin.

2.5. CRITIQUE OF THE LITERATURE

Our critique of the theoretical literature is on both the two main research perspectives on water and international conflicts i.e. the realist/water war/neo-Malthusian research perspective and the water cooperation/Liberal Institutionalists/cornucopian perspective. However before we point out what we consider to be the main weaknesses in the two perspectives in relation to the problematic of this study, a number of other shortcomings have

also been observed in the general literature on environment-conflict (i.e. in addition to those identified by Gleditsch as enumerated above), especially in relation to the West African sub-region.

According Nils Gleditsch (cited earlier) confusion reigns in the research designs of the environment-conflict literature on the appropriate level of analysis. This shortcoming is also observed in relation to the West African sub-region. The first is that, the two levels of analysis (intra and interstate conflicts) are conflated. There is no clear separation of the conflicts for example that are caused by the inadvertent movements of large populations (whether gradual or the movement of large groups of environmental refugees), due to the depletion of resources such as cropland or water, into the territories of neighboring communities within the same country (migration), with conflicts that arise due to similar movements but across national boundaries (immigration). In other words, the tensions or conflicts that may arise due to internal movement of people is an internal matter of the state concerned, which is different from tensions that may be caused by environmental refugees that cross national boundaries.

Secondly, environmentally induced conflicts that arise because local authorities sponsored, sanctioned or turn a blind eye to the gradual appropriation of environmental resource by one community within the same country are also not separated from similar cases which occur across national boundaries. For example, intra-state disputes between adjacent communities are different from a similar dispute but one involving same communities but separated by international boundaries. Yet, a 'deliberate' act of appropriation of resource by one

community is not the same as the 'unintentional' appropriation of resource by a community who probably shares certain cultural or linguistic affinities but is separated by the 'invincible' lines of national or international boundaries. The often cited example of inter-state conflict over the water resources of the Lake Chad; in which Nigerian fishermen inadvertently 'migrated' by following the reseeding waters of the Lake Chad into the Cameroonian side of the lake and which resulted in military skirmishes between Nigerian soldiers and Cameroonian gendarmes is an example of this error.

In this case, although the Nigerian state had 'sanctioned' the occupation of the areas in dispute by establishing schools and hospitals, military and police posts, yet, this case did not fall into the category of an inter-state conflict over shared water resource because of the following reasons: firstly, there was a long running border disputes between Nigeria and Cameroon at different parts of the borders of two countries the most important territory in dispute being the Bakassi Island. Secondly, the 'immigration' of the fishermen was an inadvertent act not preconceived and executed by the Nigerian state. Thirdly, the main cause of the encounter between the forces of the two countries arose because the Nigerian government had to respond to the constant harassments and killings of Nigerian citizens by the Cameroonian gendarmes particularly in Darak village and the surrounding settlements, not because the Nigerian government sent in soldiers to occupy the disputed areas and then establish the said settlements. Consequently the conflict that ensued falls more accurately into the general border/territorial disputes between the countries and not as a result of deliberate act of appropriating Cameroonian's water resources by the Nigerian state.

2.5.1. THE SHORTCOMINGS IN THE TWO MAINRESEARCH PERSPECTIVES ON WATER AND INTERNATIONAL CONFLICT

The Realist/Water War/Neo-Malthusian Model

The main shortcoming in the water war literature in our view is in the choice of the key independent variable. Although there is no consensus on the elements that are generally included or even which variable should take the place of the central variable in most of the models that came out of the environment-conflict theories, the emphasis in the mainstream literature is usually placed on population pressure; the key variable in the models of the environment-conflict empirical research perspective. The Nils Gleditsch model (cited on page 33) provides a typical representation of the models used generally.

For example the models of the more cited works of the environment-conflict thesis (i.e. the team led by Homer-Dixon's and the one led by Bæchler), the emphasis is placed on population pressure as the central independent variable which precipitates the degradation of the environment and depletion of resources. The Homer-Dixon's model for example, in which he put forward a tripartite categorization of the type/sources of environmental scarcity the emphasis has been on the demand induced scarcity type which is attributed to increase in population and not on the supply induced source of scarcity which may be caused for example by climate variability (Homer-Dixon, 1991). The general conclusion of the research based on these models suggest that, although there is no linear course to environmental conflict (because many factors are at play), environmental conflicts depend on the prevailing conditions and the interactions of the factors present, yet the works point to a correlation between population pressure and the likelihood of conflict especially in developing countries.

Consequently, predictions for environmental conflicts are focused on regions that are regarded as having high rates of population growth.

Although the link between population growth and scarcity of resources as clearly demonstrated by Homer-Dixon and others is apparent, we contend that to focus mainly on population growth as the key indicator to potential resources conflict and to relegate other important factors whether due to ontological and epistemological constrains placed by the school of thought which the researchers are orientated to, gives the impression that, the conclusions drawn from such research undertakings are geared towards certain outcomes. This 'factor selection bias' by the environment-conflict research community can be characterized as a deliberate act by some Western scholars to place the blame of the effects of climate change on the developing countries. In a paper titled: *Constructing Blame: Overpopulation, Environmental Security and International Relations,* Jessica LeAnn Urban contends that,

> "within mainstream environmental security discourse, this enemy-creation process is carried out by constructing raced, classed and gendered "others" as threats to environmental security vis-à-vis overpopulation. The creation of these "others" legitimizes Western neocolonial efforts in the form of coercive population control programs targeting non-Western women (Urban: 2001: p.18).

It is in the same vein that many interpret the much acclaimed and much cited paper of Kaplan (1994) *The Coming Anarchy,* which is perhaps the best example of this mode of thinking. The following statements are quoted from the opening remarks in Kaplan's paper which was published in *The Atlantic Monthly.*

> West Africa is becoming the symbol of worldwide demographic, environmental, and societal stress, in which criminal anarchy emerges as the real "strategic" danger. Disease, overpopulation, unprovoked crime, scarcity of resources, refugee migrations, the increasing erosion of nation-states and international borders, and the empowerment of private armies, security firms, and international drug cartels are now most tellingly demonstrated through a West African prism. West Africa provides an appropriate introduction to the issues, often extremely unpleasant to discuss, that will soon confront our civilization. To remap the political earth the way it will be a few decades hence--as I intend to do in this article—I find I must begin with West Africa. (Kaplan: 1994: 2)

As mentioned above, although the population is an important variable in environment-conflict research, we contend that the climate change variable is more potent in terms of generating inter-state conflict than the population variable, because of the following reasons:

Firstly, the climate change is a double-edged sword factor that can prompt tension generating response from states that share international water courses because on the one hand the climate change impacts projections for the West African sub-region suggest that the region is likely to suffer from adverse climate change that can bring about the scarcity of environmental resources and, on the other hand, according to Bates some models indicate that there is a high degree of uncertainty on how the impacts of the climate change factor will unfold in the region, particularly on the region's water resources (Bates B.C *et al:* 2008). Consequently whether or not the impacts become real, the uncertainty associated with the projections would very likely generate anxiety in the states of the region. Unlike the population factor this state of affairs will have far more effects on the behavior of riparian states of the Niger River basin in their response to the scarcity of water resources or the fear of scarcity in terms of veering towards conflict behavior than population pressure would: the

effects of growing population on resources availability (e.g. land and water resources) can be predicted with a high degree of accuracy while ecological disasters like prolonged droughts which climate change could generate maybe frequent and catastrophic or slow and catastrophic. Consequently, it is easier for vulnerable states like the West African states to respond to environmental resource scarcity generated by increase in population in a measured way than it is for the states to handle the impacts of abrupt resources scarcity which climate change can bring about.

Secondly, the models such the one constructed by Nils Gleditsch (cited on page 33) that place emphasis on population growth obscure the difference between how states respond to the underlying factors that generates conflict in both intra-state and inter-state conflicts. The two policy issues are not in the same level; while responding to population growth is entirely a domestic policy issue, responding to the likely effects of climate change on shared/transboundary water resources for example is an intermestic policy issue. Hence while it is easier for the states concerned to act with considerable leverage on domestic policies, they face constraints when faced with intermestic issues like transboundary natural resources.

The sources of this shortcoming in the mainstream literature (i.e. the choice of a weaker independent variable-population increase) lies in the conflation of two categories of environmental resources: renewable and non-renewable resources which can be traced to the ontological priority of the dominant neo-Malthusian/realists' perspective. That is that, the central concern of the developed industrialized world is with maintaining their sources of

energy (i.e. non-renewable resources), in disregard to the primary concern of poor developing countries like those of West Africa for example, in relation to the effects of high energy consumption elsewhere (which results in global warming and climate change) on the sources of the livelihood of majority of the people who depend directly on renewable environmental resources like cropland and water.

The Water Cooperation/Liberal Institutionalists School

The main shortcoming of the water cooperation perspective borders around the argument that; new and emerging conditions particularly phenomena like climate change which has the potential to affect the behavior of states in a negative way that would galvanize other benign conflict generating conditions in a basin area and consequently weaken or obliterate the existing sources of cooperation between riparian states.

Putting the evidence and factors or conditions identified in the arguments for the water cooperation perspective to test on the water interactions of the countries of the Niger River Basin may appear to be cogent on the surface, but looking further would reveal that the water war argument in relation to the water resources of the Niger River basin is weighty and convincing as well. For example if we take the strategic argument, Nigeria is clearly the regional hegemon; doubling also as the last downstream country in respect of the Niger River. However, given the historical cordial relationships that exist between Nigeria with her neighbors and even for reputational reasons, the likelihood of Nigeria launching a war on its weaker neighbors over the waters of the Niger River can be seen to be weak. This is evident in the wayNigeria responded to her immediate neighbours' unprovoked hostility towards her

in the past. For example in 1981 Cameroonian troops attacked and killed five Nigerian soldiers at Ikang in Cross-Rivers state. 1n 1983 Chadian soldiers occupied Nigerian islands on Lake Chad. In 1987, the authorities of Equatorial Guinea permitted the hostile apartheid regime of South Africa to have a foot-hold on its territory. Earlier in 1960 Niger allowed France to test an atomic bomb in its territory, while the Gendarmes of Benin Republic were reported to have occupied Nigerian villages on at least two occasions (Ate, 1992). These examples therefore, support the argument on the political relation between the countries of West Africa and point to the unlikelihood of the regional hegemon launching a war in West Africa.

In addition to this the evidences in respect of inter-state relations in West Africa, particularly on the settlements of territorial disputes, (the issue most closest to the contention over shared (transboundary natural resources), suggests that, cooperation, rather than confrontation or conflict prevails across the region; whether the dispute in question is irredentist or positional in nature. Of the ten territorial disputes that occurred in West Africa since 1960, none had degenerated into war. Accounting for this peculiar characteristic of inter-state relations in West Africa, Kornprobst identified the entrenchment of what he called secondary norm of territorial integrity into the primary norm of decolonization as the main factor that explains the difference between West Africa and the Horn of Africa where in contrast four territorial disputes occurred and two of which erupted into wars. (Kornprobst: 2002). If this precedence is taken into consideration, it can equally be argued that, it is highly unlikely that, disputes or

contestations over shared water resources between West African countries would degenerate into conflicts or wars between states in the region.

The same conclusion can also be drawn based on the shared interest and the institutional resilience arguments. Given the growing role of ECOWAS; the regional body is assuming in terms of advancing the shared interests of all the ECOWAS Member states and also the existence of the international water management organizations in this respect the Niger Basin Authority it can be argued that the odds are against the likelihood of conflicts over the shared/transboundary water resources in West Africa or more particularly the Niger River basin.

On the other hand, although there are no conclusive evidences (as yet) on how climate change will affect the water sector in West Africa (which in our view is a sources of worry in itself), there is a strong reason to suspect the likelihood of interstates conflicts over shared water resources of the Niger River basin. For one the peculiar characteristics of the West African sub-region (as outlined in the general introduction- chapter one), are not found in anywhere in the world; in addition to the endemic poverty in the region, the region is also closest to the equator which makes it prone to climate variability which can be aggravated by both the natural cycle as well as the manmade one. Yet again, the uncertainty surrounding the nature of the impacts of climate change as well as other important or intervening factors such as projected increase in the region's population, food insecurity and the heavy reliance on rain fed agriculture, very high water dependency ratio of most of the states of the basin area, could all combine to trigger unhealthy competition over shared water resources in

addition to the vulnerability of having very low capacity to cope or mitigate the impacts of climate change in most of the states in the region.

Also, in spite of the evidence of cordial relationships among West African states, disputes over transboundary natural resources have different dynamics with territorial disputes. The incidence between Senegal and Mauritania over grazing rights in which nerves were strained and gun shots were fired across borders in1989 and 1991 indicates that environmental resources disputes could be more volatile than territorial disputes especially on resources that are crucial to self-preservation.

In addition to this the international water laws are said to be at poor state: according to Wolf (1998), the international law that governs water management is poorly developed, contradictory, and unenforceable (Wolf: 1998: 1). In addition to this, cases referred to the International Court of Justice (ICJ) are heard only with the consent of all the parties involved. This is the anarchical situation at the international level that the realists harp on. Where there are no universally agreed upon rules of behavior or where there no clear sanctions to the infringement of even the 'weak' rules, then states would have no option but to resort to self-help. Consequently if all these factors are taken into consideration, the argument for the likelihood of water conflict in West Africa can also stand.

Another important factor in support of the likelihood of disputes and conflict between the riparian states of the Niger River basin is the fact that conditions do change: poor countries that may have been depending on handouts from Nigeria may suddenly discover new sources

of wealth in their territories. And their dependence on Nigeria may become less and less in the coming decades. Consequently where their interests collide with that of Nigeria, the situation may not be the same as was obtained in the past.

In conclusion, in spite of his strong views against the water wars postulations, Wolf provided a caveat thus:

> "While "water wars" may be a myth, the connection between water and political stability certainly is not. The lack of a clean freshwater supply clearly does lead to instability which, in turn, can create an environment more conducive to political or even military conflict. Bangladeshi instability and "environmental refugees" brought about by the environmental degradation, which in turn was caused by Indian diversions of Ganges waters, is perhaps the best recent example" (Wolf; 1998; 259).

Consequently, it is reasonable to argue that, the impacts of climate change on the behavior of the states is a more portent indicator on whether riparian states would veer towards conflict than population increase or pressure. Secondly although the mediating role that water management organizations play in the settlement of inter-riparian disputes is important, the effectiveness of the role that international organization play in conflict prevention is not a given even where treaty agreements are seen to be 'comprehensive'. As highlighted above, the weakness of international law is an important indicator: issues of compliance; enforcement of treaty rules, cheating, defection and more importantly membership of international organizations is optional are difficult to deal with.

2.6. THEORETICAL FRAMEWORK

The theory of Liberal Institutionalism provides the most appropriate framework for the explanation of the problematic of this study and a guide to the study. The argument of the water cooperation school is anchored on the theory of Liberal Institutionalism. Liberal Institutionalists share with Realists some of the central assumptions of realism; however differ with realists on certain important details. For example, while they accept the importance of the state and the anarchic nature of the international system, they disagree with the realists that, anarchy situations necessarily lead to conflicts. According to Burchill, Institutionalists maintain that, anarchy can be mitigated by regimes and institutional cooperation which bring higher levels of regularity and predictability to international relations (Burchill: 2005: 65). Because regimes constrain the behavior of states by formalizing the expectations of each party to an agreement where there is a shared interest. Institutions then assume the role of encouraging cooperative habits, monitoring compliance and sanctioning defectors. Regimes also enhance trust, continuity and stability in a world of ungoverned anarchy (Burchill: 2005: 65).

Secondly, the two perspectives also differ on how states conceive of their interests in the international arena. Whereas realists, argue that states are concerned with 'relative gains' which means gains assessed in comparative terms (who will gain more?), Institutionalists maintain that states are concerned with maximizing their 'absolute gains'; an assessment of their own welfare independent of their rivals (what will gain me the most?). Hence, Liberal Institutionalists believe that, international relations need not be a zero-sum game, as many states feel secure enough to maximize their own gains regardless of what accrues to others.

Mutual benefits arising out of cooperation are possible because states are not always preoccupied with relative gains (Burchill: 2005: 65).

According to D'Anieri, the central point in Liberal Institutionalists theory is that cooperation does not result from altruism or trust; it results from the rational pursuit of self-interest (D'Anieri: 2010: 78).

On the other hand, a strong critique of the Liberal Institutionalists theory is the possibility of cheating and the problem of enforcement of agreements. On which they reply that, more collaboration among the states would eliminate these problems (D'Anieri: 2010: 77-78). However the Liberal Institutionalists acknowledge that cooperation between states is likely to be fragile, particularly where enforcement procedures are weak.

Given the weaknesses identify in the two perspectives in relation to the problematic of this study and to mark out the research design of the study based on the theoretical framework adopted, the study adopted and modified the Gleditsch representation of the environment-conflict models. The Gleditsch model as cited on page 33 above represents a typical realist/neo-Malthusian roadmap to environment-conflict.

Firstly in the modified model, the key independent variable of the environment-conflict /water war model (i.e. population growth) as represented by Gleditsch is substituted with the climate change factor. Secondly the mediating role that treaty agreement and international water management organizations play in disputes/conflicts prevention and resolution is taken

into consideration which the realist/water war scholars ignore. Thus the causal path to conflict which guides this study is as follows:

Climate change or the uncertainty of climate change →depletion and scarcity of water resources or the fear of scarcity → competition for greater access to/and control over water resources → weak or the absence of treaty agreement/institutional capacity of the overseeing international organization → greater likelihood of conflict.

In the trajectory presented in the modified model above the independent/causal variable of climate change will invariably affect the behavior of riparian states in a negative way if the level of the river discharge drop over a considerable period of time; it is likely that changes will be attributed to climate change. On the other hand, unless there is clear scientific evidences which suggest the impacts of climate change will be beneficial to the Niger River basin, the uncertainty element in the climate change projections would most likely generate anxiety among the riparian states. Consequently, unless the treaty agreement that govern the water interactions of the riparian states is drawn up to be resilient i.e. to encourage the riparian states to conceive their interests in terms of absolute gains in the face of threats to the availability of water in the basin and the Niger River Basin Authority has adequate institutional capacity in terms of effective monitoring of compliance, effective sanction mechanisms as well as effective sanction enforcement instruments, then the likelihood that climate change will endanger unhealthy competition for greater access to/ and control of the water resources of the Niger River among the riparian states will be high.

This model is based on the theoretical postulates of the Liberal Institutionalist/Water Cooperation School: that whatever disorder or chaotic environmental disasters and scarcity of environmental resources that may be generated either by a changed climate or higher demands for environmental resources, the mediating role that international water treaties and river basin organizations play will mitigate or eliminate the possibility of disputes degenerating into conflicts if the treaty agreement of the basin states is comprehensive and the river basin organization that oversees the affairs of the states has the capacity to ensure compliance to the rules of behavior expected of the states.

The main advantage of this modified model is that it enables the researcher to conduct a comprehensive assessment of all the factors involved which the two perspectives focus on. For example the realists/water war school foresee anarchy (which the Liberal Institutionalists agree with).While the view of the Liberal Institutionalists is that the role that International Water Treaties (IWTs) and River Basin Organizations (RBOs) play mitigate the effect of anarchy and consequently eliminates the likelihood of disputes degenerating into conflict situations.

Although there are no universal indicators for assessing basins at risks of international conflicts: different researchers from different fields and research orientations use different yardsticks for assessing basins at risks of inter-riparian conflicts or disputes. However, Stefano *et al* conducted an extensive review of the literature and extracted some international relations (institutional) indicators and used what they called geographical approach to map-out areas of potential risk of future hydrological tensions associated with water variability

due to climate change in some international basins across the world. The following principles and mechanisms were employed in their study of a number of river basins across the world:

1. Water Allocation principle
2. Variability Management principle
3. Conflict Resolution Mechanism
4. An effective River Basin organization (Stefano *et al:* 2012: 193-209)

These principles and mechanisms conform to those provided in the 1997 UN Convention on the non-Navigational Uses of International Watercourses. And also they conform to the indicators of the Water Cooperation School which focuses on in identifying basins at risk of international conflict based of the features that the international water agreements contain that guarantee their resilience to water variability and uncertainty in shared international watercourses. These principles and mechanisms are therefore used in assessing the comprehensiveness of the Water Charter and the Convention of the Niger River basin countries that is to determine whether or not the Niger Basin legal instruments are weak and/or the institutional capacity of the Niger River Authority is weak or can be resilient to the impacts of climate change.

CHAPTER THREE:

RESEARCH METHODOLOGY

3.1. INTRODUCTION

As highlighted in the preceding chapter the focus and areas of emphasis of the two main approaches on the problematic of water and international conflict (i.e. the Water War and Water Cooperation Schools) differ, hence what they look into for example in the investigation of basins at risks of international conflicts also differs. The focus of the Water War perspective is anchored around the identification of the causes of environmental resources disputes and conflicts steeped in the realists/neo-Malthusian precepts. On the other hand, the emphasis of the Water Cooperation School is in the main on the examination of the sources of cooperation in the international water interactions of riparian states in a basin area, usually in treaty agreements which basin management organizations oversee. Given the vulnerability of the states of the Niger River basin to the threats posed by climate change, the low capacity of most of the Niger basin riparian states to cope or mitigate the impacts of adverse climate change, in addition to the presence of other benign conflict generating conditions within the countries of the Niger River basin, the Niger River basin can be characterized as a complex basin area in which several variables are interwoven and at play, hence to focus mainly on either the cause of resources conflict (the realists/neo-Malthusian area of emphasis) or the area of emphasis of the Water Cooperation School will limit the factors to be considered and hence restrict a thorough and comprehensive assessment of the risks of conflict in the Niger River basin area.

Consequently, this study focused on both the sources of disputes and conflict, in other words the causes of water scarcity and as well as on the presence of/and effectiveness of the principles and mechanisms that promote cooperation (the area of emphasis of the Water Cooperation-liberal Institutionalist School) guarantee the resilience of institutionalized cooperation in international river basins. In essence the two main theoretical perspectives of International Relations that is; the Realists and the Liberal Institutionalists share one fundamental assumption: that, the international system is anarchical but they differ on the consequences of anarchy. Liberal Institutionalists do not see anarchy as necessarily leading to conflict; states they contend can cooperate to overcome the problem of anarchy.

To assess the likelihood of inter-state conflict over the water resources of the Niger River basin, the research design of this study is constructed/derived from the modified model (presented in the preceding chapter) which takes into consideration a focus on the causes of conflict and also the effectiveness of the sources of cooperation.

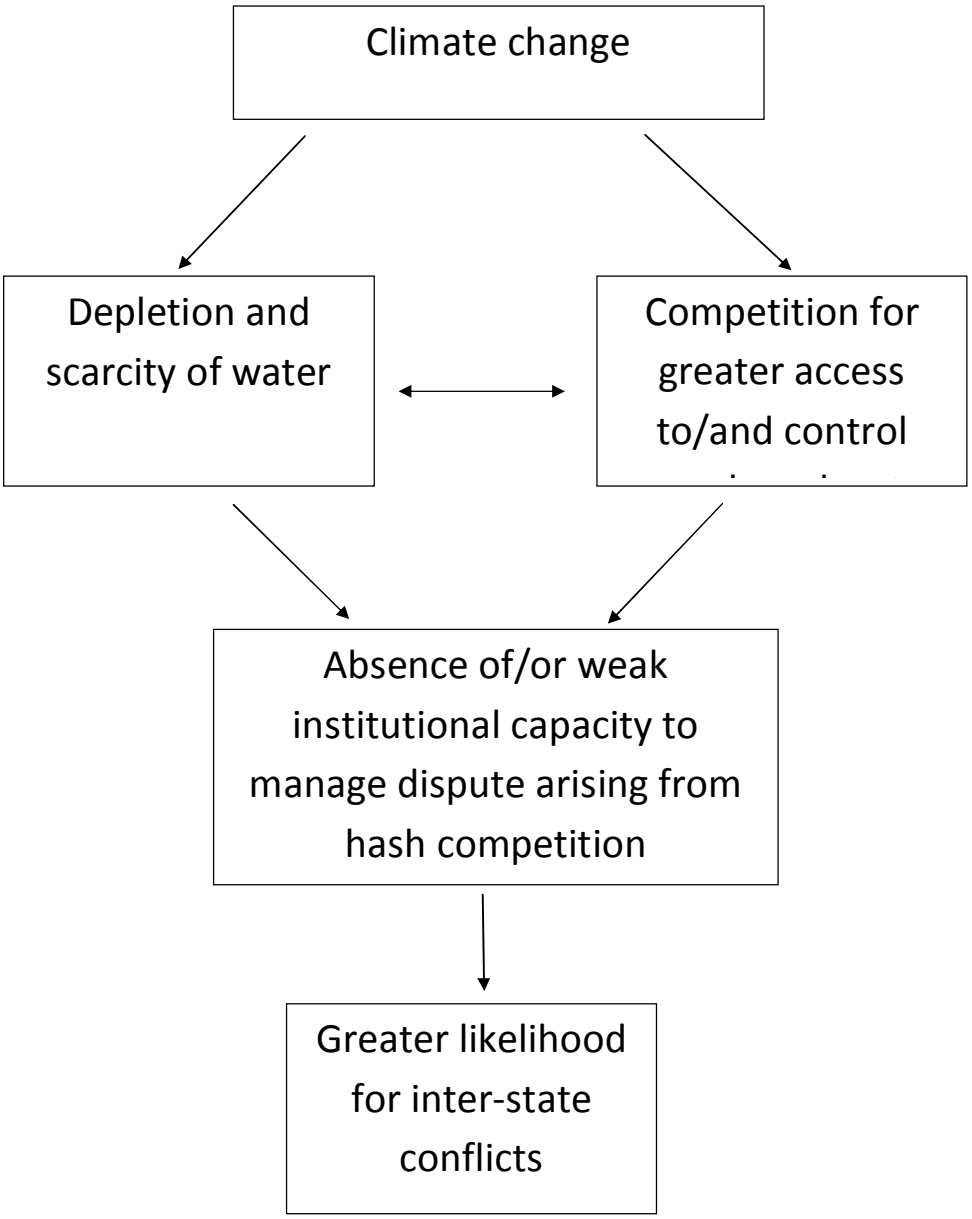
3.2. RESEARCH DESIGN

The modified model reads:

Climate change or the uncertainty of climate change → depletion and scarcity of water resources or the fear of scarcity → competition for greater access to/and control over water resources → weak or the absence of treaty agreement/institutional capacity of the overseeing international organization → greater likelihood of conflict.

This causal path to conflict is represented in the diagram on figure 3.1

Figure 3.1: A model of climate change induced conflict over shared water resources



The following indicators are therefore identified and contracted into three categories (obtained from various institutional sources including the 1997 UN Convention on the non-Navigational Uses of International Watercourses). These indicators gauged the comprehensiveness of Niger Basin treaty rules:

1. Mechanism for the allocation of the water resources of the Niger River between the riparian states based on equity and need;
2. Dispute/Conflict Prevention Mechanisms such as the duty to inform other riparian states of plan to embark on projects by every member state, monitoring compliance to the rules among others;
3. Enforcement mechanisms; this includes the capacity to apply sanction regimes in protracted disputes/conflicts particularly on a belligerent member

On the other hand the effectiveness of NBA was measured against the effects of the independent variable (climate change), on the behavior of the riparian states in response to the threat of climate change in terms of compliance or non-compliance of the individual Member States to the NBA's rule books i.e. from the year the first Intergovernmental Panel Climate Change (IPCC)'s climate change impacts projections was released -1990 (which was the most authentic assessment of regional impacts of climate change as yet), up to the year 2011 in comparison to the preceding years i.e. from 1963 the year the then Niger River Commission (NBC) was formed particularly evidence were sought in the following areas:

1. Unilateral actions
2. Defection/Cheating (both intentional and unintentional)

These behavior patterns were meant to provide the evidence with which to gauge the impacts of climate change on the behavior of the riparian states in terms of its inducement for competition over the water resources of the Niger River basin: if the occurrence of the incidences of general rules flouting, defection or cheating increase substantially from 1990 upwards we will presume that to be an indication of negative impacts of climate change on the riparian states of the Niger River basin, subject to the validation of the evidence with experts in the legal and hydrology departments of the Niger Basin Authority.

Based on the model that guided the study, the study design was necessarily a retrospective-prospective design. Retrospectively we examined the data on the trends in rainfall over the Niger basin and the flow or discharge of the Niger River from the 1950s onwards. To determine the impacts of climate change on the riparian states in terms of the quest to acquire more of the water resources of the Niger River by the riparian states we compared the period before 1990 and the period from 1990 up to 2011 (1990 being the year the first IPCC report on climate change was released).

Prospectively (to determine the likely future course of inter-riparian interactions in terms of conflict or cooperation over the Niger River), that is, in addition to the trend in the period between 1990 to 2011 we examined the comprehensiveness of the convention establishing the NBA and the Water Charter that govern the water interactions of the riparian states of the Niger River basin in view of the threats posed by climate change to the water resources of the Niger River basin.

Hence the instrument for data collection was constructed to obtain data from the following sources/categories:

1. Evidence on the impacts of climate change on the water resources of the Niger River basin both from the Niger Basin Authority and from international bodies particularly from the Intergovernmental Panel on Climate Change (IPCC) reports.
2. Data on the current state of knowledge on global climate change and the current situation on the global efforts to cut the emissions of greenhouse gases as well as the projections made on the future imparts of climate change particularly on the water resources of the Niger River basin on the basis of current and projected global greenhouse gases emissions.
3. Evidence on new demand between the riparian states to have greater access to and control of the water resources within their territories.
4. Evidence of the capacity of the Niger Basin Authority in terms of disputes/conflicts prevention mechanisms between the riparian states of the Niger River basin and the capacity of the NBA to resolve disputes or conflicts if they occur in the future.

3.3. COSTRUCTION OF THE INSTRUMENT OF DATA COLLECTION

Based on the objectives of the study the research instrument was constructed to obtain data from documents as well as from in-depth interview with experts (e.g. hydrologists) and other resource persons like administrators. This meant that, the main sources of data are the Convention and the Charter of the NBA, the past and present legal issues between the riparian states as well as data from the hydrology department of the NBA on the impacts of

climate change on the Niger River basin. Secondly the in-depth interview provided up to date information as well as helped in the elimination one of the main disadvantages of using document data of this nature such as ambiguities that may be in the documents. Hence the interview provided the opportunity to seek further clarifications in both the legal issues and even the technical data.

The following steps were followed in constructing the instrument:

Step I: The objectives of the study were formulated.

Step II: Against each objective, associated questions were listed.

Step III: A list of all the information that is required to answer the research questions identified in step II above was provided.

Step IV: Another set of questions were further formulated to obtain the information in step III above

This procedure was adopted from Kumar 2008: p. 138.

3.4. VALIDITY OF THE INSTRUMENT

To establish the validity of the instrument, i.e. to ascertain if the instrument can measure what the study set out to measure, a validity test was conducted. Of the three types of validity commonly used in the Social Sciences the face and content validity test was selected. Face and content validity is simply the establishment of a logical link between the questions and the objectives of the study. Also, the use of content validity also requires that, "the items and questions cover the full range of the issues or attitudes being measured" (Kumar: 2005:154).

The main reason for the selection of this validity was because the research instrument constructed indicated that the data to be collected are qualitative. Hence, face and content validity is the appropriate validity test for this kind of instrument. One advantage of the face and content validity is that it is easy to use; each question or item on the scale must have a logical link with an objective (Kumar: 2005:154).

Table 3.1 illustrates the procedure followed in developing the instrument

Objective	Associated Questions	Information Required	Further Questions to obtain Information
(1) To determine the impacts of climate change projections on the behavior of the riparian states of the Niger River Basin via their response	(1)How did the climate change impact projections for West Africa in relation to the water resources of the Niger River basin affected the behavior of the riparian states of the Niger River basin?	(1) Evidence of 'rush' in acquiring greater access to the water resources of in the basin (particularly from 1990 to 2011) (2) Evidence of non-compliance of the individual Member States with the NBA's Water Charter and Convention i.e. from the year of the first Intergovernmental Panel Climate Change (IPCC)'s climate change impacts projections-1990 to 2011 in comparison to the preceding years i.e. from 1963 the year the then Niger River Commission (NBC) was established particularly to 1989 evidences will be sought in the following areas: i. Unilateral actions ii. Defection/Cheating (both intentional and unintentional) etc.	(1)What is rate of projects to acquiring more water resources by member states? (2) What is rate of non-compliance prior to 1990 to the rules of behavior among the riparian states of Niger River basin? (2)What is rate of non-compliance after 1990 up to 2011 to the rules of behavior among the riparian states of Niger River basin? (3)Are there incidences of unilateral response to the threats posed by climate change from any Member state?

(2) To assess the comprehensiveness and effectiveness of the Convention and Charter of the River Niger Basin Authority (3) To assess the capacity of the Niger River Basin Authority in managing eventualities like climate change	(1) How comprehensive are the NBA's rule books e.g. in terms of having features like conflict prevention and sanction enforcements mechanisms? (1) How comprehensive are the NBA's rule books e.g. in terms of managing unforeseen eventualities like climate change?	(1) Point by point comparison of the provisions in NBA' rule books with the provisions of the UN Convention on the non-navigational uses of the international water courses (1) Evidence of provisions in the NBA's rule books that stipulate what measures will be taken by the Authority in the event of unforeseen circumstances like climate change to discourage unilateral response by members.	(1) Are the rule books of the NBA up to the standard of the UN Convention? (1) In the event of situations like the climate change projections, are there clear guidelines in the NBA's rule books on what is expected of the states concerned? (2)How prepared is the NBA to eventualities like the climate change impacts projections for the West African sub-region?
(4) To assess the capacity of the Niger Basin Authority in the management of inter-state disputes and enforcing compliance to agreed rules of behavior among Member states	(1) How effective has the NBA been in dispute settlement and enforcement of agreements?	(1) Evidence on disputes settlements and enforcement compliance by the NBA.	(1) Are there incidences of non-compliance by any Member states?

Source: Adapted from Kumar (2008: 139).

3.5. TYPES AND SOURCES OF DATA

As mentioned above, the main source of the data of the study was the Niger Basin Authority. This is because the NBA has well established departments that have been collecting data over the Niger River basin for at least the past four decades. For example metrological and hydrological data are daily being collected by scientists and experts in the observatory stations of the Technical Department of the Authority in Conakry- Guinea, Bamako-Mali, Niamey-Niger and Lokoja-Nigeria. On the other hand, the legal Department of the Niger Basin Authority is the custodian of all legal matters concerning the Convention of the NBA and the Water Charter including the interpretation of such. Hence there is no better source of obtaining reliable and valid hydrology and climate data over the Niger River basin as well as data on the nature and effectiveness of the Treaty establishing the NBA than from the NBA itself.

However, this does not suggest that the study relied 100% on the NBA. Other reliable sources of data were also made used of. For example the study obtained and made used of the reports of the Intergovernmental Panel on Climate Change (IPCC).

3.6. PRE-FIELD PREPARATION

3.6.1 Recruitment and Training of Research Assistants

As indicated, the fieldwork was essentially conducted at the headquarters of the Niger River Basin Authority which is located in Niamey in Niger republic. Of the nine riparian member countries of the Niger River Basin Authority only Nigeria is an English speaking country; all the other eight are French speaking countries. Preliminary inquiries on the Niger Basin

Authority revealed that, although both English and French are the official languages of the authority, the French language is the main language that is spoken in the headquarters of the Niger Basin Authority because majority of the staff of the Authority are from the eight French speaking member countries. All the documents of the Authority are supposed to be in both French and English but some of the documents are yet to be translated into English. And this researcher does not understand the French language; which will certainly slow the progress of the field work. Hence the need for at least one research assistant that speaks both languages fluently at almost every stage of the fieldwork, especially at the interview phase of data collection preferably a Nigerien citizen.

Secondly, one of the preliminary requirements of conducting a research of this nature is to write and seek the consent and cooperation of the relevant authorities before the field work. As a citizen of ECOWAS, I do not need a visa to enter Niger Republic. However to obtain the permission and the necessary commitment of the authorities may require not just sending a letter to the authority because certain details may be needed before permission is granted.

Thirdly there was also the need to obtain all the necessary information (logistics) before the journey to Niamey is embarked upon: such as the financial implications; cost of hotel accommodation; transportation; feeding etc.

Fortunately, in the Department Science and International Studies (Ahmadu Bello University, Zaria) there were students from Niger Republic. So, the first task was to identify the most

competent amongst them and hope they will be willing to serve as research assistants. Through some of the students' leaders four potential candidates were identified and invited to a meeting. In the first meeting the purpose of the research was explained to them and why research assistants were needed to help in conducting the research in Niamey. At that time two of them were about graduating while the other two have at least a year to graduate. The two graduating students were therefore the most suitable to be engaged. Fortunately also one of the two was from the capital city; Niamey the seat of the headquarters of the Niger River Basin Authority.

Having found the right assistants (at least to engage in the pre-field activity), the next task was to test their proficiency in the English language before the training proper began because in all our earlier interactions we spoke in Hausa. Their proficiency in English language was satisfactory but not up to the preferred standard. However, in spite of this shortcoming these assistants were engaged; at least they proved to be useful at the pre-field work stage.

The first day of training centered on explaining the nature of the research problem and the research design, while the second day focused on the phase of data collection including the pre-field activities and the actual data collection stage. At the pre-field stage the emphasis was on getting the permission and on identifying the units or departments as well as the resource persons that will be interviewed at the headquarters of the Basin Authority. The emphasis was also laid on the importance of creating the necessary rapport with the key officers because unless we were able to build confidence in the respondents it might be possible to run into some of the problems that are associated with the data collection that

involved sensitive documents. For example the researchers might be told that some of the documents are classified as confidential and therefore will not be made available.

Although the convention is to send the letter of introduction and consent-seeking to the relevant authority through the conventional means, (e.g. via a courier company) I chose to send the first letter by hand through one of the research assistants. The reason for this decision was to start engaging them immediately after their graduation. Hence in addition to the instruction to hand the letter to the Secretary of the Executive Secretary of the Basin Authority, I also instructed the assistant that took the letter to search for and identify Nigerians that may be working there and possibly collect and send to me their phone numbers and email addresses. This was to enable me start communicating with somebody in the Authority's headquarters, particularly to identify someone who is proficient in both English and French languages that may be of help particularly with the translation while I was there.

The pre-field work phase went fairly smoothly. The research assistant who took the letter of introduction did a good job in explaining and establishing the necessary rapport. Permission was granted (see Appendix 1) and he was also able to find two Nigerian nationals: one of them double as the Special Assistant to the Executive Secretary of the Authority and a translator.

3.7. DATA COLLECTION

The researcher left for Niamey via Maradi and on arrived the researcher was received by one of the research assistants at the bus station and then took a taxi to the hotel which he helped identified and booked. We arranged to meet the next morning at the headquarters of the Niger Basin Authority by 9 am to meet with the Special Assistant to the Executive Secretary whom the researcher had earlier established contact with and was aware of my arrival. A meeting was arranged for me with the Executive Secretary.

As we anticipated, the meeting turned out well. Instructions were given by the Executive Secretary to all the Heads of Department and Units that we should be given maximum cooperation. Not only that, a car and a driver was provided to the researcher (because some of the Departments and Units are not located at the Headquarters of the NBA), throughout the researcher stay in Niamey.

Although interview instrument was not pre-tested before the researcher arrived Niamey, we were able to have a feel of the accuracy of the research instrument in terms of asking the right questions and eliciting accurate responses after collecting and examining Convention establishing the NBA, the Water Charter of the Niger River basin and other documents from the Legal and Archival Departments. This activity provided the researchers with more insights that enabled us to further fine-tune the interview questions.

After this phase, the researcher drew an interview schedule together with the Chief of Cabinet of the Executive Secretary who then forwarded same to the Heads of Department

and Units that were to be interviewed. The mode of the interview was in-depth- unstructured. Most of the questions centered on seeking current information and clarifications on areas that were ambiguous to the researcher in the documents consulted in the first phase. This phase of the fieldwork lasted for five days. Overall the whole process went fairly smoothly (see Appendix 2-Summary of Fieldwork activities).

3.7.1Challenges Encountered in the Process of Data Collection

The main challenge encountered at the phase of data collection was the demand by the Heads of Basin Observatory (Hydrology) that, before data will be provided to the researcher, the researcher must undergo a 'desk-work' tutorial in their Departments. The main reason being that, the researcher is not a climate scientist and that, unless an on hand coaching was given to the researcher, he may not be able to make good sense of the data.

Although the researcher received some coaching on the data that he collected, the researcher was able to convince the hydrologists that his financial resources will not sustain him for the additional of stay in Niamey. In the end this issue was settled when the researcher further explained to them that, with their email addresses, he can always consult them even while he had returned to Nigeria for more clarifications if the need arises.

3.8. METHOD OF DATA ANALYSIS

The unit of analysis of the study is the NBA, in other words, the NBA is more or less a case study, hence the sources of data required to answer the research questions are document and in-depth interview with the relevant experts in the organization i.e. the data was generated qualitatively, and the interpretation of the data was therefore non-numeral. A main criticism of the qualitative method is that is it subject to the researcher's bias because it is not numerically quantified and therefore measurement may be subjective, and also the interpretation of the data may reflect the bias or preferences of the researcher. In the case of this study this problem has been eliminated: from the conception of the research problem through the construction of the research design, careful consideration has been made towards achieving question objectivity. Thus the researcher is confident that the findings of the study reflect the evidence obtained.

CHAPTER FOUR:

THE CLIMATE SCIENCE DEBATE AND THE PROTRACTED NEGOTIATIONS ON THE REDUCTIONS OF GREENHOUSE GASES EMISSIONS

4.1. INTRODUCTION

There are a number of issues in the science of climate change that have direct and indirect bearing on the global efforts to cut the emissions of greenhouse gases which the climate scientists are confident will prevent what they called dangerous climate change. One of the issues centres on the question- why is the climate changing? This (climate science) question has generated a lot of debates, disagreements and controversy among scientists and other stakeholders particularly in the United States of America: because according to the climate scientists there are some uncertainties over the complex mechanisms of the Earth's climatic system with regard to this question which the scientists are yet to unravel.

On the one hand of the contention are the mainstream climate scientists who have concluded (with very high degree of confidence; based on available evidence) that, the emissions and concentration of greenhouse gases in the atmosphere is the main cause of climate change in spite of the uncertainties. On the other hand are the scientists (viz. global warming sceptics) who are not convinced that global warming is caused by the concentration of greenhouse gases in the atmosphere.

This disagreement among the scientists are supported by at the one hand, big energy businesses and on the other, those who are concerned with the state of the environment and the consequences of environmental security problems as each group tries to woo public

supports with the view to influence the decision making process especially in the United States of America.

As it stands, most governments across the world have accepted the explanation of the mainstream scientists including the past and present administrations of the United States of America, as presented by the Intergovernmental Panel on Climate Change (IPCC) that, global warming is caused by the emissions and concentration of greenhouse gases in the atmosphere. Hence global efforts are made through the platform of the United Nations Framework Convention on Climate Change (UNFCCC) to achieve global agreements to cut the emissions of the greenhouse gases in order to halt or possibly reverse the glide towards dangerous climate change.

Although the economic considerations of the countries that are negotiating to achieve long term legally binding agreements (to cut the emissions of greenhouse gases into the atmosphere), is foremost, the lack of universal scientific consensus over the cause of climate change and the polarization it generated in United States of America has directly and indirectly impacted on the behaviour of the industrialized countries in the ongoing global climate negotiations. And this has caused a lot of the difficulties that are being encountered in the conferences of the parties to the UNFCCC to achieve consensus in having legal obligations to cut and stabilize the emissions of greenhouse gases.

The next section of this chapter examines the issues in contention over the answer to the question why is the climate changing. The third section examines how these contentions

affect the efforts to cut the emission of greenhouse gases particularly carbon-dioxide through international agreements between the industrialized or Annex1 countries-all industrialized countries fall under this category and the group is led by the United States of America and the industrializing or Annex 2 countries-77 of them including African, Asian, Island countries and Latin American countries led by China. In the fourth section the implications of the protracted international climate negotiations on the most vulnerable regions to the adverse effects of climate change particularly the West African sub-region are explored.

4.2. THE SCIENCE OF CLIMATE CHANGE: THE ISSUES IN CONTENTION

There are several questions that climate scientists are contending with, with regards to climate change. One of which is why is the climate changing? This section of the chapter will examine the issues in contention over this question; that is yet to have universal consensus given that the answers to some of the questions are settled among scientists. On the one hand of the disagreement over this question are the mainstream scientists who are convinced that climate change is caused by the emissions and concentration of greenhouse gases in the atmosphere, the biggest of which is carbon dioxide ($C0_2$), emitted through the burning of fossil fuels like coal and oil in generating electricity, industrial productions, exhumes from motor vehicles and many other uses. Therefore they argue that, the continuous emission of these gases into the atmosphere is dangerously interfering with the climate system; consequently climate change is caused by human activity. They therefore warn that, if dangerous climate change is to be avoided, the emissions of the greenhouse gases must be cut and stabilize around 2 ^{0}C of the Earth's pre-industrial temperature (Dessler: 2012: 170).

The views of this group of scientists is officially represented by the Intergovernmental Panel on Climate Change (IPCC) a United Nations sponsored intergovernmental body that also serves as a network of some of the world's climate scientists and experts. Established by the World Metrological Organization (WMO) and the United Nations Environmental Programme (UNEP), the IPCC therefore represents the mainstream understanding and interpretation of climate science over the issues of climate change. The Charter of the IPCC is: "...to assess on a comprehensive, objective, open and transparent basis the scientific, technical and socio-economic information relevant to understanding the scientific basis of risk of human-induced climate change, its potential impacts and options for adaptation and mitigation" (IPCC principles).

The objective of the IPCC is to provide a summary of what climate scientists know about climate change and how confidently they know it for policy makers and the general public (Dessler: 2012: 207). Thus far the body has produced four rounds of main reports: the First Assessment Report (FAR)-1990; the Second Assessment report (SAR) -1995; the Third Assessment report (TAR) -2001 and the Fourth Assessment Report (AR4) -2007 which is the latest, and several other Special Reports updating current state of knowledge on the science of global warming and climate change.

According to the Fourth Assessment Report- IPCC AR4 2007 report, on the question of global warming and the influence of human activity in the changing climate, the answer to the question is an unequivocal *Yes* (Solomon *et al*: 2007:5). On the second question, (i.e. the extent to which the concentration of atmospheric greenhouse gases is responsible for global warming), the conclusion of the IPCC is that, "most of the observed increase in global

average temperatures since the mid-20th century is *very likely* due to the observed increase in anthropogenic greenhouse gas concentrations". Adding that, this is an advance since the Third Assessment Report's conclusion that, "most of the observed warming over the last 50 years is *likely* due to the increase in greenhouse gas concentration" (Solomon *et al*: 2007:10).

Likelihood according to the IPCC's principles of reporting the degree of confidence in the Fourth Assessment Report "refers to a probabilistic assessment of some well-defined outcome having occurred or occurring in the future, and may be based on quantitative analysis or an elicitation of expert views." Very likely represents the probability of the occurrence/outcome of 90-99% probability and likely represents 66-90% probability (Parry *et al*: IPCC: 2007:21).

On the other hand, are the scientists that have dissenting views to that of the mainstream climate scientists (refer to as global warming sceptics), who rejected that global warming is out of the natural cycle of the Earth's climate variations. In addition to the main argument of the global warming sceptics' which is anchored around some of the unknowns or the uncertainties in the science of climate change, data from Earth's past climate indicate that, the Earth has experienced periods of both cooling and warming over several millennia in Earth's climate history (Leroux:2005). Hence they argue that, the current warming of the Earth falls within the natural cycle of the variations of the Earth's climate; that the current climate change is nothing out of the ordinary and therefore the changes that are taking place cannot be stopped by cutting the emissions of greenhouse gasses.

The debate and sometimes heated disagreements that ensued between the two camps since the Intergovernmental Panel on Climate Change (IPCC) was established 1988 is still alive and yet to be resolved. The most recent significant 'altercation' between the two groups of scientists was in November 2009 when it was alleged that a key temperature dataset that show the prove of global warming which the IPCC used, provided to it by the Climate Research Unit (CRU) of the University of East Anglia in conjunction with the UK's Hadley Centre for Climate Prediction was manipulated.

In a paper titled: Climate Science Corrupted: *How the IPCC's sponsor, the UNEP, and key IPCC individuals have misled Governments into supporting the notion of manmade warming*, John McLean (2009)accuses the scientists working for the IPCC thus:

> Since the publication of its Fourth Assessment Report, the Intergovernmental Panel on Climate Change (IPCC) has been severely criticized by several writers, myself included. These writers have highlighted the IPCC's use of questionable data, weak evidence, wild assertions, failure to abide by its own procedures, distortion of the normal peer review process, mendacious statements of some of its senior people and, overall, its attitude of advocacy and the continued defense of a dubious and discredited hypothesis (Mclean: 2009:3).

Also, in response to the IPCC Fourth Assessment Report (AR4) some of the leading critics of the IPCC like Fred Singer and Greg Idso led the response of the skeptics in producing the skeptics' version of the state of knowledge on climate change, titled: *Climate Change Reconsidered- 2009 Report of the Nongovernmental Panel on Climate Change* (NIPCC). In the report Idso and Singer reiterated that, "in many instances conclusions have been seriously exaggerated, relevant facts have been distorted, and key scientific studies have been omitted or ignored" (Idso and Singer: 2009: iii).

Hence a point by point response was made against the IPCC's Fourth Assessment Report. For example one of the suspected causes of global warming which the climate scientists considered is solar radiation beingone of the factors from the sun that control the climate. According toForster, *et al*although solar physicists have observed an 11 year variation in the sun's outputs of approximately 0.1 percent over the last four decades (p.132), the scientists are convinced that:

> The differences in radiative forcing estimates between the present day and the start of the industrial era for solar irradiance changes and volcanoes are both very small compared to the differences in radiative forcing estimated to have resulted from human activities. As a result, in today's atmosphere, the radiative forcing from human activities is much more important for current and future climate change than the estimated radiative forcing from changes in natural processes (Forster, *et al*. 2007: 137)

In response to this the NIPCC report states that, "The role of solar activity in causing climate change is so complex that most theories of solar forcing must be considered to be as yet unproven. But it would also be appropriate for climate scientists to admit the same about the role of rising atmospheric CO_2 concentrations in driving recent global warming" (Idso and Singer: 2009:5).

In his book: *Global Warming Myth or Reality* Marcel Leroux also accuses the IPCC of manipulating the media and the media for allowing itself to be hoodwinked and manipulated by the IPCC in propagating the myth of global warming which the IPCC concocts and propagates. Stating that;

> …the media, which have a priori no season to hold back, and which more often than not have no way of distinguishing truth from falsehood (nor, perhaps, do they feel the need to do it), rehash the IPCC's handouts; they add a dash of sensationalism and doom, concentrating, as

> usual, on bad news and disaster. Year upon year, from conference after conference, the same slogans, the same propaganda, and the same 'exceptional' images! Again we see the same articles and pictures, the same opinions, the same clichés about 'polar bears in peril' and the same 'Maldives syndrome'. Just change the date as (ever more frequent) circumstances dictates… it gets quite wearing when one hears and sees the relentless fables, which, by mere force of repetition, acquire the semblance of truth! (Leroux: 2005: 8)

In addition a petition project was undertaken, signed by 30 thousand scientists in the United States of America in which they urged the U.S government to reject the global warming agreement; the Kyoto protocol signed in December, 1997, and also any other similar proposals. They argue that, if the U.S ratifies the protocol and limits its emission to meet the obligation under the protocol it will harm not only the environment, but also hinder the advance of science and technology, and damage the health and welfare of mankind. Because according to this group of scientists there is no convincing scientific evidence that human release of carbon monoxide, methane, or other greenhouse gases is causing or will, in the foreseeable future, cause catastrophic heating of the Earth's atmosphere and disruption of the Earth's climate. They further argue that, there is substantial scientific evidence that increases in atmospheric carbon dioxide produce many beneficial effects upon the natural plant and the animal environments of the Earth **(**Global Warming Petition Project).

On the other hand the IPCC scientists and other scientists who agree with the assessments of the IPCC have also been firing back at the dissenters. Dessler and Parson for example state that, the actions of the skeptical scientists is fraud with dishonesty because it was a classic example of a situation in which "policy actors who want to influence decision making

process do employ biased or inaccurate arguments, anecdotes and stories, invocation of powerful symbols, appeals to emotion or prejudice, flattery and manipulation, promises and threats, deals to exchange support on other issues, and sometimes – although these are illegal in most nations – bribery and coercion" (Dessler and Parson: 2006: 36). And also, to further stress their accusations that the global warming skeptics are serving the interests of some big businesses they quoted at length the statements made by Jerry Mahlman, former director of the US Geophysical Fluid Dynamics Laboratory at Princeton:

> . . . we know that the earth's climate has been heating up over the past century. This is happening in the atmosphere, ocean and on land . . . [I]f the climate model projections on the level of warming are right, sea level will be rising for the next thousand years, the glaciers will be melting faster and dramatic increases in the intensity in rainfall rates and hurricanes are expected . . . Unfortunately, these projections are based on strong science that refuses to go away. Oh sure, there are people insisting that warming is just a part of natural weather cycles, but their claims are not close to being scientifically credible . . . These people remind me of the folks who kept trying to cast doubt on the science linking cancer to tobacco use. In both situations, the underlying scientific knowledge was quite well established, while the uncertainties were never enough to render the problem inconsequential. Yet, this offered misguided incentives to dismiss a danger . . . Global warming is unpleasant news. The costs of doing something substantial to arrest it are daunting, but the consequences of not doing anything are staggering (quoted in Dessler and Parson: 2006: 36).

In another instance, Dessler dismiss most of the global warming sceptics as people who lack the necessary expertise in climate science. Suggesting that not everyone's opinion counts when it comes to evaluating competing claims on matters of science because even an expert in a related field is not the same as an expert in that field. For example "a person with a Ph.D. in physics without specialized knowledge of the climate would not be qualified to be an expert on matters of climate. That also goes for weather forecasters – climate and weather

are different, and being an expert in weather would not qualify someone to be an expert witness on climate. The reverse is also true, so I, despite being a professor of atmospheric sciences, would not qualify as an expert in weather" (Dessler: 2012:9). And that, a close evaluation of the dissident scientists on the lists of the numerous petitions in the internet reveals that in almost all cases they should not be considered experts on climate (Dessler: 2012:11).

Dessler further emphasize that, the procedures for selecting the individual scientists that produced the IPCC's reports are based on standard procedures: because the IPCC assembled large writing teams of scientific experts and have them write, as a group, a report detailing what they know about climate change and how confidently they know it. Stressing that, the reliance on large writing groups reduces the possibility that the erroneous opinions of an individual or a small group make it into the report. Also to minimize the possibility that the group of scientists writing the report are biased in some direction, the scientists making up the writing teams are not drafted by a single person or organization; they are nominated by the world's governments. Hence he concludes that, the only way the IPCC's writing groups would be biased in some direction is if all of the world's governments nominated biased individuals. This he points out is very unlikely, particularly because some of the world's governments are very concerned about climate change whereas others would be very happy if climate change disappeared completely as a political issue. Consequently he charged that, the only reason that advocates (global warming sceptics) put such transparently unqualified people forward as experts is that legitimate experts with the desired opinions are not available(Dessler :2012 :10).

Dessler also emphasised that, the IPCC statements were endorsed by other assessment organizations: for examplethe American Association for the Advancement of Science, the American Chemical Society, the American Geophysical Union, and the American Institute of Biological Sciences, the American Meteorological Society, the American Society of Agronomy have all endorsed the IPCC's statements on why the climate is changing (Dessler: 2012:10).

As mentioned above, there are several issues in dispute over the science of climate change. However what is clear is that climate scientists have established that the Earth's climate has experienced bouts of warming and cooling over many millions of years from the Earth's geological history. Also scientists have identified the (natural) mechanisms or the physical processes by which the changes in the Earth's climate over the past many millions of years occurred. Some of the causes identified include tectonic motions, solar variations, orbital variations and internal variations (Dessler: 2012). Hence to find the answer to the question- why is the climate changing, all the identified natural mechanisms or physical changes are considered. And, according to Dessler scientists have ruled out that the present day warming are not caused by these natural causes because changes that occur due to natural events take a long period of time to take place: millions of years in some cases, while the current changes that are occurring are rapid; occurring within decades.

For example Tectonic changes which Dessler defined as the movements of the continents that can substantially alter the arrangement of the continents across the Earth's surface and as such changes can directly lead to large changes in the climate through several mechanisms cannot be responsible for the present day climate change. Because these movements take

millions of years to cause any significant change in the Earth's climate system, and there is no evidence indicating that that is the case (Dessler: 2012:103).

Also considered in the Earth's natural climate variability was orbital variation. This natural mechanism by which the distance of the Earth in relation to the Sun changes which also brings about changes in the Earth climate. However, like the other factors considered by the climate scientists, orbital variation is also ruled-out because it takes many millions of years for the mechanisms involved to bring about any big changes to the climate system as is being witnessed over the last few decades.

Another candidate considered in the search for the answer to the question-why is the climate changing is what is referred to as the "internal variability of the Earth". This is the change that occurs in the Earth's climate system that is driven by the internal physics of the system rather than the external energy changes affecting the Earth. This mechanism which causes the Earth's climate to change is also ruled-out as the possible reason for the changes in the Earth's recent changes. Because according to Dresser **"**the record between 1000 AD and 1800 AD shows nothing similar to the rate and magnitude of warming of the 20th century. Thus, the paleoproxy data do not support internal variability as a cause of the recent warming" (Dessler: 2012:108)**.**

As it stands today governments across the world have accepted the explanations of the IPCC that, global warming is real due to climate change and is caused by the emission of greenhouse gases, mainly carbon-dioxide (CO_2) through the burning of fossil fuels. And that, climate change is imbued with environmental security problems that could jeopardize the

livelihoods of hundreds of millions of people across the world not only in the developing countries of the South but also in some of the developed countries. It was in realization of this that the United Nations resolved to tackle the climate change challenge by means of a global treaty which would ensure that the emission of the greenhouse gases are halted and stabilized at the level the scientists say is safe. This is because, given that to cut the emissions of the greenhouse gases that are causing climate change, particularly carbon-dioxide necessarily mean cutting back the burning of fossil fuels which account for over 90% of the world sources of energy. And this will be particularly difficult task to achieve without a global treaty.

4:3 GLOBAL NEGOTIATIONS ON REDUCING THE EMISSIONS OF GREENHOUSE GASES

Over the past several decades many international conferences we reorganized to highlight the effects of man's activity on the environment and the danger posed by climate change. For example the 1972 Stockholm Conference (The Stockholm Conference on the Human Environment), which according to Leroux the outcome of which characterized the global situation as "The two worlds of Man, the Biosphere he inherited and the Techno-sphere he created are in disequilibrium and virtually in conflict and man finds himself in the middle of that conflict" (Leroux: 2005: 26). Also important was the World Climate Conference which took place in Geneva Switzerland in 1979- which further confirmed climate change as a common global and urgent problem and therefore issued a declaration that called on governments to work towards addressing this problem.

However, besides the 1987 Montreal Protocol that saw the phasing out of the substances chlorofluorocarbons (CFC) which are responsible for depleting the ozone layer which prevents ultra-violent sun rays from reaching the earth, the first global conference organized to address the concerns on climate change and which primary objective was to create a platform on which international treaty can be achieved to tackle the threats that climate change poses to the environment by the United Nations was the Rio de Janeiro in Brazil conference in June 1992: the UN Conference on the Environment and Development (UNCED).

According to Bert Bolin- The first Chairman of the Intergovernmental Panel on Climate Change (IPCC), the First Assessment Report (FAR) of the IPCC kick started the process of creating the United Nations Framework Convention on Climate Change. In other words, the IPCC First Assessment Report provided the basis on which the United Nations Framework Convention on Climate Change United Nations Framework Convention(UNFCCC)was created(Bert Bolin: 2007: 69). The Rio Conference was therefore the first global conference that aimed at creating a long term international agreement to tackle challenges of climate change. The outcome of which was the first global United Nations Framework Convention on Climate Change United Nations Framework Convention (UNFCCC).

Article 2 of the UNFCCC states the objective of the Convention thus:

> The ultimate objective of this Convention and any related legal instruments that the Conference of the Parties may adopt is to achieve, in accordance with the relevant provisions of the Convention, stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food

> production is not threatened and to enable economic development to proceed in a sustainable manner. (United Nations Framework Convention on Climate Change-UNFCCC 1992) See Appendix 3.

Although the Rio UNFCCC Treaty did not set any binding limits on the emission of greenhouse gases on any individual country, many important provisions are provided in the Convention that will facilitate the eventual setting of binding limits on the emissions of greenhouse gases. For example Article 17 (Protocols) paragraph1provides that **"**The Conference of the Parties may, at any ordinary session, adopt protocols to the Convention". This provision provides the mandate for the upgrading of the Treaty towards achieving the objective of the Convention.

Consequently since the Rio conference, regular review of the implementation of the convention through the Conferences of the Parties (COP) and the negotiation of new agreements, protocols or accords in line with the provisions of the convention are being carried out.

4:3:1 The Kyoto Protocol

The first protocol agreed to by the Third Conference of the Parties (COP3) in Kyoto, Japan was the Kyoto protocol in 1997. The Kyoto protocol established legally binding obligations on Annex 1 (developed) countries who agreed to cut their emissions of greenhouse gases to the level of their 1990 levels by 2012 (see Appendix 4), but exempted developing countries (Annex 2-Developing countries). The protocol came into force on the 16th of February 2005

after the required number of countries that ratified the protocol had deposited their instruments of ratification.

Given the United States of America's energy consumption, which is put at nearly 25% of the total global energy consumption, the U.S can be considered as the most important country when it comes to the global efforts to cut and stabilize the emissions of greenhouse gases. Although the United States did not ratify the Kyoto Protocol, it voluntarily agreed to cut its emission by 7% by its 1990 level. The United States is an observer in all the Conferences of the Parties to the Kyoto Protocol by virtue of its having ratified the UNFCCC.

As mentioned above, the main issue in contention in all the efforts to achieve legally binding agreements centered on the economics of growth and the emission of carbon dioxide CO_2. The United States of America protested against the Kyoto Protocol saying that it is not fair to the U.S because the cost of compliance would stress the U.S's economy and at the same time citing the non-inclusion of China among the Annex 1 countries (China is currently the second largest economy in the world and the fastest growing economy as well). While on the other hand the group of 77 Annex 2 (developing) countries led by China argues that the developed countries have the historic responsibility to pay their carbon debts. Because the current concentrated greenhouse gases in the atmosphere, was accumulated over the past two centuries from the industrial activities of the West. Also, the developing countries maintained that, the current carbon footprint of the developed countries is far greater than that of the developing countries. For example the US carbon footprint is about 25% of the world's total in contrast the whole of Africa's is about 8%. Consequently for the sake of equity the developed industrialized countries should shoulder the responsibility of reducing the

emissions of the greenhouse gases to the required level; at least for a considerable part of this century.

The Kyoto Protocol expired in 2012 and prior to the termination date efforts was made in subsequent COPs since 2008 to agree on a second Kyoto commitment period and also the Bali action plan which was supposed to come up with a long term plan for the stabilization of carbon dioxide in the atmosphere. However the much hoped 2009 Copenhagen Conference of the Parties (COP15) did not produce a new accord that was agreed to by all signatories of the UNFCCC. The same problems that prevented the Copenhagen conference from achieving a new all-inclusive accord to replace the first Kyoto Protocol also prevented new agreements in Cancun Mexico (COP16) 2010 and in Durban South Africa (COP 17) 2011. According to some analysts what prevented new agreements from being achieved was essentially the insistence of the developed economies led by the United States of America to change the UNFCCC guidelines or rules of procedure in arriving at decisions. For example according to Martin Khor the UNFCCC rules of procedure are based on the bottom-up approach, from Copenhagen to Durban the developed countries have managed to arm-twist the developing countries by changing the procedures to a top-bottom approach. Hence decisions in these conferences were not collective but the host countries only selected a handful of countries to make decisions on behalf of the rest. This change of the rules has affected the outcomes of these conferences. Because "the developing countries made considerable concessions and sacrifices at Cancun, while the developed countries managed to have their obligations reduced or downgraded" (Khor: 2012: 92). This suggests that the first principle of the UNFCCC which guides the actions of all the 194 states who are signatories to the UNFCCC

has been jettisoned. Article 3 paragraph 1 of the UNFCCC states that; The Parties should protect the climate system for the benefit of present and future generations of humankind, on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities. Accordingly, the developed country Parties should take the lead in combating climate change and the adverse effects thereof.

The 2012 Conference of the Parties (COP 18) took place in Doha Qatar from the 26th November to 8th December 2012 which also served as the 8th Meeting of the Parties to the Kyoto Protocol (CMP8). Two of the main objectives set out for the Doha Conference are: to achieve the formal adoption of the second commitment period to the Kyoto Protocol and to continue the momentum towards achieving a new legally binding agreement for 2020. In Section I paragraph 4 of the Decisions of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol, (released by the UNFCCC Secretariat 28 February, 2013) it was decided that the second commitment period will begin on 1 January 2013 and that it will end on 31 December 2020.

Some analysts believed that, the Doha Conference of the Parties (COP 18) 2012 and the8th Meeting of the Parties to the Kyoto Protocol (CMP8) has fall short of the expectations of the IPCC in the agreed second commitment period of the Kyoto Protocol. What the IPCC recommended was an aggregate cut of between 25-40% cut in the emissions of the greenhouse gases. What came out of the Doha Conference were far less legally binding commitments than what was obtained in the first commitment period of the Kyoto Protocol: Canada, Russia, New Zealand and Japan who were in the Annex 1 parties category (i.e. with

legally binding commitments) opted out of the Annex 1 category in the second commitment period leaving the Protocol to control only 15% of the global emission of the greenhouse gases (see paragraphs 13, 14, 15 and 16 of Appendix 4).

4:4 IMPLICATIONS OF THE PROTRACTED CLIMATE NEGOTIATIONS ON THE WATER INTERACTINS OF THE NIGER RIVER BASIN COUNTRIES

What the outcome of the Doha Conference indicates is that, for the next seven years i.e. between 2013 and 2020 even if the emissions of the greenhouse gases remain as 'business as usual' the temperature rise across the world could go into what Kevin Anderson describes as "climate change going beyond dangerous-brutal numbers". According to Anderson, this is because scientists understanding have remarkably improved on how the impacts of climate change are likely to unfold since 1990 when the IPCC First Assessment Report (FAR) was released and the 2^0C was set as the 'guard-rail' between acceptable and dangerous climate change. Consequently what is clearer now is that:

> Not only do the impacts occur earlier than had been thought, but the set of impacts considered to be just about acceptable corresponds with much lower temperatures. The conclusion is clear. The impacts of 2°C are more serious than previously thought, and consequently the 2°C guard-rail lies in far more dangerous territory. If the logic of defining 2°C impacts as dangerous is to hold, the more recent impact analysis suggests 2°C represents the threshold between dangerous and *extremely* dangerous, rather than between acceptable and dangerous climate change. Certainly, it could reasonably be argued that 1°C rather than 2°C should become the *de facto* appropriate target (Anderson: 2012: 10-20).

In essence the current situation in the efforts to cut the emissions of greenhouse gases particularly since the Kyoto Protocol came into effect indicate that the world has failed to stop climate change. And as Anderson clearly explains in the quotation above, the world is

heading towards a global mean temperature rise of 4^0C. And as he warns, "Without radical and immediate mitigation, we are likely to see global emission increases of 3-5 per cent per year from 2012. We are fast heading in the wrong direction, accelerating towards the cliff rather than breaking and steering away from the edge (Anderson: 2012: 20).

The impacts of climate change on the environment varies across the world: while some regions are/or will face rising sea levels; with the attendant effects of coastal erosion and floods, other regions will be confronted with challenges like soil degradation and water resource depletion due to persistent draughts and other impacts. Yet, other regions will encounter all of the above challenges. It has been shown that, the West African sub-region is one of such regions, hence one of the most vulnerable to climate change worldwide (Niasse, Afouna, Amni; 2004, Atlas on Regional Integration: 2008).

4:4:1 Climate Change and Water Security in West Africa

The question which this section of the chapter will attempt to answer is what are the implications of this apparent global 'no good deal' situation to tackle the climate change threats to the security of West Africa's water resources? The link between the ongoing global climate change negotiations and the threats to the environmental security of West Africa lies in the consequences of the delay in reaching a globally binding agreement to cut the emissions of the greenhouse gases which would ensure that global mean temperature remains at least at the 2^0C below the pre-industrial level which the IPCC scientists believe to be the threshold between what is acceptable and dangerous climate change. In other words, the longer it takes the biggest emitters to agree on sharing the burden of the cost of cutting back the emission of greenhouse gases, the faster the effects of climate change will be felt in West

Africa. Consequently this situation will very likely heighten the sense of water insecurity in the region.

According to the IPCC's Fourth Assessment Report 2007 -AR4 it is still unclear how climate change will affect water availability in the future in West Africa. Also according to 2008 IPCC Technical Paper VI on water and climate change the records in West Africa indicate that a decline in annual rainfall has been observed since the end of the 1960s, with a decrease of 20–40% in the period 1968–1990 as compared with the 30 years between 1931 and 1960 (Bates B.C *et al*: 2008:135).

However, uncertainties still remain with regards to projected impacts of climate change on water resources in West Africa in the coming decades. For example, while it is stated in the 2008 IPCC Technical Paper VI on water and climate change that;

> There is abundant evidence from observational records and climate projections that freshwater resources are vulnerable and have the potential to be strongly impacted by climate change. However, the ability to quantify future changes in hydrological variables, and their impacts on systems and sectors, is limited by uncertainty at all stages of the assessment process (Bates B.C *et al*: 2008:135)

On the other hand, the 2012 IPCC Special Report on managing the risks of extreme events and disasters to advance climate change adaptation states that;

> Based on the Meteorological Research Institute and Japan Meteorological Agency 20-km horizontal grid GCM, heavy precipitation was projected to increase substantially in south Asia, the Amazon, and West Africa, with increased dry spell persistence projected in South Africa, southern Australia, and the Amazon at the end of the 21st century **(**Seneviratne, S.I, *et al*: 2012: 147)

These two examples of the observed trend of decrease in water availability over the past decades in the West African sub-region and the two conflicting projections on how the impacts of climate change on the water resources of the region will unfold in the coming decades that is whether the trend will continue (decrease rainfall) or there will be increase precipitations as the second projection suggests in the region, demonstrate the level of uncertainty on how climate change will affect the water resources in the West African sub-region. Consequently in addition to the 'no good deal' situation in the global climate negotiations to cut the emission of greenhouse gases, it can be argued that, this situation is very likely to generate anxiety, fear and even a sense of panic in some of the riparian countries that share transboundary water resources in West Africa, particularly, those countries that have high water dependency ratio. This is in spite of any palliatives, which the developed countries might provide in terms of aid to adapt to some of the impacts of climate change on the most vulnerable countries or regions in the world.

CHAPTER FIVE:

OVERVIEW OF THE RIPARIAN STATES, THE WATER CHARTER AND THE CONVENTION ESTABLISHING NIGER BASIN AUTHORITY

5.1. INTRODUCTION

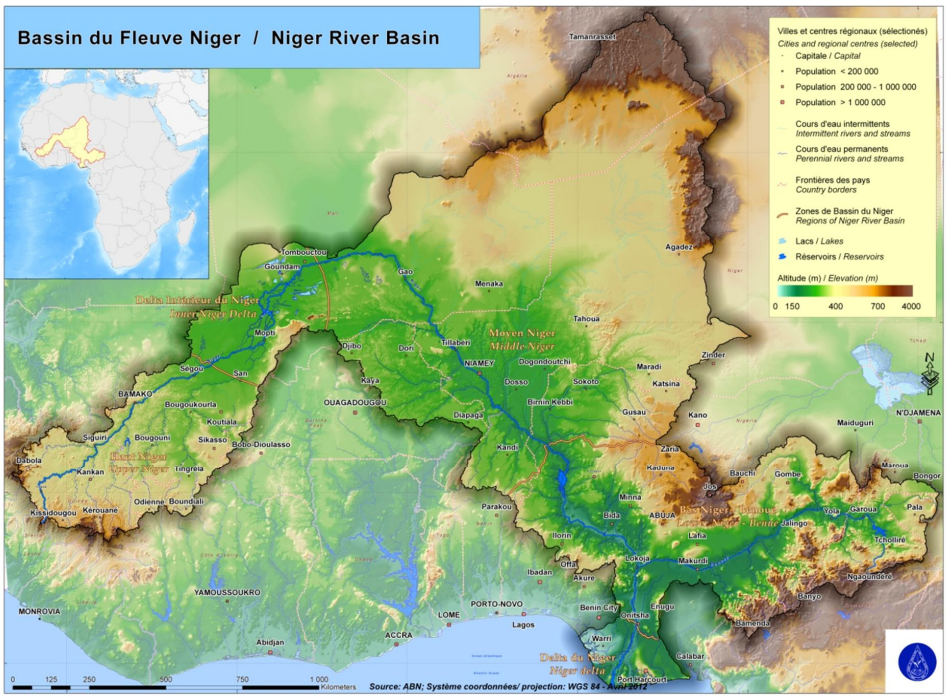
To understand the contest on which conflicts between the riparian states of the Niger River Basin may manifest an overview of the Niger River Basin is necessary. This includes the topography of the Niger Basin, riparian states, the Water Charter of the Niger River Basin and the Convention establishing the Niger Basin Authority. Consequently, the chapter therefore provides a brief description of the physical geography of the Niger River Basin; (and with the aid of maps), the entire basin and the hydrological regions of the Niger River Basin is also shown. The profiles of the nine riparian states (Benin, Burkina Faso, Cameroon, Chad, Cote D'Ivoire, Guinea, Mali, Niger and Nigeria are also highlighted), focusing on the indicators that expound the extent of the vulnerabilities of the Niger basin countries to environmental security challenges (particularly on water scarcity and food security) and their capacities to cope and/or mitigate the impacts of challenges.

A brief survey of the Water Charter and the Convention of the Niger River Basin is also provided in the chapter in line with the objective of the study. That is to gauge the Water Charter of the Niger River Basin countries and the Convention that established the Niger Basin authority against the principles and mechanisms that largely indicate the resilient capacity or otherwise of International Water Treaties (IWTs) in preventing inter-riparian disputes and conflicts.

5.2. THE PHYSICAL GEOGRAPHY AND HYDROLOGICAL ZONES OF THE NIGER BASIN

The Niger River basin covers a sizable area of the West African sub-region encompassing several ecological zones from the arid (Sahara), semi-arid, the savanna through to the rain forests of the Niger delta. The Niger River is the third longest river in Africa after the Nile and River Congo. It stretches about 4200 kilometers in length while the entire basin area covers 2.2 million square kilometers.

Map 1 showing the physical geography of the Niger River Basin



Source: NBA, 31st August 2012

The Niger River is divided into six hydrological regions clustered on the basis of the different topographic characteristics of the region. These are;

1. The Upper Niger River basin
2. The Niger River Inland Delta and Lakes Districts
3. The Middle Niger, Malian-Nigerien and Beninese-Nigerien Right Bank
4. The Middle Niger Left-Bank Tributaries
5. The Benue River
6. The Lower Niger River and the Niger Delta (Golitzen K. G (ed.):2005:12)

On the other hand the basin area is divided into four hydrological regions based on the different physical-geographical zones, geology and hydrology of the parts. These are; the Upper Niger, Inner Delta, Middle Delta and the Lower Delta. The average annual water flow in each of the zones as provided by the NBA is as follows.

The Upper Niger, which covers a surface area of approximately 140 000km^2, with an annual average volume of water of 45 billion m^3 with significant rises in the water level in September and October of around 5 to 6000 m^3/s (passing through the Koulikoro station in Mali).

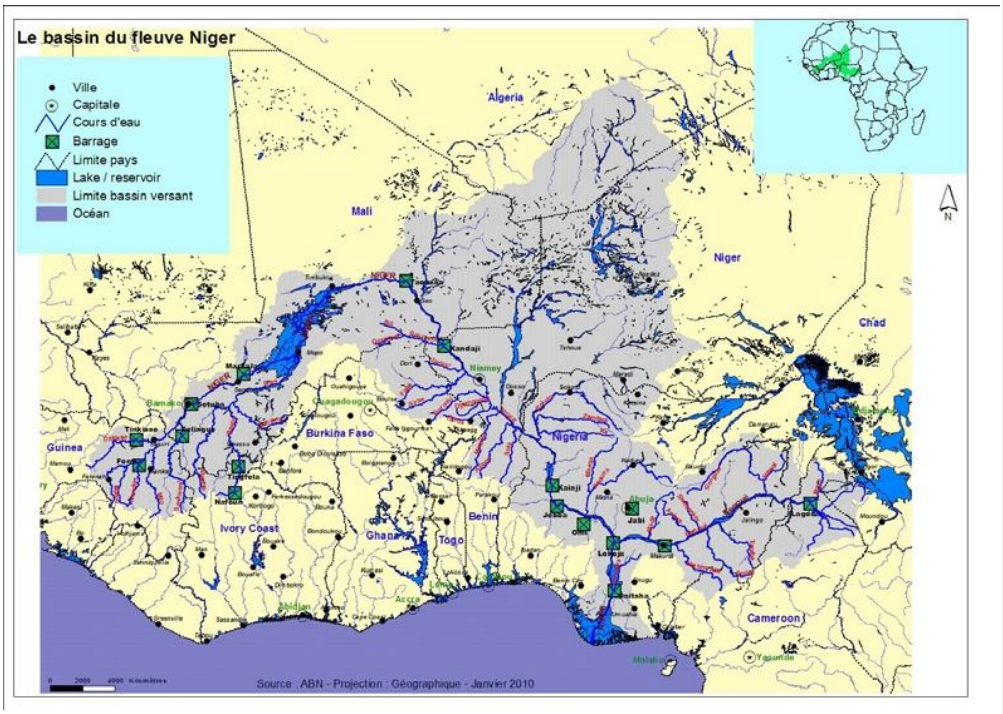
The Inner Delta, covers a surface area of 84500 km^2 consists of complex systems of tributaries, distributaries, lakes and flood plains with an annual water flow volumes in this zone of the basin ranging from 45 billion m3 in Koulikoro to 30 billion in Dire; mainly because of the effects of flooding and evaporation in the Delta. The December and January floodwaters reach 2000 m3/s on average.

The Middle Niger extends from Timbuktu in Mali to Malanville in Benin, and covers an area of 900 000km^2 which includes an inactive basin of 230 000km^2. The Middle Niger flows are affected by the Inner Delta flows. The average annual flow rate of the river at the Niamey level between 1971 and 2000 was only 697 m^3/s compared to 1050 m^3/s between 1929 and 1970.

The Lower Niger is situated in zones with high humidity. The average annual flow rate of the river at the Jebba level, downstream of the Kainji and Jebba dams, is 1454 m^3 /s. The river Niger has a flow rate of 5590 m^3/s where it is joined by the Benue the largest tributary of the Niger River (NBA Strategic Action Plan: 2010:3-4).

Given these characteristics of the Niger River basin area and also the physical location of the West African sub-region, (close to the equator), the Niger basin area is characterized as a basin area that is susceptible to the impacts of climate variability and change.

Map 2 showing the tributories and land areas of the Niger Basin



Source: NBA, 31st August 2012

Table 5.1 shows countries and their land areas in the Niger Basin

Area of Basin in Country	Countries km2	%
Nigeria	561,900	26.59
Mali	540,700	25.58
Niger	497,900	23.56
□Algeria	161,300	7.63
Guinea	95,900	4.54
Cameroon	88,100	4.17
Burkina Faso	82,900	3.93
Benin	45,300	2.14
Côte D'Ivoire	22,900	1.08
Chad	16,400	0.78
□Sierra Leone	50	0.00

Source: International Freshwater Agreements, River Basin Organizations, and River Basin Commissions of Africa

□Although the asterisked countries are riparian states of the Niger basin, they are not members of the NBA.

5.3. PROFILES OF THE RIPARIAN STATES OF THE NIGER RIVER BASIN

There are nine riparian member countries of the Niger River basin who are members of the Niger Basin Authority: Benin, Burkina Faso, Cameroon, Chad, Côte d'Ivoire, Guinea, Mali, Niger, and Nigeria. The countries are affected by Niger River in different scales, hence the individual country's internal contributions to, consumptions and dependence on the water resources of the Niger River also differs significantly. The nine member countries of the basin are thus classified into three categories: Guinea and Cameroon are "water resources producers" and to a lesser extent Benin, while Mali and Niger are "water resources

consumers". Nigeria is both a producer and a consumer. Côte d'Ivoire, Burkina Faso, and Chad are minimally affected by the use of the river's water resources: but they are members of the Niger Basin Authority because some of the tributaries and sub-tributaries originate from these countries (Golitzen (ed.): 2005 :). The population of people living within the basin is also significant. According to Ayibotele the basin area is home to an estimated 100 million people, 80% of whom are Nigerians (Ayibotele: 2010:2).

Benin Republic

As mentioned above Benin Republic is an important contributor of the water resources of the Niger River: the catchment areas of several right-bank tributaries of the Middle Niger River have their sources in northern Benin. The total population of people living within the basin area in Benin Republic is more than 1.95 million. Livestock grazing, groundnut farming and cotton farming are the main function of the basin land area within the Basin Republic. The main city within the basin area in Benin Republic is Kandi, while Malanville is the river port (Golitzen K. G (ed.):2005:4).

Burkina Faso

A number of tributaries of the Niger River also originate in Burkina Faso. While the country's total territory within the Basin area is about 3.9 %. The population of Burkina Faso living within the Basin is 2.12 million. In terms of economic activities it is the poorest area, "with pastoral livelihoods that are semi-nomadic in the north and sedentary in the south" (Golitzen K. G (ed.):2005:4).

Cameroon

The River Benue is the main tributary of the Niger River and most of its waters originate from Cameroonian part of the basin. It occupies an area of about 4 % of total basin area that is about 88,000 square kilometers. The population of basin within the territory of Cameroon is 4.46 million. The main preoccupation of the population is agriculture, producing cash crops like cotton, groundnuts in addition to tea, coffee, and corn for export. Livestock production is also an important part of the economy of the basin population. One of the main dams on the Niger River- the Lagdo dam was built on the Cameroonian side of the River Benue the dam has the potential to generate hydro-power that is significantly greater than the needs of the population of the basin area within Cameroon which means electricity can be exported (Golitzen K. G (ed.):2005:4).

The Republic of Chad

The source of the Mayo River emanates from Chadian side of the Niger Basin. The Chadian side of the Basin is less than 1 % of the total land area of the Basin. The population of the people living in the area is about 80,000. The Chadian part of the Basin supports a sparsely settled rural population that depends on subsistence farming and limited cotton production for its livelihood (Golitzen K. G (ed.):2005:5).

Ivory Coast

Several tributaries of Niger basin have their sources within Ivory Coast. The total land area of the Basin within Ivory Coast is about 23,000 square kilometers of the entire Basin that is about 1.1 % with a population of 800,000 lives in the Ivory Coast part of the Basin.

Agricultural activities in the area are mainly centered on cotton, kola groundnuts production and also raising livestock. Locally, small development projects (ponds and small dams) provide opportunities for market gardening and aquaculture. The main cities are Odienne and Boundiali (Golitzen K. G (ed.):2005:5).

Guinea

A number of important tributaries of the Niger River have the sources in Guinea. While the total land area of the Basin within Guinea is about 4.6 % that is about 69,000 square kilometers of the total land area of the Basin. 1.6 million People live in this part of the Basin, and the main agricultural activities in the area are raising livestock with limited rain-fed farming, generally of sorghum and millet. Groundnut, Coffee and paddy rice productions are also very important in this part of the Niger Basin.

Mali

The population of Malians living in the Malian part of the Niger Basin is about 7.8 million people. While the land area is 540,700 km^2, that is about 30 % of the total land area of the Niger basin. According to Golitzen, is one of the largest and oldest irrigation schemes in West Africa; Office du Niger in Bamako has continue to provide opportunities for agricultural development. And that, Irrigated farming along the river produces 590,000 tons of rice and303,000 tons of sugar cane per year (Golitzen K. G (ed.):2005:5). Cotton production covers an area of 122,000 square kilometers and Southern Mali also produces more than 230,000tons of millet and sorghum, 215,000 tons of corn, and 18,000 tons of groundnuts per year, all as rain-fed crops (Golitzen K. G (ed.):2005:5).

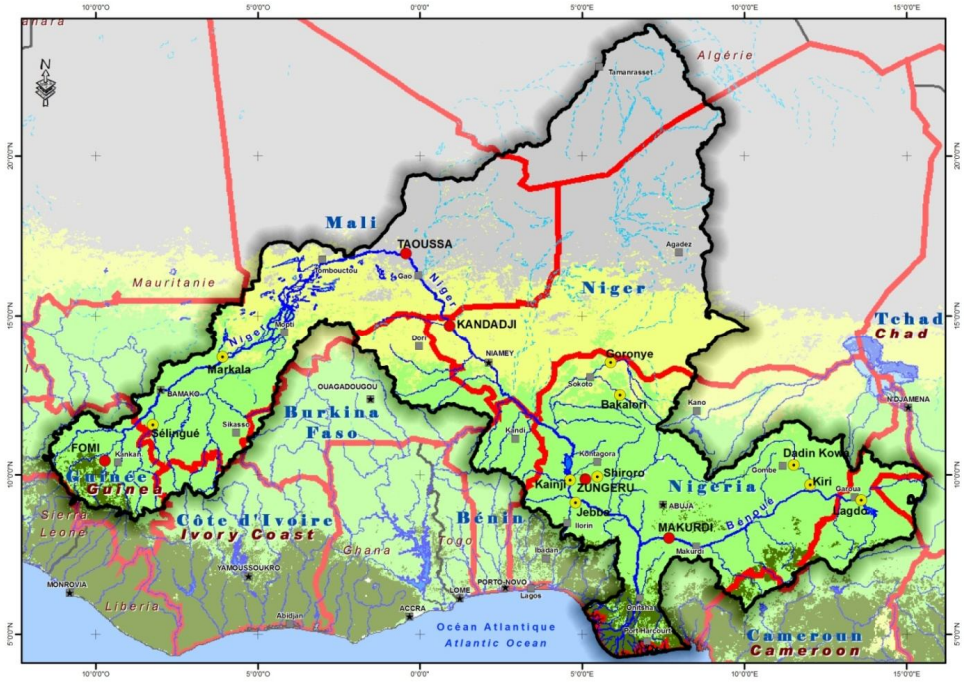
Niger

The hydrologically active area of the Niger Republic part of the Niger River is approximately 357,000 square kilometers. The total area of the Basin within Niger Republic is about 23 % and has a population of 8.3 million. The production of traditional grains of the Sahel region such as millet, beans and sorghum is significant in the part of the Niger Basin. Agricultural practice in Niger is significantly dependent on the water resources of the Niger River (Golitzen K. G (ed.):2005:6).

Nigeria

Nigeria has the largest land area of the Niger basin about 560,000 square kilometers of the total Basin area. This includes the two main rivers of Nigeria: the Niger and the Benue rivers. According Golitzen, almost 60 % of Nigeria's population lives in the Basin and agricultural production, within the Nigerian part of the Basin is substantial (Golitzen K. G (ed.):2005:7).

Map 3 showing all the riparian states of the Niger River Basin



***Source**:* NBA, 31st August 2012

5.3.1 Vulnerabilities of the Riparian States of the Niger River Basin

Major indicators (for example the state's fragility or failed state index, Human Development Index), indicate that consistently over the past several decades the states of West Africa have occupied the bottom rungs of all the indices that measure political stability and the status of the economic wellbeing of a state. For example of the 187 countries on the 2011 Human Development ranking list, five of the bottom seven are in West Africa. The standings of the riparian states of the Niger River basin are as follows: Cameroon has the best score at number 150, Nigeria is placed at 156, Benin at 167, Cote d'Ivoire is number 170, Mali is number 175, Guinea is number 178, while Burkina Fatso occupied number 181, Chad number 183, and Niger is second to the last country in the list at number186 (UNDP/HDR: 2011:184).

What this suggests is that the Region still retains the largest concentration of the poorest countries in the world. In other words, the Niger River Basin area has the poorest countries in the poorest continent of the world. Consequently, the standings of the West African countries and particularly the riparian states of the Niger River basin suggest very high vulnerability and low capacity to cope with insecurities driven by environmental disasters.

On the other hand, according to the report of the Population Reference Bureau of 2012, the states of West Africa are among the states that have the highest rates of population growth. It is projected that the population of West Africa will reach450 million by the year 2025. By the year 2050, it will hit 774 million people. Given the food security situation in region, (which according to the World Food Program is still precarious), future demands for water

resources in the region will be greater. Majority of the countries in the region are net importers of food, especially rice (Lançon, and Hélène: 2007) the region's growing staple food. Five million tons of rice is imported in West Africa every year, which amounts to 20% of the world's total importation of rice (WFP: 2011). Yet the price of rice in the international markets is volatile (mainly due to the activities of speculators and partly due to export restrictions by the surplus producing countries), hence it is very likely that, the subsidies which some of the governments in the region are currently providing for the importation of the imported food items will become increasingly unsustainable. And this will spur the quest to attaining food security and food sufficiency by the states in the region and one strategy which would most certainly be adopted is shifting food production from the traditional rain-fed agriculture (which may no longer be relied upon because of climate change or the uncertainties of water availability), to the more reliable irrigation agriculture.

5.4. THE NIGER BASIN WATER CHARTER

The Water Charter of the Niger River is the legal instrument that spells out the rights and responsibilities of the parties; that is the riparian states of the basin that are signatories to the Niger basin legal instruments. It was adopted and signed by the Member countries in 2011 and it consists of ten chapters.

5.4.1Overview of the Niger Basin Water Charter

Chapter one of the charter contains the general principles. For example Article 2 in the chapter states that "the purpose of the present Charter is to encourage cooperation based on solidarity and reciprocity for a sustainable, equitable and coordinated use of the Niger Basin hydrographic catchment area".

Chapter two of the Chapter comprise of the general principles that guide the water interactions of the riparian states (parties to the charter): it stipulates the way and manner the water resources will be used by the Member countries of the River Niger basin. For example Article 4 states that the water resources of the basin shall be used equitably and reasonably by the riparian states.

Chapter three of the charter is the chapter that consists of the general obligations expected of the riparian states. It is stated that the State parties shall manage the Niger Basin water resources in a manner which maintains the quantity and quality of the resources at the highest possible level.

Chapter four of the charter stipulates that the Basin water uses shall aim at the satisfaction in a just and equitable manner of the conditions for the use and relations between uses. All the articles in the chapter aimed at the satisfaction of all uses of the water resources in a just and equitable manner.

Chapter five is the chapter that outlines the organs of the Niger Basin water resources management. That is the Permanent Technical Committee which is created to pursue the aims of the present Charter.

Chapter six covers the issues on planned measures by Member states. The articles in the chapter include articles on information exchange, notification and the like. For example it is stated that the State Parties shall exchange information and consult each other and, if necessary, negotiate on the possible effects of measures planned on the River Niger Basin.

Chapter seven deals with issues that concern public participation; Article 25 of the chapter states that; the State Parties shall ensure to any user the right to be informed on the quality of water resources and participate in the development and the implementation of the decision relating to the valorization of the basin.

Chapter eight is titled- Common facilities and facilities of common interest. The chapter expounds on the ownership of the facilities built over the Niger River. For example article 27 states that; facilities built on the Niger Basin and which have been the subjects of a declaration to the Authority, by the State owners or joint-owners, may obtain the status of common facilities or facilities of common interest.

Chapter nine deals with the settlements of disputes among state parties: all the articles under this chapter encourage amicable settlements of disputes by all members. In article 29 it is stated that; in the event of a dispute between two or several State Parties concerning the

interpretation or the application of the present Charter, the Parties shall seek a settlement by the good offices of the Authority, mediation or conciliation, or by any other peaceful means of dispute settlement.

Chapter ten of the charter contains the final provisions of the charter. It outlines the conditions for amendments of the charter, entry into force withdrawal etc.

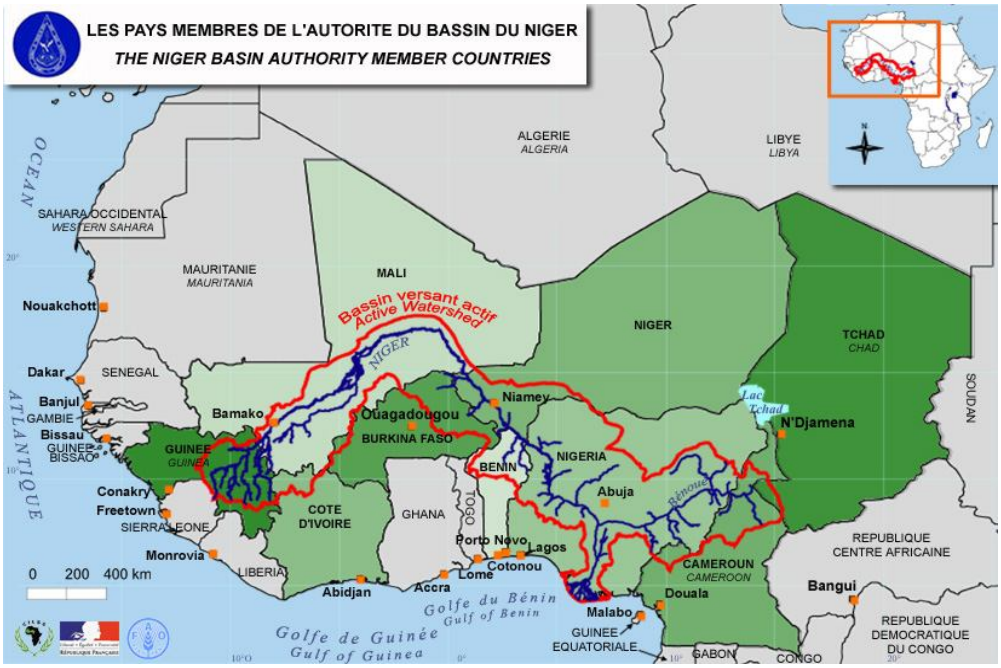
5.5. THE ESTABLISHMENT OF THE NIGER BASIN AUTHORITY

International agreements over the water resource of the Niger River preceded the independence of the countries that share the water resources of the Niger River basin. The first colonial era agreement over the Niger River was between France, England and Germany which took place on the 26 of February 1885 in Berlin Germany. The main aim of the Treaty between the colonial powers was essentially to ensure free navigation over the Niger River among the three colonial powers that colonized the territories of West Africa. The Berlin agreement lasted until the defeat of Germany after the First World War when changes were made which renewed the provisions of the agreement to be between France and England in September 1919 (Golitzen (ed.):2005:).

5.5.1. Post Colonial Period: The Establishment of the Niger Basin Commission (NBC)

In all, the agreements between the colonial powers were effective throughout the colonial period. There was no record of any incident of disputes between the colonial powers over the navigational use of the Niger River. At independence, the colonial period agreement was replaced. The first agreement in the post-colonial era was between Nigeria and Mali, which was essentially an agreement that defined the conditions for the use of the river in terms of commerce and custom duties. While the first conference in which all the riparian states of the Niger River basin participated took place in Segou, Mali in May 1961. The Second conference which paved the way for the establishment of the Niger Basin Commission and which the principles of cooperation among the riparian states were agreed upon was held in November 25 1964 in Niamey Niger republic. The establishment of the NBA expanded the areas of agreement to include water use and water resources development (Golitzen K. G (ed.):2005).

Map 4 showing the Nine Member countries of Niger Basin Authority



Source: NBA, 31st August 2012

5.5.2. The Convention Establishing the Niger Basin Authority (NBA)

Against the backdrop of the challenges which the Niger River Commission (NRC) faced in terms of the shortcomings of the Commission to fully execute its mandate, as well as the potentials of the Niger Basin, the highest decision making body of the Commission (i.e. the Summit of Heads of State and Government) decided to revised the Convention that established the NBC and consequently replaced it with the Niger Basin Authority (NBA) in Faranah in Guinea on the 21st of November 1980. The decision to replace the NBC was primarily to strengthen the capacity of the body in order to further cooperation among Member states. According to Ayibotele (2010) the major decisions that came out of the Faranah conference were:

- Establish the Niger Basin Authority to ensure that the aims and objectives set out in the Convention are achieved.
- Launch a prospective Development Plan for the Niger River Basin as a vehicle by which the objectives can be achieved.
- Prepare a protocol on the guarantee of loans, Conditions of exploitations, realization and management of projects and definition of their status to guide the allocation of financial contributions to member states.
- To prepare a protocol to set up a Niger Basin Development Fund (Ayibotele N.B 2010:4)

After the establishment of the NBA in 1980, the Convention that established the NBA was revised in 1987 in N'Djamena on the 29th of October. In Section 2 Article 3 of the Convention the aim of the Authority is stated thus:

The aim of the Authority is to promote cooperation among the member countries and ensure an integrated development of the Niger Basin in all the fields of energy, water resources, agriculture, livestock, fishing and fish-fanning, forestry and forestry exploitation, transport, communications and industry.

While Article 4 of the Convention states that,

I. For the purpose of Article 3 above, the Authority is mandated:

a) to harmonize and co-ordinate national water resources development policies of the Niger Basin;

b) to participate in development planning through preparation and implementation of an integrated development plan of the basin;

c) to promote and participate in the design and exploitation of works and projects of common interest.

d) in conformity with the Niamey Act, to ensure control and regulation of any form of navigation on the river, its tributaries and sub-tributaries;

e) to participate in formulation of applications for assistance and in mobilization of financing for studies and works needed for the development of the resources of the Basin.

2. The Authority shall maintain permanent contact with the member States in order to acquaint themselves with the development plans, notably, the aspects affecting the Niger Basin.

They also undertake to refrain from carrying out, on the section of the river, its tributaries and sub-tributaries situated within their territorial jurisdiction; any works likely to pollute the

waters or adversely change the biological characteristics of the fauna and flora (see Appendix 5).

5.5.3.The Structure of the Niger Basin Authority

According to Section III Article 5 of the NBA's Convention, the permanent organs of the Authority are:

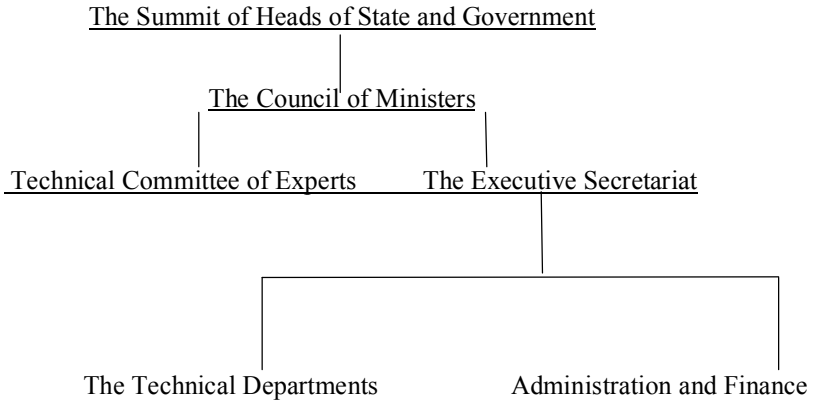
a) The Summit of Heads of State and Government

b) The Council of Ministers

c) The Technical Committee of Experts

d) The Executive Secretariat.

The organogram below shows the hierarchy of authority and the organizational structure and of the NBA



The Summit of Heads of State and Government is the supreme decision making organ of the Niger Basin Authority. It is composed of Heads of State and Government or duly accredited representatives of the Member states which meet every two years.

The Council of Ministers of the Authority is the control organ of the Authority. It is composed of Ministers or their duly accredited representatives at the rate of one vote per Member State. The Council is responsible for monitoring the activities of the Executive Secretariat and reports to the Summit. It prepares the Sessions of the Summit, examines all issues, deals with matters submitted to it and, submits recommendations to the Summit.

The Technical Committee of Experts is composed of representatives of the Member States. Its mandate is:

a) to prepare the sessions of the Council of Ministers;

b) to submit reports and recommendations to the Council of Ministers.

The Executive Secretariat is the Executing Organ of the Authority. The Headquarters of the secretariat is in Niamey, Niger republic. It is directed by an Executive Secretary appointed by the Summit of Heads of State and Government, upon the recommendation of the Council of Ministers, for a period of four years renewable only once. Each Member State can present a candidate for the post of Executive Secretary. The Executive Secretary is the Chief Executive of the Executive Secretariat of the Authority. Under the Executive Secretary are the Technical Departments that are responsible for conducting research in the various sections of the basin as well as data collection and documentation among many other

responsibilities in fields like climatology, hydrology, conservation etc. the Department of Administration and Finance are also under the direct supervision of the Executive Secretary.

5.6. ASSESSMENT OF THE NIGER BASIN LEGAL INSTRUMENTS

Examination of the Legal instruments of the NBA reveals that nearly all of the basic principles that are designed to prevent conflict and promote cooperation as provided in the UN Convention and the Berlin Rules are adopted in the Niger Basin Convention and the Water Charter. However, some of the principles that are considered as fundamental in guaranteeing the resilience of International Water Treaties especially in the face of threats to the availability of water resources over a long period or the uncertainty of water availability are not included in the Water Charter or the Convention of the NBA. For example while variability management and conflict resolution mechanisms are included, there are no provisions for water allocation and no provisions for sanctions of any type to be applied against any member state that decides to violate the provisions of the Water Charter or the Convention of the Niger River basin countries if amicable settlements of disputes fail.

As mentioned above these institutional indicators used by Stefano *et al* are the institutional indicators employed to assess the effectiveness of the Niger Basin legal instruments in this study. These are:

1. Water Allocation principle
2. Variability Management principle
3. Conflict Resolution Mechanism
4. An effective River Basin organization (Stefano *et al:* 2012: 193-209)

These principles and mechanisms are in conformity with the precepts of the Liberal Institutionalists/Water Cooperation School.

Water allocation in our view is regarded as the pivot of all the principles that are designed to guarantee the resilience of international water treaties against any eventualities and the uncertainties that climate change could generate in the future. Consequently it can be concluded that the Niger basin water charter and the convention that guide the water interactions of the riparian states of the Niger basin are inadequate and do not meet the requirements based on the precepts of the Liberal Institutionalists/Water Cooperation precepts.

Yet again, sanctions are important instruments of conflict prevention diplomacy. The absence of any form of sanctions in the legal instruments of the Niger River Basin countries is an important defect in the legal instruments. Although the debate over the utility of sanctions is still on, the absence of any form of sanction in an international agreement indicates weakness of the deterrence capacity of the agreement and any member may capitalize on to accrue some advantages.

Against the fact that climate change has had adverse impacts on the water resources of the Niger basin in the past forty years, as well as the threats posed by climate change to the availability of water resources in the Niger basin and/or the uncertainties surrounding projections on the future impacts of climate change on the water resources of West Africa it can be argued that the two most important principles that can guarantee the resilience of the

treaty instruments and sustain cooperative water interactions among the riparian states are missing. As alluded to above to prevent disputes and conflicts and achieve long term sustainable cordial water interactions among the riparian states of the Niger River Basin, the legal instruments that guide the water interactions of the Niger River countries must be comprehensive. This means that all loopholes or lacunae that may be present in the legal instrument are blocked.

CHAPTER SIX:

DATA PRESENTATION, ANALYSIS AND FINDINGS

6.1. INRODUCTION

Both primary and secondary data were obtained from the field and other relevant sources. However as mentioned in chapter three, most of the data were obtained from the head quarters of the Niger Basin Authority at Niamey in Niger Republic. That is both the data on the impacts of climate change on the Niger Basin and the legal instruments that govern the water interactions of the riparian states as well as the data on the responses of the riparian states to the threats posed by climate change.

Based on the model that guided this study, the study design adopted was necessarily retrospective-prospective. Consequently the data on the impact obtained of climate change represent data on the pattern of rainfall records and river discharge over the Niger Basin from the 1990s and beyond. In other words, although the retrospective part of the study examined the impacts of climate change on both the water resources of the Niger Basin and its impacts on the behavior of the riparian states from 1990, (1990 being the year the first IPCC report on climate change was released), the data obtained from the NBA on the trends in rainfall over the Niger basin and the flow or discharge of the Niger River extends beyond the 1990s. However, to determine whether the climate change factor has generated a sense of panic and uncertainty in the riparian states in terms of the quests to have greater water security from the water resources of the Niger River for example through the construction of dams, the study

compared the activities of the riparian states from the period before 1990 and the period from 1990 up to 2011.

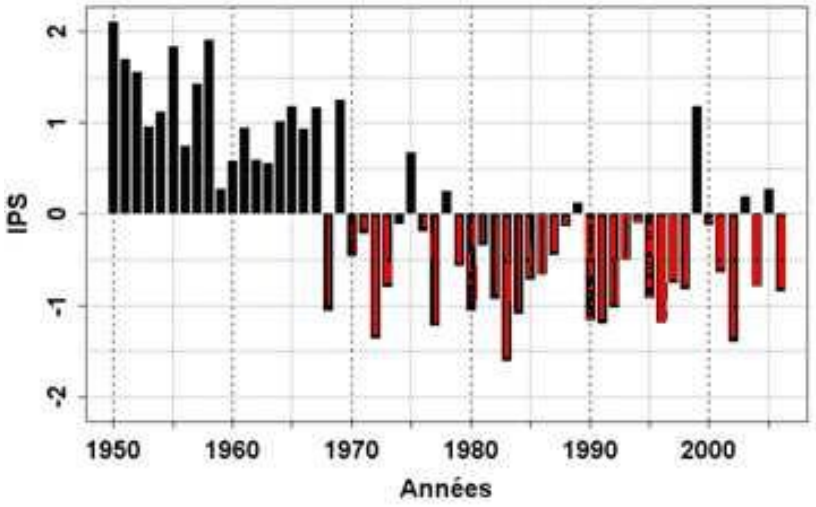
Based on the propositions of the study, the likelihood of the onset of disputes and/or conflicts between the riparian states over the water resources of the Niger River Basin is dependent on the conformity of the responses of the riparian states to the climate change factor (because climate change would either generate water scarcity or the fear of water scarcity or both) to the rules of behavior expected of them. And secondly, the conformity of their responses to the rules is dependent on the extent to which they see the treaty rules serve their interests. Hence, prospectively in addition to examining the trends in the responses of the states between the period 1990 to 2011, we also examined the comprehensiveness of the Convention establishing the NBA and the Water Charter that govern the water interactions of the riparian states, that is to determine whether the rules can ensure the resilience of the agreement to severe water variability and scarcity as well as protect the interest of the individual riparian states and thus ensuring cooperative behavior from the states of the River Basin.

6.2. THE IMPACTS OF CLIAMTE CHANGE ON RAINFALL AND RIVER DISCHARGE OVER THE NIGER RIVER BASIN

Although surface water availability varies from one section of the river to another, depending on flow rates, evaporation losses and withdrawals, the data obtained by the observatory stations of the NBA over the past several decades indicate a steady decline in the River discharge. For example in the Upper Niger observatory station of the NBA at Koulikoro in

Mali, the data (Time series analysis) indicate that the average inter-annual flow volume of 1,350 m^3/s (average 1929-1970) or 42 billion m^3/year was now around 1,039 m^3/s (average) within the period of 1971-2002, which account for a decline of approximately 33 billion m^3/year, or a decrease of 23% (see appendix 6). The hydrograph in Fig. 6.1 shows the level of rainfall recorded per decade at the Kolikoro observatory station in Mali from 1950-2006.

Fig.6.1: Decadal rainfall record at the Kolikoro observatory station in (Mali) from 1950-2000



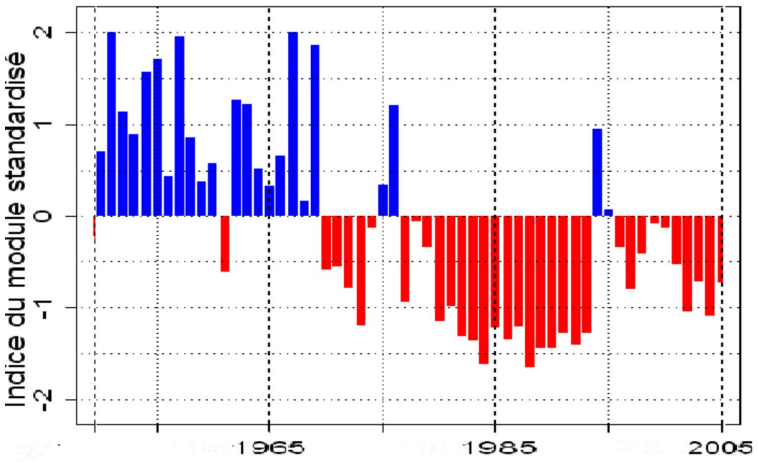
Source: NBA/AGRHYMET 2012

This data from the Niger Basin observatory stations are consistent with the data from other research centers particularly the data which the authors of the 2008 IPCC Technical Paper VI on water and climate change used. It is stated in the 2008 IPCC report, decline in annual

rainfall in West Africa has been observed since the end of the 1960s; with a decrease of 20–40% in the period 1968–1990 as compared with the 30 years between 1931 and 1960 (Bates B.C *et al* (eds.): 2008:135).

At the same time the records of the Niger River discharge indicate steady decline at Koulikoro observatory station in Mali from 1945-2005, as the hydrograph bellow shows.

Fig, 6.2. Hydrograph of 1945-2005 decadal rainfall



Source: NBA/AGRHYMET 2012

The water variability and decrease in water availability observed over the Niger River and in West Africa generally over the past several decades is attributed to climate change by experts at the Technical Department of the Niger Basin Authority (for example see Appendix 7 interview with the Head of the Technical Department of the Niger Basin Authority Abdou

Guero 4th September 2012 Niamey, Niger republic). And also according to the Head of Observatory of the NBA although several factors may be responsible for the decline in water availability over the Niger River, however he identified climate change as the most important factor (see Appendix 8 interview with the Head of Observatory of the NBA Dessouassi Y. Robert, 5th September 2012).

The report of the IPCC Technical Paper VI on water and climate change also attributed the decline in rainfall in much of West Africa and particularly in the Sahel region in the last three decades of the 20th Century to climate change (Bates *et al*: 2008:79-80). This also corroborates the data from the observatory of the Niger Basin Authority.

Consequently it can be stated that, climate change has had negative impacts on the water resources of the Niger River Basin. Up to twenty percent (steady) decline is important in terms generating scarcity particularly in the West African sub-region. In this regard therefore it can be concluded that, climate is an important source of generating water scarcity over the Niger River Basin.

6.3. RESPONSES OF THE RIPARIAN STATES TO WATER DECLINE IN THE NIGER RIVER

It was difficult to obtain up to date information on the number of all the new projects that have come up to acquire more water resources by all the riparian states of the Niger River Basin, especially projects on small dams or other forms of water reservoirs like micro-dams or weirs and water diversion projects. This is because there is no data source that contains the

records of all the projects over the Niger River even at the headquarters of the NBA (see appendix 9 interview with Head of Planning and Studies). Also new projects are still coming up in many of the riparian states, both on the main River and the tributaries of the River which are yet to be formally communicated to the NBA by the states concerned. However a number of projects have come up within the period between 1990 to 2011which have been/or are being executed or are in the pipeline. According to Niasse as at 2005, there are no fewer than 20 plans for building new large dams on the Niger River. These projects include the Fomi and Kamarato in Guinea; Kenie, Toussa and Labezanga in Mali; Mekrou in Benin and Niger; Kandadji in Niger; Lokoja, Makurdi, and Onitsha in Nigeria. And that, Guinea and Benin have plans for 4 to 5 large dams that they expect to build in the coming years (Niasse; 2005: 5). Between 2005 and 2011 several other projects have also come up for example the Kashimbila dam project in Nigeria and the Talo dam in Mali which was built over the Bani river, a tributary of the Niger River.

Hence, according to the officials of the Niger Basin Authority from 1990 to 2011 there was a big increase in the quests to acquire more of the water resources of the Niger River by most of the riparian states in comparison to the period before 1990. And that, this increases in the number of projects to acquire more of the water resources of the Niger River can be attributed to the fear of what climate change might precipitate in the coming years (see for example Appendix 10 interview with Ibraheem Olomoda 4th September, 2012 Niamey Niger Republic).

This therefore indicates that, as the study anticipated the climate change factor has heightened the sense of water insecurity in the riparian states of the Niger River Basin

because it has to some extent stimulated the urgency to safeguard their water security. In other words, there is an unspoken competition to have greater access to/and control over the water resources of the Niger basin triggered by both the decline in water availability over the Niger River and the fear of what climate change might in the coming years.

However, according to the Legal adviser of the NBA thus far, all the projects initiated by the riparian states i.e. those that have been officially communicated to the NBA by the states concerned have complied with the rules as stated in the Convention establishing the NBA and the Water Charter. Hence there are no evidences of any incident of unilateral actions by any member state to acquire the water resources of the River (see Appendix 11 interview with Legal Adviser Drissa Naman Keita 3rd September, 2012 Niamey Niger Republic). This therefore indicates that although the climate change factor has generated anxiety and the 'rush' to acquire more in the riparian states it has not pushed the riparian states of the Niger River basin to act outside the rules within the period under consideration i.e. from 1990-2011. In other words, although we found a relationship between the climate change factor and the onset of competition between the riparian states of the Niger River basin, there is no relationship between the competition that ensued and conflict generating behavior among the states.

6.4. COMPREHENSIVENESS OF THE NIGER BASIN WATER CHARTER

There are three main sources from which the principles of contemporary international water law are derived. The first is the 1966 Helsinki Rules on the Uses of the Waters of International Rivers; the second is the 1997 United Nations Convention on the Law of Non-

navigational Uses of International Watercourses and the 2004 Berlin Rules on Water Resources which the International Law Association developed. Our assessment of the comprehensiveness of the treaty rules of the Niger River Basin is based on the UN Convention and the Berlin rules: because the principles enshrine in both the UN Convention and the Berlin Rules are improvements of the principles on the 1966 Helsinki rules.

The UN Convention was adopted in New York in May 1997 but yet to come into force; it requires 35 countries to deposit their instruments of acceptance before it enters in force. As at last check (May 30 2013) the website of the United Nations indicates that six of the nine member countries of the Niger Basin Authority have ratified and deposited their instruments of ratification with the U.N. These are: Benin on the 5th July, 2012, Burkina Fatso 22nd March, 2011, Chad 26 September, 2012, Cote d'Ivoire 25th 1998, Niger 20th February, 2013 and Nigeria 20th September 2010.

There are three theoretical positions of international water law on the question of state sovereignty and the rights over transboundary water resources. The first is the theory of Absolute Territorial Sovereignty also known as Harmon Doctrine which emphasizes the absolute sovereignty of states within their territory. This theory favors the upstream countries to have greater rights over the waters that emanate from their territories. In contrast, the theory of Absolute Territorial Integrity emphasizes the absolute right of downstream countries to uninterrupted natural flow of a river. However both of these theories are rejected by international jurists and in their place the theory of Limited Territorial Sovereignty is widely accepted; it recognizes the rights of both the upstream and downstream countries and

most of the principles that are enshrined in the two sources of contemporary international water law are based on this theory.

The principles include the obligation of all riparian states not to cause significant harm to the water resources within their territory, the principle of the duty to cooperate, information exchange, notification, consultation and peaceful settlement of disputes, the principle of equitable and reasonable participation and use, among others.

As mentioned above the comprehensiveness of a treaty agreement means the presence in it of all the principles that would guarantee the resilience of the treaty agreement in the event of any unforeseen circumstances. Water allocation has been found to be at the heart of international water conflicts. Hence the resilience of a treaty over an international water course can only be determined by the extent to which the principles in the treaty (which guide the interactions of the states) serve the interests of the individual member states. Consequently it can be argued that, any treaty agreement over an international water course that does not contain the sharing of the water resources by allocation is not a comprehensive treaty agreement.

The advantage of allocation lies in the sharing of what is available; which would encourage the states to be concern only with their 'absolute gains' i.e. what each member state will gain the most. In other words the concern of each state will be with its own welfare independent of what others might get. Hence the allocation of the water resources of a river basin between the countries would enhance the resilience of a river basin's treaty regime to withstand the

effects of extreme events that could jeopardize cooperative behavior and also substantially reduce the likelihood of cheating and defection.

Examination of the Legal instruments of the NBA reveals that nearly all of the basic principles that are designed to prevent conflict and promote cooperation as set-in in the UN Convention and the Berlin Rules are contain in the Niger Basin Convention and the Water Charter. However there is no allocation of the water resources of the Niger River basin between the riparian states.

According to the Executive Secretary of the NBA, the absence of sharing arrangement based on allocation in the Niger basin is because the emphasis of the NBA is not on the allocation of the water resources, but rather on the development of the resources of the basin as a whole for the benefit of all the member countries (interview with the Executive Secretary of the NBA Collins Ihekire 7th September, 2012 Niamey Niger Republic see Appendix 12). In other word the ES was refering to the application of the principle of 'community of interests' which encourage the sharing of benefits between the states.

However, in our view the disadvantage of this practice is that, it will in long run create the tendency in the riparian states to view their interests on the basis of 'relative gains' i.e. the states assessing their gains in comparative terms to what others obtained (or who will gain more?). This would invariably lead to dissatisfaction and disaffection among the riparian states, and consequently accentuate the ongoing competition for the control of the water resources of the Niger River between the riparian states for example through the

constructions of more hydroelectric dams, because it is obvious that the country owning the project would benefit more than the others that may also benefit. This arrangement is not the same as a joint project by for example Nigeria and the Republic of Niger in which both countries would invest and share the benefits based on their share of what has been invested.

According to the Executive Secretary of the NBA the concession for the construction of hydroelectric dams that are currently being built like the Kandadji in Niger Republic by the other riparian states was obtained on the basis of the principle of sharing benefits (interview with the Executive Secretary of the NBA Collins Ihekire 7th September, 2012 Niamey Niger Republic see Appendix 12).

In contrast to the views of the ES, this study is of the view that the application of this principle in the water interactions of the riparian states of the Niger River basin will not enhance the resilience of the treaty agreement of the Niger basin in the event of severe water scarcity; because it will not sustain the cooperation of the riparian states. And based on this argument therefore it is concluded that, the rule books of the NBA (the Convention and Water Charter) are lacking in the most important principle that would guarantee the resilience of the treaty rules of the NBA, hence the treaty agreement of the Niger River basin is not comprehensive.

6.5. CLIMATE CHANGE PROJECTIONS AND THE TRENDS IN WATER AVAILABILITY OVER THE NIGER RIVER

Based on the reports of the Intergovernmental Panel on Climate Change (IPCC) on the future impacts of climate change in the West African sub-region and particularly the impacts of

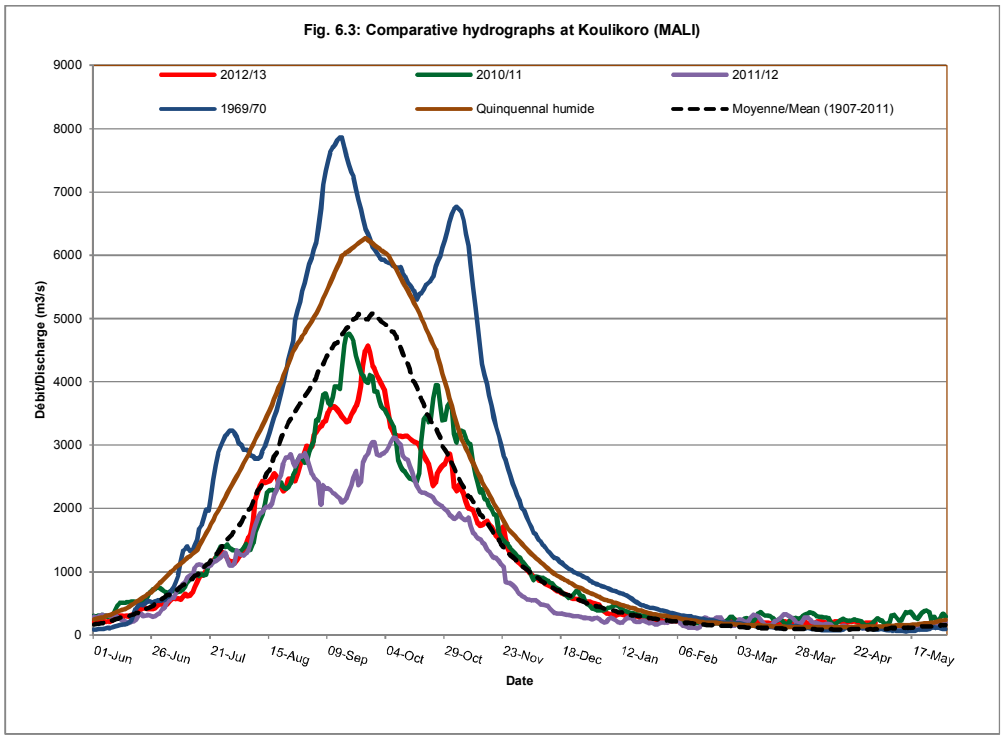
climate change on water resources, it is clear that uncertainties still remain. As mentioned in chapter four, projections on climate change are made based on models that simulate levels of CO_2 emissions and concentration in the atmosphere. However the major shortcoming of the existing models used by the scientists in some instances is that different models do indicate different outcomes over the same scenarios. Hence projections on the likely impacts of climate change for one region may have different outcomes. This difficulty has also manifested in the projections for the West African sub-region on the impacts of climate change and on rainfall and water availability in the coming decades as demonstrated in chapter four.

This situation is a source of concern in relation to the central question of this study. As explained above, the fact of uncertainty on the climate change projections and its impacts on water resources of the Niger River basin has directly or indirectly galvanized the riparian states to work towards attaining greater water security in the event of adverse climate change and the depletion of the water resources of the Niger River.

Secondly as outlined in chapter four, the outcomes of the protracted global climate change negotiations particularly between the major emitters of greenhouse gases indicate that, the world is poised for a 3 to 4^{o}C rise in temperature; which is the dangerous threshold that the climate scientists have consistently warned the international community against. Whatever the implication of a 3 to 4^{o}C rise in temperature to the environmental security of West Africa may turn out to be, it is likely that this situation may continue to influence the behavior of the riparian states of the Niger basin in their quests to achieve greater water security (especially among the states that are heavily dependent on the water resources of the Niger River basin).

This conclusion can be further supported by the recent records of the River discharge or water flow over the Niger as an example of the continuation of the situation since 2011, there are no significant changes in terms of increase water availability over the Niger River. According to the latest data from the observatory unit of the NBA, (April 2013), the records in the four main observatory stations of the NBA i.e. Upper Niger at Koulikoro (Mali), the Inner Delta at Dire (Mali), the Middle Niger in Niamey (Niger), the Lower Niger at Lokoja (Nigeria) indicate that the situation remains much the same as records of the preceding years. For example, although the total flow volume at Koulikoro from 1st June 2012 to 30th April 2013 was about 35.68 m^3. This volume is higher than that of the previous year as shown in Fig. 6.3. A maximum monthly flow of 216 m^3/s was observed on 23rd April 2013 and a minimum of 160 m^3/s was recorded on the 03rd April 2013 while the mean monthly flow of 196 m^3/s has an frp of 5 years wet. However the data indicate that this flow is supported by releases from Selingue dam, upstream.

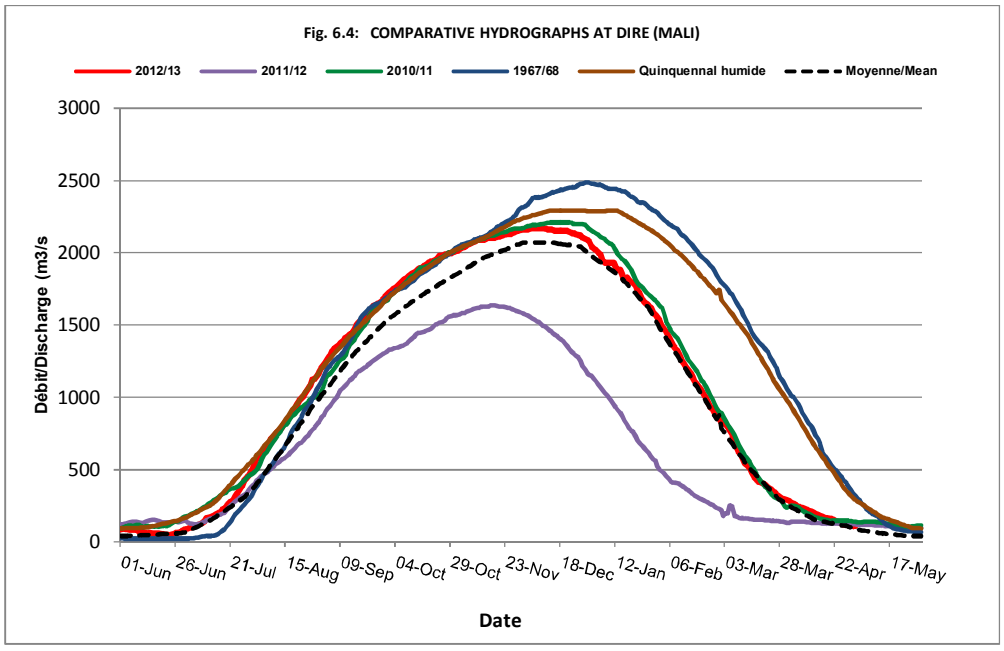
Fig. 6.3. Comparative hydrograph at Koulikoro (Mali)



Source NBA, 2013

While the total flow volume at Diré in the Inland Delta from 1st June to 30th April 2013 was about 32.81 km^3. The maximum monthly flow of 282 m^3/s was observed on April 1st and the minimum of 108 m^3/s on April 30th, 2013. The average monthly flow of 184 m^3/s corresponds to an frp of 3 years wet as shown in Fig 6.4.

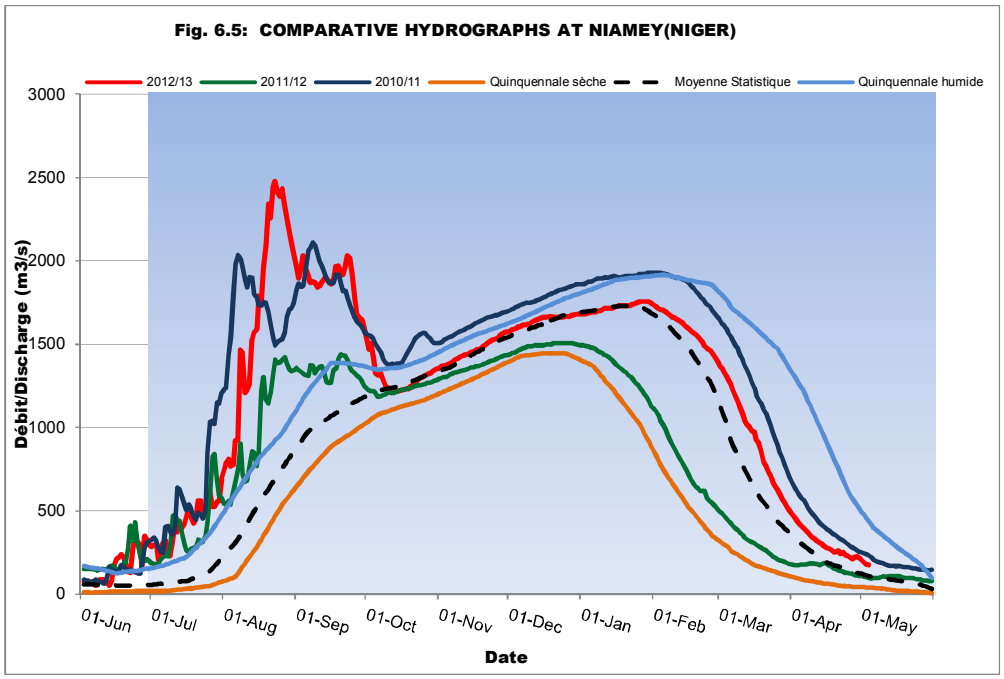
Fig.6.4. Comparative hydrograph at Dire (Mali)



Source NBA, 2013

At the Middle Niger the total flow volume recorded in Niamey from 1st June 2011 to 30th April, 2013 is of about 34.42 m^3. This volume is higher than last year during the same period. The average monthly flow recorded during this month is 300 m^3/s (value equivalent to 3 years wet return period) with a maximum flow of 472 m^3/s observed on 1st April and a minimum of 203 m^3/s on 30th April 2013 as shown in Fig 6.5.

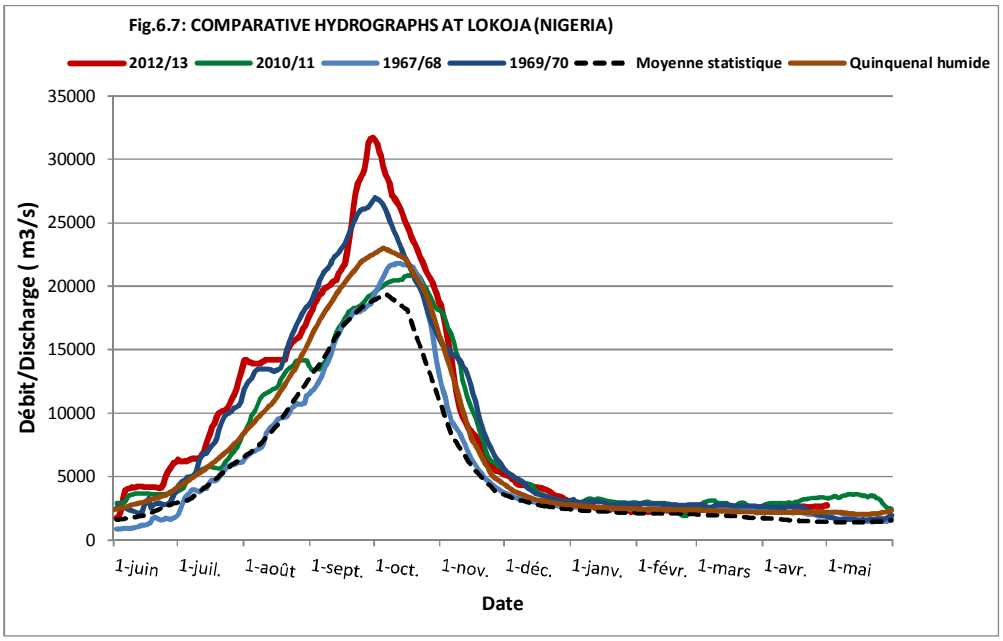
Fig. 6.5. Comparative hydrograph at Niamey (Niger Rep.)



Source NBA, 2013

At the Lower Niger the total flow volume in Lokoja from 1st June 2011 to 30th April, 2013 is about 263Km^3. This volume is also higher than previous years during the same period. The average monthly flow recorded during this month was 2638 m^3/s (value of 3 years wet frp)with a maximum flow of 2873 m^3/s observed on 12th April and a minimum of 2503 m^3/s observed on 08th April 2013 as shown in Fig 6.7.

Fig. 6.7. Comparative hydrograph at Lokoja (Nigeria)



Source NBA, 2013

As mentioned above what these records tell us is that the water situation over the Niger River has remained the same over the years: decline in water availability.

6.6. COMPETITIONS OVER THE WATER RESOURCES OF THE NIGER RIVER BASIN AND THE RISKS OF INTER-RIPARIAN DISPUTES AND CONFLICTS

In spite of all of the above, it is still difficult to provide a definitive answer to the question: can the ongoing competitions to have more access to the water resources of the Niger River

Basin between the riparian states degenerate into disputes and conflict? This is because there are several other factors at play which our research design may not have captured. However given the research questions of this study and the evidences obtained as presented in this and the preceding chapters, it can be concluded that it is likely that disputes might arise in the coming years and if the disputes are not handled effectively, it is likely that the disputes can degenerate into conflict situations especially between member countries that have a history of disputes and conflicts for example between Nigeria and Cameroon.

This conclusion can further be supported by the lack of any form of sanction against Nigeria over the inability of the Nigerian government to conform to the requirement to inform the NBA and other states before it began the dredging of the Lower Niger (see Appendix 11 interview with Legal Adviser Drissa Naman Keita 3rd September, 2012 Niamey Niger Republic).

Although according the Executive Secretary of the NBA this infringement by Nigeria has been rectified by the Nigerian authorities through a letter they sent to the NBA (interview with the Executive Secretary of the NBA Collins Ihekire 7th September, 2012 Niamey Niger Republic see Appendix 12). In the letter to the NBA (made available to the researcher by the ES) which was dated 22nd December 2011 the Nigerian government informed the NBA through the Federal Ministry of Environment notifying the other riparian states that under its proposed Erosion and Watershed Management Project, it will carry out the rehabilitation of some parts of the Lower Niger at the Cross River Basin in order to prevent long term erosion

and degradation of the Lower Niger. (This project is not to acquire more water from the Niger River).

However there are two problems with this piece of evidence given to the researcher by the Executive Secretary of the Niger Basin Authority. The first is that the two projects are not the same. The content of the notification letter of the Nigerian Minister of Environment indicated that the project was for Erosion and Watershed Management, it was not indicated in the document that the new project is an extension of the dredging project of the Lower Niger or a belated notification of the dredging project. Secondly, there is nowhere in which it was stated in the letter that Nigeria is conforming to her obligation based on the requirement to do so as stipulated in the rule books of the NBA. In other words the document indicated that the Nigerian government was complying with the requirements stipulated by the World Bank as part of the conditions for obtaining the counterpart funding of the Erosion and Watershed Management Project. The reasons stated in the letter of the Nigerian Minister of Environment indicate that, the Nigerian government was informing the NBA and other riparian states because the World Bank's Operational Policy OP 7.50 requires that all projects involving international waterways which the bank supports, the beneficiary state must inform all riparian states that share the international watercourse (see Appendix 13 letter of the FME to the ES of the NBA).

Based on these facts, it can be concluded that the dredging of the Lower Niger which Nigeria embarked upon, Nigeria did not comply with the requirement to notify other riparian states that may be affected by the actions of Nigeria.

However it may appear that this conclusion is faulty on two grounds. The first is that this case is one isolated incident; given that all other projects involving other riparian states have complied with the rules. The following explanation will show that, that is not the case:

That one example of individual disregard to the laid down rules of behavior expected of the riparian states is enough to point to a loophole in the rules: one of which is that there are no sanctions to noncompliance to the rules as presently constituted in the Convention and the Water Charter of the Niger River Basin Authority. And this can have serious implications in the future water interactions of the riparian states.

The second possible criticism to the above conclusion is that Nigeria did not infringe on the rules because of the provisions in articles 19, 20 and 23 of the Water Charter. In Article 19, Information Exchange, it is stated that,

The State Parties shall exchange information and consult each other and if necessary, negotiate on the possible effects of measures planned on the River Niger Basin.

And Article 20 on Notification of Planned Measures states that,

Before a State Party implements or permits the implementation on its territory of measures that may have significant adverse effects upon other Basin States, it shall provide the latter with timely notification through the Executive Secretariat. Such notification shall be accompanied by the available technical data and information, including the results of any environmental and social impact assessment, in order to enable the Authority to evaluate the possible effects of the planned measures.

While article 23 maintains that,

If a State Party or the Authority has reasonable grounds to believe that another Basin State is planning measures which could have a significant adverse effect on its own uses or the condition of the resource, it may request that the latter meets the notification requirement. In the event the State which plans the measures considers that it is not under obligation to provide a notification, it shall so inform the Executive Secretariat and any State that could be affected by providing a documented statement explaining its decision. If the decision does not satisfy the Executive Secretariat and the States that could be affected, consultations and negotiations shall be engaged between the Parties.

All of these indicate that, because the dredging project may not have any direct impacts on any other riparian state (Nigeria being the last downstream riparian state) and also the fact that none of the other riparian countries complained about the dredging project either to Nigeria or via the NBA at least officially. When this was pointed out to the Legal Adviser of the NBA his response was that, the claim that, the project will not affect other riparian states is not tenable, because the project will increase the dimension of the river and the water flow to Nigeria will increase and this will invariably affect the other upstream countries (see appendix 11). This position however contradicts the earlier position of the legal advisers that, there is a hundred percent compliance to the rules by the riparian states of the Niger River Basin.

As mentioned above there are a number of issues which this 'example' by Nigeria raised: The first points to the weakness in the NBA's rule books: there are no consequences for

violation, infringement or any act of illegality against the provisions of the treaty. This indicate that the rule books of the NBA cannot serve as sufficient deterrence to uncooperative behavior: "consultations and negotiations" as stated in Article 23 of the Water Charter do have their limits in resolving disputes that may arise, for example in the event of acute scarcity. And, according to the Legal Adviser if a state fails to live up to her obligations, "the only thing they can do is to appeal to the state concerned to do what is expected of it" (interview with the NBS's Legal Adviser Drissa Naman Keita- 3rd September, 2012, Naimey Niger Republic See appendix 11).

The second implication of this behavior by Nigeria is that, Nigeria being the most important country in the Niger basin area and also the last downstream country on the Niger River has set a precedent which other riparian states of the Niger River basin may repeat.

Consequently, if disputes manifest and diplomacy fails there are no sanctions in place to deter a state from behaving in a belligerent manner. Furthermore, cases are only entertained by the ICJ if the parties involved in the dispute agreed to participate. Hence it can be concluded that if all the present conditions and factors persists in the coming years the likelihood of conflict will also be greater.

6.7. THE KEY FINDINGS

The following are therefore a summary of the findings of the study:

1. That climate change is a source of threat to the security of water resources of the Niger River Basin.
2. That the climate change factor has generated anxiety and, consequently, triggered competition for greater control of water resources between the riparian states of the Niger River Basin.
3. That the treaty rules that govern the behavior of the Riparian States of the Niger River basin (as currently constituted) are not comprehensive and therefore cannot prevent the onset of disputes and/or conflict.
4. If the correlations between the impacts of climate change over the water resources of the Niger basin, the anxiety over the future impacts of climate change over the water resources of West Africa and the quests to acquire more of the water resources among the riparian states persist, then the likelihood of conflicts over the water resources of the Niger River basin will become stronger.
5. Compliance to the provisions of the treaty rules of the Niger River Basin is not hundred percent as the example by Nigeria has indicated.

CHAPTER SEVEN:

SUMMARY, CONCLUSION AND RECOMMENDATIONS

7.1. INTRODUCTION

The problematic of this study is predicated on two emerging global concerns. The first is the growing concerns expressed by some international statesmen like the former General Secretary of the United Nations Mr. Kofi Anan and others warning the international community to the effect that the wars of the coming decades will be fought over water in some regions of the world. The second is the concern expressed by climate scientists particularly the group of scientists that produced the IPCC Assessments Reports in which they warn that, the globe is warming and the climate is changing, and that a changed climate could have devastating consequences on the security of environmental resources.

The West African sub-region is one of the regions that are vulnerable to the adverse impacts of climate change, particularly on cropland and water resources because of several reasons: one the physical location of the region; its closeness to the equator, two, because West Africa has the largest concentration of the poorest countries in the world, and, three because the region is home to some of the most unstable countries in Africa.

In addition to the climatic factor and the economic and security conditions of the West African states, some of the states have high water dependency ratio (i.e. Water dependency ratio is defined as the share of a country's total renewable freshwater that is generated outside its borders). In effect all the indicators that point to the vulnerability to the adverse impacts of climate change and those that point to the low capacity to mitigate its impacts are present in the region.

The most vulnerable basin that embodies all the above mentioned characteristics in West Africa is the Niger River basin: shared by nine countries, the basin area transverse into several ecological and hydrological zones; from rainforests semi-arid and arid zones.

7.2. SUMMARY

Examination of the environment-conflict literature reveals that, the mainstream research community that is concerned with the implications of environmental security problems to international security gives little regard to the climate change factor in its research focus on the link between environment and conflict: the preferred variable of focus of the mainstream scholars is population pressure as the sources of the causes of environmental resources degradation and scarcity. However, on re-examining all the factors involved in relation to the West African sub-region, we maintained our proposition that the climate change factor is a veritable source of generating scarcity induced inter-riparian conflicts over the water resources of the Niger River basin.

Also the argument put forward by the two main perspectives on the question of water and international conflict (i.e. the water war school-which is based on the realist research perspective and the water cooperation school which is based on the Liberal Institutionalist School) are both persuasive. While the research perspective of the Realists focus on the causal linkages between environmental factors and conflicts, the focus of the water cooperation school is on the role that international water agreements and river basin organizations play in mitigating, managing or resolving conflict. Given the potential consequences of climate change as a source of scarcity induced conflict and as a factor that

can weaken or obliterate the sources of cooperation between users of transboundary water resources, the areas of focus of both schools are important areas of concern. Consequently we adopted and modified the causal path to conflict model as represented by Gleditsch's model of environment-conflict in constructing our research design. The Gleditsch reads:

Population growth→ high resource consumption per capita→ deteriorated environmental conditions→ increasing resource scarcity → harsher resource competition → greater risk of violence (Gleditsch: 1998:383).

In the modified model the area of focus of the water cooperation school was incorporated. Thus the model that guided this study reads as follows:

Climate change or the uncertainty of climate change → depletion and scarcity of water resources or the fear of scarcity → competition for greater access to and control over water resources → weak or the absence of treaty agreement/institutional capacity of the overseeing international organization → greater likelihood of conflict.

In this model, we contend that the climate change factor (i.e. the independent variable) can affect the behavior of the riparian states that share international water courses in two ways: one because climate change can generate scarcity of water resource and two; because climate change can be a source of the fear of scarcity. Either or both can generate anxiety among the riparian states and consequently trigger completion for the available water resources in a basin area. On the other side of the trajectory of the model, the presence of a River Basin Organization in a basin area suggest the presence of a form of agreement between the

riparian states and its capacity to play the mediating role of preventing disputes and conflicts between the riparian states is the determining factor i.e. whether the competition that can ensue would degenerate into disputes or conflicts.

Our model therefore represents the arguments of both the water war and water cooperation schools of the environment-conflict thesis which in our view the climate change factor has made both arguments to be persuasive particularly over the interactions of riparian states in international water courses. The realist/water war perspective is based on the argument that because of the anarchic nature of the international system, states are in constant search of security, especially that aspect of security that determines their wellbeing and self-preservation. And consequently, where scarcity ensued over international water courses conflicts between riparian states may very likely arise.

However according to the realist perspective the sources of environmental resources scarcity is population increase. Hence the research models of the perspective emphasize the demand induced scarcity as the main source or trigger of competition between users of common pool resources. In our view this argument is weak on two important aspects. In the first place this perspective (based on the basic principles of the realist paradigm), ignores the role that international organizations play in mediating the conflicting interests of their members which has repeatedly been found to be so. Secondly the water war/realist/neo-Malthusian school over states the strength of the demand source (which population increase represents) of scarcity while at the same time deemphasizing the supply source of environmental resources scarcity which events like climate change can generate with far more devastating impacts. In

other words the strength of climate change in generating scarcity induced resource conflicts is far greater than that which population increase would generate. Climate change for example can be swift in degrading environmental resources through ecological disasters like droughts and floods (which overuse through population increase cannot generate). Secondly it is possible to project population increase with near accurate precision but very difficult as the scientists tell us to predict ecological disasters like droughts. Consequently climate change is a better factor to focus on in constructing research designs even based on the water war/realist world view than population growth. Yet in spite of this shortcoming the realists/water war research perspective is a useful tool for mapping out the causal chains of environmental conflict but not as useful in predicting the likelihood of water conflict.

On the other hand, the focus of the Liberal Institutionalist/water cooperation school is on the role that river basin organizations play via the enforcement of treaty agreements which has been found to be the main reason why inter-riparian conflicts over international waters is very minimal when compared with the instances of cooperative behavior of states that share water resources. Hence because the strength of this research perspective lies in its focus on the treaty rules of international basin organizations, it offers a more useful tool to predict the likelihood of conflict over international water courses.

Hence to determine the likelihood of disputes and conflict in the Niger River basin because of the threats posed by climate change to the security of environmental resources in West Africa, the capacity of Niger Basin Authority via the assessment of the comprehensiveness and resilience of the treaty rules that guide the behavior of the riparian states of the Niger

River basin as supervised by the NBA in preventing conflict in the advent of an acute supply induced scarcity generated by adverse climate change in the basin was gauged

However the main shortcoming of this perspective is that it does not give attention to the sources of inter-riparian disputes outside of river basin organization's treaty.

The central objective which this study therefore set out to achieve was to assess the risks of climate change induced inter-riparian conflicts over the water resources of the Niger River basin. That is to assess whether the climate change factor could generate supply induced water scarcity in the Niger River basin or induced the fear of water scarcity between the riparian states of the Niger River Basin in such a way that it could negatively affect the water interactions of the riparian states of the basin to the extent of generating conflicts.

7. 3. CONCLUSION

In this study, the attempt has been made to highlight the significance of the climate change factor both as a threat to the stability of the West African sub-region as well as in the environment-conflict research: particularly on the question of conflict and cooperation in international water interactions between states that share international water courses.

The study has demonstrated that the climate change factor (which is overlooked or given little attention by the environment-conflict research community especially the realist/neo-Malthusian/water war research perspective), is a key factor in the search for understanding the implications of water related environmental security challenges to international security. The example in this regard that, there is a correlation between climate change impacts, the

decline of between 20-40% in annual rainfall in the River discharge with the increase in the quests to acquire more of the water resources of Niger River by the riparian states between 1990 and 2011 through the constructions of dams indicate that climate is a potent risk factor than population increase. The realist/neo-Malthusian/water war model which focuses on the rise in demand due to population increase cannot point to this correlation.

Secondly based on the central argument of the study and the weaknesses observed in the literature of the research perspectives of the two main approaches, this study has demonstrated that it is possible to incorporate the areas of strength in the two research perspectives in the search for a more comprehensive understanding of all the main factors at play in the water interactions of riparian states and a more clearer prediction of the likelihood of inter-riparian conflict. Because the modified model has enabled us to undertake a comprehensive and systematic study which involves assessing the effects of the climate change factor on the behavior of the riparian states of the Niger River basin as a causal variable vis-à-vis the comprehensive assessment of the Niger basin treaty rules. Hence the model has the potential to contribute to the research on conflict and cooperation and by extension the systematic study of/and identifying basins at risk of scarcity induced inter-riparian conflicts over shared /transboundary water courses.

The conclusion of this study therefore is that, the climate change factor is an important potent risk factor of generating environmental resource scarcity induced conflict in the coming years over the water resources of the Niger River basin because the global conditions that generate climate change induced environmental resources scarcity are not abating. These include:

i. The steady rise in global energy demands

ii. Continuous global reliance on fossil fuels

iii. The likelihood that global temperature rise will reach the dreaded 4-6^{o}C because of the failure of the international community to reach agreements on cutting the emissions of greenhouse gases particularly Carbon-dioxide $C0_2$

iv. And also, because it has been shown that the climate change factor can eliminate the sources of cooperative behavior among riparian states that share transboundary water resources.

7.4. RECOMMENDATIONS

Based on the findings of the study the following recommendations are therefore made:

1. In order to achieve the ultimate goal of global greenhouse gas reduction to the levels the scientists say is safe, African countries and particularly West African countries must review their approach and strategies in subsequent conferences of the parties to the Kyoto 2 protocol at the international climate negotiations. This is because current approaches are not producing the desired results. The industrialized countries have maintained their emissions levels; a global greenhouse gas emission is business as usual even though some of these countries have also started feeling the destructive impacts of climate change. The approaches of African countries which appear to be more of passive participants need to be changed: a collective bargain approach in which the position of Africa is presented should be in place before the 2015 Paris Climate Change Conference.

2. In order to prevent the onset of disputes and possibly conflicts between the riparian states of the Niger River basin, the capacity of the Niger Basin Authority must be strengthened. This is necessary because as it stands the NBA faces a number of challenges particularly financial challenges. And if the NBA is not strong enough to confront the new emerging problems that need to be avoided in the coming years then it is only a matter of time before such problems would surface in the basin area. All Member countries of the NBA must be made to honor their financial commitments to the organization.
3. Most importantly, to avoid disputes and conflicts in the coming years it is necessary to upgrade the current status of the treaty agreement of the Niger River basin to provide for the allocations of the water resources of the basin based on the available river discharge. This is because as pointed out in the findings of this study, water allocation is at the heart of international water disputes and conflicts. This will go a long way in assuaging the fears and uncertainties that climate change may generate in the riparian states of the Niger River Basin.
4. Also the allocation agreement must have in it a mechanism that would ensure the compliance of all the countries and the appropriate sanctions are also in place; which would ensure that the cost of defection is greater the than the benefits that may accrue to the defecting state.

5. The ECOWAS must take a proactive role in the management of the international water courses in the West African sub-region. As an emerging supra-national body, the ECOWAS can play an important role in ensuring hydro-stability among the

countries that share international water courses. For example Article 3 of the Niger River Basin Water Charter states that, *in the event of no satisfactory settlement* [of disputes] *...the parties to the dispute shall refer the matter to the Conciliation Commission of the African Union as a first step, before any referral to the International Court of Justice.* This provision should be reverse to include as first step referral to the ECOWAS Commission.

REFERENCES

Allenby, B. A. (2000). Environmental Security: Concept and Implementation

International Political Science Review, Vol.21, No. 1 (Jan., 2000).

Alkire, S. (2003). A Conceptual Framework for Human Security (WORKING PAPER 2) Centre for Research on Inequality, Human Security and Ethnicity, CRISE,

University of Oxford.

Annan K.(2001). The united nations and the International geographers Union. Speech at the 97th Annual Meeting of the Association of American Geographers. Accessed 14/02/2014 from the UNDESA- International Decade for Action "Water for Life" 2005-2015.

Anderson K. (2012). Climate Change Going Beyond Dangerous-Brutal Numbers and Tenuous Hope. *Development Dialogue,* No. 61 pp16-40.

Ann-Sofi, R. (2008). *ECOWAS and West Africa's Future- Problems and Possibilities?* available at www.umu.diva- portal/smash/get/diva2:141533/FULLTEXT01.pdf

Retrieved December 22, 2008.

ARI- Atlas on Regional Integration in West Africa, available at www.oecd.org/swac/publications/38903590.pdf Retrieved Jan. 2008.

Ate, E. B. (1992). Issues in Nigeria's Security Relations with its Immediate

Neighbors, in Bassey E.A and Bola A. Akintenwa (eds.) *Nigeria and its Immediate Neighbors: Constrains and Prospects of Sub-regional Security in 1990s, Nig. Institute of International Affairs, (NIIA), Lagos.*

Ayibotele, N.B. (2010). *Transboundary Organization in the Niger Basin (#46).* Available at

www.gwptoolbox.org/images/stories/cases/en/cs%2046%20transboundary.pdf Retrieved February 2012.

Baldwin, A. D. (1997). The Concept of Security, *Review of International Studies,* Vol. 23, pp. 5- 26.

Barilleaux, R. J. (1985). The President, "intermestic" Issues, and the Risks of Policy Leadership. *Presidential Studies Quarterly* 15(4), pp.754-767.

Bæchler, G. (1999). Environmental Degradation and Violent Conflict: Hypotheses, Research Agendas and Theory-building, in Mohammed Suliman (ed.) *Ecology, Politics and Violent Conflict,* pp. 77-112,ZED BOOKS, London.

Bates, B.C., Z.W. Kundzewicz, S. Wu and J.P. Palutikof, Eds., 2008: *Climate Change and Water. Technical Paper of the Intergovernmental Panel on Climate Change*, IPCC Secretariat, Geneva.

Bolin, B. (2007). *The History of the Science and Politics of Climate Change* Cambridge University Press London, UK.

Boutros B. G. a BBC Radio 4 interview - February 2 2005. Available at www.bbc.co.uk/radio4.

Burchill, S. (eds.) (2005). *Theories of International Relations* (third edition), Palgrave Macmillan Y.K USA.

Craig, I and Fred S. S. (2009). *Climate Change Reconsidered: 2009 Report of the Nongovernmental Panel on Climate Change (NIPCC)*, Chicago, IL: The Heartland Institute.

D'Anieri, P. (2010). *International Politics: Power and Purpose in Global Affairs,* Wadsworth, Belmont CA USA.

De Mesquita, B.B. (2002). *Domestic Politics and International Relations.* International Studies Quarterly pp. 46, 1-9.

Dessler, E. A. (2012). *Introduction to Modern Climate Change.* Cambridge University Press, New York U.S.A.

Dessler, A. E. and Edward A. P. (2006). *The Science and Politics of Global Climate Change: A Guide to the Debate*. Cambridge University press, Cambridge U.K

Edger, W. N., Hug, S., Brown, K., Conway, D. and Hulme, M. (2003). *Adaptation to climate Change in the Developing World, Progress in Development studies* 3(3), 179-195 Elements for a Regional Strategy for Preparedness and Adaptation Retrieved 11, January, 2010, from www.pdj.sagepub.com/content/3/179.short.

Falkenmark M. (1989). The Massive Water Scarcity Now Threatening Africa: Why Isn't It Being Addressed? *Ambio*, Vol. 18, No. 2 pp. 112-118

Forster, P., V. Ramaswamy, P. Artaxo, T. Berntsen, R. Betts, D.W. Fahey, J. Haywood, J. Lean, D.C. Lowe, G. Myhre, J. Nganga, R. Prinn, G. Raga, M. Schulz and R. Van Dorland, 2007: *Changes in Atmospheric Constituents and in Radiative Forcing*. In: *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to* D.Qin *the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* [Solomon, S., M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M.Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

Freedman, L. (1998). International Security; Changing Targets, *Foreign Policy,* No. 110, Special Edition: pp. 48-63.

Giordano, M. A, Giordano, M. A, Wolf T. A. (2005). International Resources Conflict and Mitigation, *Journal of Peace Research.* Vol. 42. No 1, pp. 47-65.

Gleditsch, N. P. (1998). Armed Conflict and the Environment: A Critique of the Literature: *Journal of Peace Research*, Vol. 35, No. 3, Special Issue on Environmental Conflict pp. 381-400.

Gleick P. H. (2008). *Water Conflict Chronology* Pacific Institute for Studies in Development, Environment, and Security.

Græger Nina (1996). Environmental Security? *Journal of Peace Research,* Vol. 33, No. 1 pp. 109-116 pp. 109-116.

Global Warming Petition Project *Petitionproject.org,* Cave Junction, nd Retrieved: June, 7 2012 available at

http://www.petitionproject.org/frequently_asked_questions.php.

Golitzen, K. G (ed.), (2005). The Niger River basin: A Vision for Sustainable Management

Directions in Development 34518.

Hardin, G. (1968). The Tragedy of the Commons. *Science,* Vol. 162, No. 3859.

Heinrigs, P. (2010). *Security Implications of Climate Change in the Sahel Region: Policy Consideration*, available at Oecd.org/swac. Retrieved 13, November, 2011

Homer-Dixon, T. (1991), The Threshold: Environmental Changes as causes of Acute

Conflict *International Security*, vol. 16, No. 2, pp. 76-116.

Intergovernmental Panel Climate Change, *Forth Assessment Report (AR4).* 2007 IPCC Principles: The Principles Governing the IPCC Work. Available at

www.ipcc.ch/../IPCC%2520Procedures.pdf.

International Freshwater Agreements, River Basin Organizations, and River Basin Commissions of Africa. Available at http://www.up.ac.za/academic/libarts/polsci/awiru/. Retrieved March 2012.

Kaplan, R. D. (1994). "The Coming Anarchy," *The Atlantic Monthly*, pp. 44-76.

Kendie, D. (1999), Egypt and the Hydro-Politics of the Blue Nile River, *Northeast African Studies, New Series,* Vol. 6, No. 1/2 pp. 141-169.

Khor M. (2012). A Clash of Paradigms- UN Climate Negotiations at a Crossroads. *Development Dialogue,* No. 61 pp76-105.

King G. and Murray C. J. L (2002). Rethinking Human Security, *Political Science quarterly* Vol. 116, No. 4.

Kliot, N., Shmueli, D., Shamir, U, (2001). Institutions for management of transboundary water resources: their nature, characteristics and shortcomings *Water Policy* 3 (2001) pp. 229–255.

Kornprobst, M. (2002). The management of border disputes in African regional Sub-systems: comparing West Africa and the Horn of Africa *Journal of Modern African Studies*, 40, 3 pp. 369-393, Cambridge University Press.

Kumar, R. (2008). *Research Methodology,* Parson Education N/Delhi India.

Kyoto Protocol to the United Nations Framework Convention on Climate Change (1998). United Nations, NY.

Lançon, F., Benz, H. D. (2007). Rice imports in West Africa: trade regimes and food policy formulation: paper presented at the 106th seminar of the EAAE 25-27 pp. 96-105 October 2007 – Montpellier, France.

Leroux M. (2005). *Climate Change- Myth or Reality? The Erring Ways of Climatology.* Praxis Pub. Chichester U.K.

Libiszewski, S. (1999). International Conflicts over Freshwater Resources in Mohammed Suliman (ed.) *Ecology, Politics and Violent Conflict,* ZED BOOKS, London.

Mathews, J.T. (1989). Redefining Security, *Foreign Affairs*, Vol. 68, No. 2, pp. 162-177.

McLean J. (2009). *Climate Science Corrupted.* Available at www.scienceandpublicpolicy.org/commentary/. Retrieved February 26, 2013.

Metz, F. A. (2010). The Cameroonian-Nigerian Border Conflict in the Lake Chad Region: Assessment of the Resource and Conflict Management Capacities of the

Lake Chad Basin Commission, Institute for Environmental Decisions, CHN K77, Universitätsstrasse 22, 8092 Zürich, Switzerland.

Parry, M.L., Canziani, O.F., Palutikof, J.P., van der Linden P.J. and Hanson, C.E. Eds., IPCC,2007: *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, Cambridge University Press, Cambridge, UK.

Myers, N. (2002). Environmental Security: What's New and different?

United Nations University of Peace: Policy Background Paper.

Niasse, M. (2005). Climate Induced Water Conflict Risks in West Africa: Recognizing and coping with Increase Climate Impacts on Shared Watercourses: A paper presented in an International Workshop Holmen Fjord Hotel, Asker, near Oslo, 21–23 June 2005.

Niasse, M., Afouda, A. & Amani, A. (eds.). (2004). *Reducing West Africa's*

Vulnerability Climate Impacts on Water Resources, Wetlands and Desertification

Element for Regional Strategy for Preparedness and Adaptation IUCN- The World Conservation Union.

Obi, C. (2000). Globalized Images of Environmental Security. *Review of African*

Political Economy, Vol. 27, No. 83.

Ogata S. and Sen A. (eds) (2003). Human Security Now. Commission on Human Security, New York.

Oli, B. and Alec C. (2008). Assessing the Security implications of Climate Change for West Africa: Country case studies of Ghana and Burkina Faso. Iisd.

Oli, B. and Robert, M. (2009). A recurring anarchy? The Emergence of Climate Change as a Threat to International Peace and Security, *Conflict, Security and Development* 9:3.

On Better Terms, (2006). U.N. Working Group on Climate Change and Disaster Risk Reduction on the Inter-Agency Task Force on Disaster Reduction.

Paris, R. 2001. Human Security: Paradigm Shift or hot Air? *International security,* vol. 26, No.2, pp. 87-102.

Ravnborg, H. M. (2004) (ed.) Water and Conflict: Conflict Prevention and Mitigation in water Resources Management- DIIS Report 2004-2 .

Rosso, D. (1995). The Insecure State: Reflection on "The State" and "Security" in a Changing World. *Dædalus* Vol. 124, No. 2, pp 175-207.

Rourke, J.T. (2008). International Politics on World Stage. New York: Mc Graw-Hill

Security Problem", *Environmental Change and Security Project*, *Special* Security", *International Security*, vol. 18, no. 1, summer 1993, pp. 79-112.

Seneviratne, S.I., N. Nicholls, D. Easterling, C.M. Goodess, S. Kanae, J. Kossin, Y. Luo, J. Marengo, K. McInnes, M. Rahimi, M. Reichstein, A. Sorteberg, C. Vera, and X. Zhang, 2012: Changes in climate extremes and their impacts on the natural physical environment. In: Managing the Risks of Extreme Events and Disasters to Dokken, K.L. Advance Climate Change Adaptation [Field, C.B., V. Barros, and T.F. Stocker, D. Qin, D. J. Ebi, M.D. Mastrandrea, K.J. Mach, G.-K. Plattner, S.K. Allen, M. Tignor, and P.M. on Midgley (eds.)]. *A Special Report of Working Groups I and II of the Intergovernmental Panel Climate Change (IPCC).* Cambridge University Press, Cambridge, UK, and New York, NY, USA, pp. 109-230.

Schmeier, S. (2010). Governing International Watercourses-Perspectives from Different Disciplines: A Comprehensive Literature Review *Hertie School of Governace Working Paper No. 53.*

Serageldin I. (2009/2010). Water Wars? A Talk with Ismail Serageldin, *World Policy*

Journal, Vol. 26, No. 4, pp. 25-31.

Sen A. (2000).Why Human Security? A Paper presented at an International Symposium on Human Security, Tokyo.

Simon Dalby. (1992). Modernity, Ecology: The Dilemmas of Post-Cold War Security Discourse: *Alternatives: Global, Local, Political,* Vol. 17, No. 1 pp. 95-132

Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M.Tignor and H.L. Miller (eds.). *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change.* Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

Soroos, M. S. (1994). Global Change, Environmental Security, and the Prisoner's Dilemma *Journal of Peace Research,* Vol. 31, No. 3 pp. 317-332.

Stefano D. L., Duncan K., Dinar S., Stahl K., Strzepek M. K., wolf T. A. (2012). Climate Change and the Institutional resilience of International River Basin *Journal of Peace Research* 49 (1) Pp. 193-209.

Strategic Action Program (SAP) for the Environment of the River Niger Basin (2011-2027), Niger Basin Authority (NBA), (2010).

Starr J. R (1991). Water Wars, *Foreign Policy*, No. 82, pp. 17-36.

Tir, N., Stinnett, D. M. (2010). Coping with the Consequences of Climate Change: International Institutions as Strategies for Mitigating Conflict over Water Resources, Department of International Affairs University of Georgia Athens, GA 30602- 1492 USA.

Ullman, R. H. (1983). Redefining Security, *International Security,* Vol. 8, No. 1 pp. 129-153.

Urban L. J. (2001). *Constructing Blame: Overpopulation, Environmental Security and International Relations,* Northern Arizona University, U.S. Working Paper #273.

UNDP/HDR (United Nations Development Program-Human Development Report); *University of peace* Available at: http://hdr.undp.org. 2011.

United Nations Framework Convention on Climate Change (UNFCCC). U.N 1992.

UNDP- Human Development Report 2011. Palgrave/Macmillan, NY

Wolf, T. A. (1998). Conflict and Cooperation along International Waterways *Water Policy*. Vol. 1 No. 2, pp. 251-265.

WFP (World Food Program) 2011. Rice Crisis, Market Trends, and Food Security in West Africa. Available at www.wfp.org/food-security/reports. Retrieved June 2012.

APPENDIX1

APPENDIX 2

SUMMARY OF FIELD ACTIVITIES

APPENDIX **13**

	Places visited	**Activities conducted**	**Person(s) interviewed**	**Documents obtained**	**Remarks**
Day 1 Wed. 29th August,2012	Katsina (Nigeria) and Maradi (Niger Republic)	Journey from Zaria through Kat sina (Nigeria) to Maradi (Niger Republic)	-	-	Journey by road from Zaria to Maradi
Day 2 Thud. 30th August,2012		Journey from Maradi to Niamey (in Niger republic)	-	-	Journey by road from Maradi to Niamey (in Niger republic)
Day 3 Fri. 31st August,2012	The Headquarters of Niger Basin Authority	1.Introduction meeting with the Executive Secretary of the NBA 2. Collection of documents from the Archive and Legal Departments	Introduction meetings	1.Revised Convention on the Establishment of the NBA 2. The Niger basin Water Charter 3. Hand book for Integrated Water Resources Management in Transboundary Basins, Lakes and Aquifers 4. Appendix1 to	Orders were given to all Heads of Departments to cooperate with us and to release any documents that we will need.

				the Niger basin Water Charter	
Day	**Places visited**	**Activities conducted**	**Person(s) interviewed**	**Documents obtained**	**Remarks**
Day 4 and 5 Sat. and Sun. 1st and 2nd Sept. 2012	Headquarters of Niger Basin Authority	Desk work	-		
Day 6 Mon. 3rd Sept. 2012	The Headquarters of Niger Basin Authority	1. Meeting with the Chief of Cabinet to the Executive Secretary to draw interview schedule 2. Interview with the Legal Adviser to the NBA	Legal Adviser to the NBA	Interview schedule	
Day 7 Tue. 4th Sept. 2012	Technical Department of Niger Basin Authority	Interview	1. Director of Technical Department 2. Hydrologist: (Ibraheem A. Olomoda)	Several documents on climate change and some data on the water situation over the Niger basin	
Day 8 Wed. 5th Sept. 2012	Technical Dept.	Interview	Head of Basin Observatory	A number of documents, most of which in soft copies;	

				Cartographic maps other documents	
Day 9 Thus. 6th Sept. 2012	Technical Dept	Interview	Head of planning and Studies (a Hydrologist)	The Niger River Basin: A Vision for Sustainable Management and other documents	
Day	**Places visited**	**Activities conducted**	**Person(s) interviewed**	**Documents obtained**	**Remarks**
Day 10 Fri. 7th Sept. 2012	The Headquarters of Niger Basin Authority	Interview	The Executive Secretary of the NBA	A latter of notification from Nigeria's Minister of Environment on the Dredging of the Niger	
Day 11	Birnin Konni (Niger Rep.), Sokoto (Nigeria)	Journey Back to Zaria, Nigeria via Birnin Konni	-	-	Journey by road from Niamey to Zaria

APPENDIX 3

THE

UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE

UNITED NATIONS
1992

FCCC/INFORMAL/84
GE.05-62220 (E) 200705

UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE

The Parties to this Convention,

Acknowledging that change in the Earth's climate and its adverse effects are a common concern of humankind,

Concerned that human activities have been substantially increasing the atmospheric concentrations of greenhouse gases, that these increases enhance the natural greenhouse effect, and that this will result on average in an additional warming of the Earth's surface and atmosphere and may adversely affect natural ecosystems and humankind,

Noting that the largest share of historical and current global emissions of greenhouse gases has originated in developed countries, that per capita emissions in developing countries are still relatively low and that the share of global emissions originating in developing countries will grow to meet their social and development needs,

Aware of the role and importance in terrestrial and marine ecosystems of sinks and reservoirs of greenhouse gases,

Noting that there are many uncertainties in predictions of climate change, particularly with regard to the timing, magnitude and regional patterns thereof,

Acknowledging that the global nature of climate change calls for the widest possible cooperation by all countries and their participation in an effective and appropriate international response, in accordance with their common but differentiated responsibilities and respective capabilities and their social and economic conditions,

Recalling the pertinent provisions of the Declaration of the United Nations Conference on the Human Environment, adopted at Stockholm on 16 June 1972,

Recalling also that States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental and developmental policies and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction,

Reaffirming the principle of sovereignty of States in international cooperation to address

climate change,

Recognizing that States should enact effective environmental legislation, that environmental standards, management objectives and priorities should reflect the environmental
and developmental context to which they apply, and that standards applied by some countries may be inappropriate and of unwarranted economic and social cost to other countries, in particular developing countries,

Recalling the provisions of General Assembly resolution 44/228 of 22 December 1989
on the United Nations Conference on Environment and Development, and resolutions 43/53 of 6 December 1988, 44/207 of 22 December 1989, 45/212 of 21 December 1990 and 46/169 of 19 December 1991 on protection of global climate for present and future generations of mankind,

Recalling also the provisions of General Assembly resolution 44/206 of
22 December 1989 on the possible adverse effects of sea-level rise on islands and coastal areas, particularly low-lying coastal areas and the pertinent provisions of General Assembly resolution 44/172 of 19 December 1989 on the implementation of the Plan of Action to Combat Desertification,

Recalling further the Vienna Convention for the Protection of the Ozone Layer, 1985, and the Montreal Protocol on Substances that Deplete the Ozone Layer, 1987, as adjusted and
amended on 29 June 1990,

Noting the Ministerial Declaration of the Second World Climate Conference adopted on 7 November 1990,

Conscious of the valuable analytical work being conducted by many States on climate change and of the important contributions of the World Meteorological Organization, the United Nations Environment Programme and other organs, organizations and bodies of the United Nations system, as well as other international and intergovernmental bodies, to the exchange of results of scientific research and the coordination of research,

Recognizing that steps required to understand and address climate change will be environmentally, socially and economically most effective if they are based on relevant scientific, technical and economic considerations and continually re-evaluated in the light of new findings in these areas,

Recognizing that various actions to address climate change can be justified economically
in their own right and can also help in solving other environmental problems,

Recognizing also the need for developed countries to take immediate action in a flexible manner on the basis of clear priorities, as a first step towards comprehensive response strategies at the global, national and, where agreed, regional levels that take into account all greenhouse gases, with due consideration of their relative contributions to the enhancement of the greenhouse effect,

Recognizing further that low-lying and other small island countries, countries with low-lying coastal, arid and semi-arid areas or areas liable to floods, drought and desertification, and developing countries with fragile mountainous ecosystems are particularly vulnerable to the adverse effects of climate change,

Recognizing the special difficulties of those countries, especially developing countries, whose economies are particularly dependent on fossil fuel production, use and exportation, as a consequence of action taken on limiting greenhouse gas emissions,

Affirming that responses to climate change should be coordinated with social and economic development in an integrated manner with a view to avoiding adverse impacts on the latter, taking into full account the legitimate priority needs of developing countries for the achievement of sustained economic growth and the eradication of poverty,

Recognizing that all countries, especially developing countries, need access to resources required to achieve sustainable social and economic development and that, in order for developing countries to progress towards that goal, their energy consumption will need to grow taking into account the possibilities for achieving greater energy efficiency and for controlling greenhouse gas emissions in general, including through the application of new technologies on terms which make such an application economically and socially beneficial,

Determined to protect the climate system for present and future generations,
Have agreed as follows:

Article 1
DEFINITIONS*

For the purposes of this Convention:

1. "Adverse effects of climate change" means changes in the physical environment or biota resulting from climate change which have significant deleterious effects on the composition, resilience or productivity of natural and managed ecosystems or on the operation of socio-economic systems or on human health and welfare.

2. "Climate change" means a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.

3. "Climate system" means the totality of the atmosphere, hydrosphere, biosphere and geosphere and their interactions.

4. "Emissions" means the release of greenhouse gases and/or their precursors into the atmosphere over a specified area and period of time.

5. "Greenhouse gases" means those gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and re-emit infrared radiation.

6. "Regional economic integration organization" means an organization constituted by sovereign States of a given region which has competence in respect of matters governed by this Convention or its protocols and has been duly authorized, in accordance with its internal procedures, to sign, ratify, accept, approve or accede to the instruments concerned.

---

* Titles of articles are included solely to assist the reader.

7. "Reservoir" means a component or components of the climate system where a greenhouse gas or a precursor of a greenhouse gas is stored.

8. "Sink" means any process, activity or mechanism which removes a greenhouse gas, an aerosol or a precursor of a greenhouse gas from the atmosphere.

9. "Source" means any process or activity which releases a greenhouse gas, an aerosol or a precursor of a greenhouse gas into the atmosphere.

Article 2

OBJECTIVE

The ultimate objective of this Convention and any related legal instruments that the Conference of the Parties may adopt is to achieve, in accordance with the relevant provisions of the Convention, stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.

Article 3

PRINCIPLES

In their actions to achieve the objective of the Convention and to implement its provisions, the Parties shall be guided, inter alia, by the following:

1. The Parties should protect the climate system for the benefit of present and future generations of humankind, on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities. Accordingly, the developed country Parties should take the lead in combating climate change and the adverse effects thereof.

2. The specific needs and special circumstances of developing country Parties, especially those that are particularly vulnerable to the adverse effects of climate change, and of those Parties, especially developing country Parties, that would have to bear a disproportionate or abnormal burden under the Convention, should be given full consideration.

3. The Parties should take precautionary measures to anticipate, prevent or minimize the causes of climate change and mitigate its adverse effects. Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing such measures, taking into account that policies and measures to deal with climate change should be cost-effective so as to ensure global benefits at the lowest possible cost. To achieve this, such policies and measures should take into account different socio-economic contexts, be comprehensive, cover all relevant sources, sinks and reservoirs of greenhouse gases and adaptation, and comprise all economic sectors. Efforts to address climate change may be carried out cooperatively by interested Parties.

4. The Parties have a right to, and should, promote sustainable development. Policies and

measures to protect the climate system against human-induced change should be appropriate for the specific conditions of each Party and should be integrated with national development programmes, taking into account that economic development is essential for adopting measures
to address climate change.

5. The Parties should cooperate to promote a supportive and open international economic
system that would lead to sustainable economic growth and development in all Parties, particularly developing country Parties, thus enabling them better to address the problems of climate change. Measures taken to combat climate change, including unilateral ones, should not
constitute a means of arbitrary or unjustifiable discrimination or a disguised restriction on international trade.

Article 4

COMMITMENTS

1. All Parties, taking into account their common but differentiated responsibilities and their
specific national and regional development priorities, objectives and circumstances, shall:

(a) Develop, periodically update, publish and make available to the Conference of the Parties, in accordance with Article 12, national inventories of anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol,
using comparable methodologies to be agreed upon by the Conference of the Parties;

(b) Formulate, implement, publish and regularly update national and, where appropriate, regional programmes containing measures to mitigate climate change by addressing anthropogenic emissions by sources and removals by sinks of all greenhouse gases
not controlled by the Montreal Protocol, and measures to facilitate adequate adaptation to climate change;

(c) Promote and cooperate in the development, application and diffusion, including transfer, of technologies, practices and processes that control, reduce or prevent anthropogenic emissions of greenhouse gases not controlled by the Montreal Protocol in all relevant sectors, including the energy, transport, industry, agriculture, forestry and waste management sectors;

(d) Promote sustainable management, and promote and cooperate in the conservation and enhancement, as appropriate, of sinks and reservoirs of all greenhouse gases not controlled

by the Montreal Protocol, including biomass, forests and oceans as well as other terrestrial, coastal and marine ecosystems;

(e) Cooperate in preparing for adaptation to the impacts of climate change; develop and elaborate appropriate and integrated plans for coastal zone management, water resources and agriculture, and for the protection and rehabilitation of areas, particularly in Africa, affected by drought and desertification, as well as floods;

(f) Take climate change considerations into account, to the extent feasible, in their relevant social, economic and environmental policies and actions, and employ appropriate methods, for example impact assessments, formulated and determined nationally, with a view to minimizing adverse effects on the economy, on public health and on the quality of the environment, of projects or measures undertaken by them to mitigate or adapt to climate change;

(g) Promote and cooperate in scientific, technological, technical, socio-economic and other research, systematic observation and development of data archives related to the climate system and intended to further the understanding and to reduce or eliminate the remaining uncertainties regarding the causes, effects, magnitude and timing of climate change and the economic and social consequences of various response strategies;

(h) Promote and cooperate in the full, open and prompt exchange of relevant scientific, technological, technical, socio-economic and legal information related to the climate system and climate change, and to the economic and social consequences of various response strategies;

(i) Promote and cooperate in education, training and public awareness related to climate change and encourage the widest participation in this process, including that of non-governmental organizations; and

(j) Communicate to the Conference of the Parties information related to implementation, in accordance with Article 12.

2. The developed country Parties and other Parties included in Annex I commit themselves specifically as provided for in the following:

(a) Each of these Parties shall adopt national**1** policies and take corresponding measures on the mitigation of climate change, by limiting its anthropogenic emissions of

greenhouse gases and protecting and enhancing its greenhouse gas sinks and reservoirs. These
policies and measures will demonstrate that developed countries are taking the lead in modifying
longer-term trends in anthropogenic emissions consistent with the objective of the Convention,
recognizing that the return by the end of the present decade to earlier levels of anthropogenic
emissions of carbon dioxide and other greenhouse gases not controlled by the Montreal Protocol
would contribute to such modification, and taking into account the differences in these Parties'
starting points and approaches, economic structures and resource bases, the need to maintain
strong and sustainable economic growth, available technologies and other individual
circumstances, as well as the need for equitable and appropriate contributions by each of these
Parties to the global effort regarding that objective. These Parties may implement such
policies and measures jointly with other Parties and may assist other Parties in contributing
to the achievement of the objective of the Convention and, in particular, that of this
subparagraph;

---

1 This includes policies and measures adopted by regional economic integration organizations.

(b) In order to promote progress to this end, each of these Parties shall communicate, within six months of the entry into force of the Convention for it and periodically thereafter, and
in accordance with Article 12, detailed information on its policies and measures referred to in
subparagraph (a) above, as well as on its resulting projected anthropogenic emissions by sources
and removals by sinks of greenhouse gases not controlled by the Montreal Protocol for the
period referred to in subparagraph (a), with the aim of returning individually or jointly to
their 1990 levels these anthropogenic emissions of carbon dioxide and other greenhouse gases
not controlled by the Montreal Protocol. This information will be reviewed by the Conference of
the Parties, at its first session and periodically thereafter, in accordance with Article 7;

(c) Calculations of emissions by sources and removals by sinks of greenhouse gases for the purposes of subparagraph (b) above should take into account the best available scientific
knowledge, including of the effective capacity of sinks and the respective contributions of such
gases to climate change. The Conference of the Parties shall consider and agree on
methodologies for these calculations at its first session and review them regularly thereafter;

(d) The Conference of the Parties shall, at its first session, review the adequacy of subparagraphs (a) and (b) above. Such review shall be carried out in the light of the best available scientific information and assessment on climate change and its impacts, as well as relevant technical, social and economic information. Based on this review, the Conference of the Parties shall take appropriate action, which may include the adoption of amendments to the commitments in subparagraphs (a) and (b) above. The Conference of the Parties, at its first session, shall also take decisions regarding criteria for joint implementation as indicated in subparagraph (a) above. A second review of subparagraphs (a) and (b) shall take place not later than 31 December 1998, and thereafter at regular intervals determined by the Conference of the Parties, until the objective of the Convention is met;

(e) Each of these Parties shall:

(i) coordinate as appropriate with other such Parties, relevant economic and administrative instruments developed to achieve the objective of the Convention; and

(ii) identify and periodically review its own policies and practices which encourage activities that lead to greater levels of anthropogenic emissions of greenhouse gases not controlled by the Montreal Protocol than would otherwise occur;

(f) The Conference of the Parties shall review, not later than 31 December 1998, available information with a view to taking decisions regarding such amendments to the lists in Annexes I and II as may be appropriate, with the approval of the Party concerned;

(g) Any Party not included in Annex I may, in its instrument of ratification, acceptance, approval or accession, or at any time thereafter, notify the Depositary that it intends to be bound by subparagraphs (a) and (b) above. The Depositary shall inform the other signatories and Parties of any such notification.

3. The developed country Parties and other developed Parties included in Annex II shall provide new and additional financial resources to meet the agreed full costs incurred by developing country Parties in complying with their obligations under Article 12, paragraph 1. They shall also provide such financial resources, including for the transfer of technology, needed by the developing country Parties to meet the agreed full incremental costs of implementing measures that are covered by paragraph 1 of this Article and that are agreed between a developing country Party and the international entity or entities referred to in Article 11, in accordance with that Article. The implementation of these commitments shall take into account

the need for adequacy and predictability in the flow of funds and the importance of appropriate
burden sharing among the developed country Parties.

4. The developed country Parties and other developed Parties included in Annex II shall also assist the developing country Parties that are particularly vulnerable to the adverse effects of
climate change in meeting costs of adaptation to those adverse effects.

5. The developed country Parties and other developed Parties included in Annex II shall take all practicable steps to promote, facilitate and finance, as appropriate, the transfer of, or access to, environmentally sound technologies and know-how to other Parties, particularly developing country Parties, to enable them to implement the provisions of the Convention. In this process, the developed country Parties shall support the development and enhancement of
endogenous capacities and technologies of developing country Parties. Other Parties and organizations in a position to do so may also assist in facilitating the transfer of such technologies.

6. In the implementation of their commitments under paragraph 2 above, a certain degree of flexibility shall be allowed by the Conference of the Parties to the Parties included in Annex I
undergoing the process of transition to a market economy, in order to enhance the ability of these
Parties to address climate change, including with regard to the historical level of anthropogenic
emissions of greenhouse gases not controlled by the Montreal Protocol chosen as a reference.

7. The extent to which developing country Parties will effectively implement their commitments under the Convention will depend on the effective implementation by developed
country Parties of their commitments under the Convention related to financial resources and transfer of technology and will take fully into account that economic and social development and
poverty eradication are the first and overriding priorities of the developing country Parties.

8. In the implementation of the commitments in this Article, the Parties shall give full consideration to what actions are necessary under the Convention, including actions related to
funding, insurance and the transfer of technology, to meet the specific needs and concerns of developing country Parties arising from the adverse effects of climate change and/or the impact
of the implementation of response measures, especially on:

(a) Small island countries;

(b) Countries with low-lying coastal areas;

(c) Countries with arid and semi-arid areas, forested areas and areas liable to forest decay;

(d) Countries with areas prone to natural disasters;

(e) Countries with areas liable to drought and desertification;

(f) Countries with areas of high urban atmospheric pollution;

(g) Countries with areas with fragile ecosystems, including mountainous ecosystems;

(h) Countries whose economies are highly dependent on income generated from the production, processing and export, and/or on consumption of fossil fuels and associated energy-intensive products; and

(i) Landlocked and transit countries.

Further, the Conference of the Parties may take actions, as appropriate, with respect to this paragraph.

9. The Parties shall take full account of the specific needs and special situations of the least developed countries in their actions with regard to funding and transfer of technology.

10. The Parties shall, in accordance with Article 10, take into consideration in the implementation of the commitments of the Convention the situation of Parties, particularly developing country Parties, with economies that are vulnerable to the adverse effects of the implementation of measures to respond to climate change. This applies notably to Parties with economies that are highly dependent on income generated from the production, processing and export, and/or consumption of fossil fuels and associated energy-intensive products and/or the use of fossil fuels for which such Parties have serious difficulties in switching to alternatives.

Article 5

RESEARCH AND SYSTEMATIC OBSERVATION

In carrying out their commitments under Article 4, paragraph 1 (g), the Parties shall:

(a) Support and further develop, as appropriate, international and intergovernmental programmes and networks or organizations aimed at defining, conducting, assessing and

financing research, data collection and systematic observation, taking into account the need to
minimize duplication of effort;

(b) Support international and intergovernmental efforts to strengthen systematic observation and national scientific and technical research capacities and capabilities, particularly
in developing countries, and to promote access to, and the exchange of, data and analyses thereof
obtained from areas beyond national jurisdiction; and

(c) Take into account the particular concerns and needs of developing countries and cooperate in improving their endogenous capacities and capabilities to participate in the efforts
referred to in subparagraphs (a) and (b) above.

Article 6

EDUCATION, TRAINING AND PUBLIC AWARENESS

In carrying out their commitments under Article 4, paragraph 1 (i), the Parties shall:

(a) Promote and facilitate at the national and, as appropriate, subregional and regional levels, and in accordance with national laws and regulations, and within their respective capacities:

(i) the development and implementation of educational and public awareness programmes on climate change and its effects;

(ii) public access to information on climate change and its effects;

(iii) public participation in addressing climate change and its effects and developing adequate responses; and

(iv) training of scientific, technical and managerial personnel;

(b) Cooperate in and promote, at the international level, and, where appropriate, using existing bodies:

(i) the development and exchange of educational and public awareness material on climate change and its effects; and

(ii) the development and implementation of education and training programmes, including the strengthening of national institutions and the exchange or secondment of personnel to train experts in this field, in

particular for developing countries.

Article 7

CONFERENCE OF THE PARTIES

1. A Conference of the Parties is hereby established.

2. The Conference of the Parties, as the supreme body of this Convention, shall keep under regular review the implementation of the Convention and any related legal instruments that the Conference of the Parties may adopt, and shall make, within its mandate, the decisions necessary to promote the effective implementation of the Convention. To this end, it shall:

(a) Periodically examine the obligations of the Parties and the institutional arrangements under the Convention, in the light of the objective of the Convention, the experience gained in its implementation and the evolution of scientific and technological knowledge;

(b) Promote and facilitate the exchange of information on measures adopted by the Parties to address climate change and its effects, taking into account the differing circumstances, responsibilities and capabilities of the Parties and their respective commitments under the Convention;

(c) Facilitate, at the request of two or more Parties, the coordination of measures adopted by them to address climate change and its effects, taking into account the differing circumstances, responsibilities and capabilities of the Parties and their respective commitments under the Convention;

(d) Promote and guide, in accordance with the objective and provisions of the Convention, the development and periodic refinement of comparable methodologies, to be agreed on by the Conference of the Parties, inter alia, for preparing inventories of greenhouse gas emissions by sources and removals by sinks, and for evaluating the effectiveness of measures to limit the emissions and enhance the removals of these gases;

(e) Assess, on the basis of all information made available to it in accordance with the

provisions of the Convention, the implementation of the Convention by the Parties, the overall
effects of the measures taken pursuant to the Convention, in particular environmental, economic
and social effects as well as their cumulative impacts and the extent to which progress towards
the objective of the Convention is being achieved;

(f) Consider and adopt regular reports on the implementation of the Convention and
ensure their publication;

(g) Make recommendations on any matters necessary for the implementation of the
Convention;

(h) Seek to mobilize financial resources in accordance with Article 4, paragraphs 3, 4
and 5, and Article 11;

(i) Establish such subsidiary bodies as are deemed necessary for the implementation
of the Convention;

(j) Review reports submitted by its subsidiary bodies and provide guidance to them;

(k) Agree upon and adopt, by consensus, rules of procedure and financial rules for
itself and for any subsidiary bodies;

(l) Seek and utilize, where appropriate, the services and cooperation of, and information provided by, competent international organizations and intergovernmental and non-governmental bodies; and

(m) Exercise such other functions as are required for the achievement of the objective
of the Convention as well as all other functions assigned to it under the Convention.

3. The Conference of the Parties shall, at its first session, adopt its own rules of procedure
as well as those of the subsidiary bodies established by the Convention, which shall include decision-making procedures for matters not already covered by decision-making procedures stipulated in the Convention. Such procedures may include specified majorities required for the
adoption of particular decisions.

4. The first session of the Conference of the Parties shall be convened by the interim secretariat referred to in Article 21 and shall take place not later than one year after the date of entry into force of the Convention. Thereafter, ordinary sessions of the Conference of the Parties shall be held every year unless otherwise decided by the Conference of the Parties.

5. Extraordinary sessions of the Conference of the Parties shall be held at such other times as may be deemed necessary by the Conference, or at the written request of any Party, provided that, within six months of the request being communicated to the Parties by the secretariat, it is supported by at least one third of the Parties.

6. The United Nations, its specialized agencies and the International Atomic Energy Agency, as well as any State member thereof or observers thereto not Party to the Convention, may be represented at sessions of the Conference of the Parties as observers. Anybody or agency, whether national or international, governmental or non-governmental, which is qualified in matters covered by the Convention, and which has informed the secretariat of its wish to be represented at a session of the Conference of the Parties as an observer, may be so admitted unless at least one third of the Parties present object. The admission and participation of observers shall be subject to the rules of procedure adopted by the Conference of the Parties.

Article 8

SECRETARIAT

1. A secretariat is hereby established.

2. The functions of the secretariat shall be:

(a) To make arrangements for sessions of the Conference of the Parties and its subsidiary bodies established under the Convention and to provide them with services as required;

(b) To compile and transmit reports submitted to it;

(c) To facilitate assistance to the Parties, particularly developing country Parties, on request, in the compilation and communication of information required in accordance with the

provisions of the Convention;

(d) To prepare reports on its activities and present them to the Conference of the Parties;

(e) To ensure the necessary coordination with the secretariats of other relevant international bodies;

(f) To enter, under the overall guidance of the Conference of the Parties, into such administrative and contractual arrangements as may be required for the effective discharge of its functions; and

(g) To perform the other secretariat functions specified in the Convention and in any of its protocols and such other functions as may be determined by the Conference of the Parties.

3. The Conference of the Parties, at its first session, shall designate a permanent secretariat and make arrangements for its functioning.

Article 9

SUBSIDIARY BODY FOR SCIENTIFIC AND TECHNOLOGICAL ADVICE

1. A subsidiary body for scientific and technological advice is hereby established to provide the Conference of the Parties and, as appropriate, its other subsidiary bodies with timely information and advice on scientific and technological matters relating to the Convention. This body shall be open to participation by all Parties and shall be multidisciplinary. It shall comprise government representatives competent in the relevant field of expertise. It shall report regularly to the Conference of the Parties on all aspects of its work.

2. Under the guidance of the Conference of the Parties, and drawing upon existing competent international bodies, this body shall:

(a) Provide assessments of the state of scientific knowledge relating to climate change and its effects;

(b) Prepare scientific assessments on the effects of measures taken in the implementation of the Convention;

(c) Identify innovative, efficient and state-of-the-art technologies and know-how and
advise on the ways and means of promoting development and/or transferring such technologies;

(d) Provide advice on scientific programmes, international cooperation in research and development related to climate change, as well as on ways and means of supporting endogenous capacity-building in developing countries; and

(e) Respond to scientific, technological and methodological questions that the Conference of the Parties and its subsidiary bodies may put to the body.

3. The functions and terms of reference of this body may be further elaborated by the Conference of the Parties.

Article 10
SUBSIDIARY BODY FOR IMPLEMENTATION

1. A subsidiary body for implementation is hereby established to assist the Conference of
the Parties in the assessment and review of the effective implementation of the Convention. This
body shall be open to participation by all Parties and comprise government representatives who
are experts on matters related to climate change. It shall report regularly to the Conference of the Parties on all aspects of its work.

2. Under the guidance of the Conference of the Parties, this body shall:

(a) Consider the information communicated in accordance with Article 12, paragraph 1, to assess the overall aggregated effect of the steps taken by the Parties in the light of the latest scientific assessments concerning climate change;

b) Consider the information communicated in accordance with Article 12, paragraph 2, in order to assist the Conference of the Parties in carrying out the reviews required
by Article 4, paragraph 2 (d); and

(c) Assist the Conference of the Parties, as appropriate, in the preparation and implementation of its decisions.

Article 11

FINANCIAL MECHANISM

1. A mechanism for the provision of financial resources on a grant or concessional basis,

including for the transfer of technology, is hereby defined. It shall function under the guidance
of and be accountable to the Conference of the Parties, which shall decide on its policies, programme priorities and eligibility criteria related to this Convention. Its operation shall be entrusted to one or more existing international entities.

2. The financial mechanism shall have an equitable and balanced representation of all Parties within a transparent system of governance.

3. The Conference of the Parties and the entity or entities entrusted with the operation of the
financial mechanism shall agree upon arrangements to give effect to the above paragraphs, which shall include the following:

(a) Modalities to ensure that the funded projects to address climate change are in conformity with the policies, programme priorities and eligibility criteria established by the Conference of the Parties;

(b) Modalities by which a particular funding decision may be reconsidered in light of
these policies, programme priorities and eligibility criteria;

(c) Provision by the entity or entities of regular reports to the Conference of the Parties on its funding operations, which is consistent with the requirement for accountability set
out in paragraph 1 above; and

(d) Determination in a predictable and identifiable manner of the amount of funding
necessary and available for the implementation of this Convention and the conditions under which that amount shall be periodically reviewed.

4. The Conference of the Parties shall make arrangements to implement the above-mentioned provisions at its first session, reviewing and taking into account the interim arrangements referred to in Article 21, paragraph 3, and shall decide whether these interim arrangements shall be maintained. Within four years thereafter, the Conference of the Parties shall review the financial mechanism and take appropriate measures.

5. The developed country Parties may also provide and developing country Parties avail themselves of, financial resources related to the implementation of the Convention through bilateral, regional and other multilateral channels.

Article 12

COMMUNICATION OF INFORMATION RELATED TO IMPLEMENTATION

1. In accordance with Article 4, paragraph 1, each Party shall communicate to the Conference of the Parties, through the secretariat, the following elements of information:

(a) A national inventory of anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol, to the extent its capacities permit, using comparable methodologies to be promoted and agreed upon by the Conference of the Parties;

(b) A general description of steps taken or envisaged by the Party to implement the Convention; and

(c) Any other information that the Party considers relevant to the achievement of the objective of the Convention and suitable for inclusion in its communication, including, if feasible, material relevant for calculations of global emission trends.

2. Each developed country Party and each other Party included in Annex I shall incorporate in its communication the following elements of information:

(a) A detailed description of the policies and measures that it has adopted to implement its commitment under Article 4, paragraphs 2 (a) and 2 (b); and

(b) A specific estimate of the effects that the policies and measures referred to in subparagraph (a) immediately above will have on anthropogenic emissions by its sources and removals by its sinks of greenhouse gases during the period referred to in Article 4, paragraph 2 (a).

3. In addition, each developed country Party and each other developed Party included in Annex II shall incorporate details of measures taken in accordance with Article 4, paragraphs 3, 4 and 5.

4. Developing country Parties may, on a voluntary basis, propose projects for financing, including specific technologies, materials, equipment, techniques or practices that would be needed to implement such projects, along with, if possible, an estimate of all incremental costs, of the reductions of emissions and increments of removals of greenhouse gases, as well as an estimate of the consequent benefits.

5. Each developed country Party and each other Party included in Annex I shall make its initial communication within six months of the entry into force of the Convention for that Party.
Each Party not so listed shall make its initial communication within three years of the entry into force of the Convention for that Party, or of the availability of financial resources in accordance with Article 4, paragraph 3. Parties that are least developed countries may make their initial communication at their discretion. The frequency of subsequent communications by all Parties shall be determined by the Conference of the Parties, taking into account the differentiated timetable set by this paragraph.

6. Information communicated by Parties under this Article shall be transmitted by the secretariat as soon as possible to the Conference of the Parties and to any subsidiary bodies concerned. If necessary, the procedures for the communication of information may be further considered by the Conference of the Parties.

7. From its first session, the Conference of the Parties shall arrange for the provision to developing country Parties of technical and financial support, on request, in compiling and communicating information under this Article, as well as in identifying the technical and financial needs associated with proposed projects and response measures under Article 4. Such support may be provided by other Parties, by competent international organizations and by the secretariat, as appropriate.

8. Any group of Parties may, subject to guidelines adopted by the Conference of the Parties, and to prior notification to the Conference of the Parties, make a joint communication in fulfillment of their obligations under this Article, provided that such a communication includes information on the fulfillment by each of these Parties of its individual obligations under the Convention.

9. Information received by the secretariat that is designated by a Party as confidential, in accordance with criteria to be established by the Conference of the Parties, shall be aggregated by the secretariat to protect its confidentiality before being made available to any of the bodies involved in the communication and review of information.

10. Subject to paragraph 9 above, and without prejudice to the ability of any Party to make public its communication at any time, the secretariat shall make communications by Parties

under this Article publicly available at the time they are submitted to the Conference of the Parties.

Article 13

RESOLUTION OF QUESTIONS REGARDING IMPLEMENTATION

The Conference of the Parties shall, at its first session, consider the establishment of a multilateral consultative process, available to Parties on their request, for the resolution of questions regarding the implementation of the Convention.

Article 14

SETTLEMENT OF DISPUTES

1. In the event of a dispute between any two or more Parties concerning the interpretation or application of the Convention, the Parties concerned shall seek a settlement of the dispute through negotiation or any other peaceful means of their own choice.

2. When ratifying, accepting, approving or acceding to the Convention, or at any time thereafter, a Party which is not a regional economic integration organization may declare in a written instrument submitted to the Depositary that, in respect of any dispute concerning the interpretation or application of the Convention, it recognizes as compulsory ipso facto and without special agreement, in relation to any Party accepting the same obligation:

(a) Submission of the dispute to the International Court of Justice; and/or

(b) Arbitration in accordance with procedures to be adopted by the Conference of the Parties as soon as practicable, in an annex on arbitration.

A Party which is a regional economic integration organization may make a declaration with like effect in relation to arbitration in accordance with the procedures referred to in subparagraph (b) above.

3. A declaration made under paragraph 2 above shall remain in force until it expires in accordance with its terms or until three months after written notice of its revocation has been deposited with the Depositary.

4. A new declaration, a notice of revocation or the expiry of a declaration shall not in any way affect proceedings pending before the International Court of Justice or the arbitral tribunal, unless the parties to the dispute otherwise agree.

5. Subject to the operation of paragraph 2 above, if after twelve months following notification by one Party to another that a dispute exists between them, the Parties concerned have not been able to settle their dispute through the means mentioned in paragraph 1 above, the dispute shall be submitted, at the request of any of the parties to the dispute, to conciliation.

6. A conciliation commission shall be created upon the request of one of the parties to the dispute. The commission shall be composed of an equal number of members appointed by each party concerned and a chairman chosen jointly by the members appointed by each party. The commission shall render a recommendatory award, which the parties shall consider in good faith.

7. Additional procedures relating to conciliation shall be adopted by the Conference of the Parties, as soon as practicable, in an annex on conciliation.

8. The provisions of this Article shall apply to any related legal instrument which the Conference of the Parties may adopt, unless the instrument provides otherwise.

Article 15

AMENDMENTS TO THE CONVENTION

1. Any Party may propose amendments to the Convention.

2. Amendments to the Convention shall be adopted at an ordinary session of the Conference of the Parties. The text of any proposed amendment to the Convention shall be communicated to the Parties by the secretariat at least six months before the meeting at which it is proposed for adoption. The secretariat shall also communicate proposed amendments to the signatories to the Convention and, for information, to the Depositary.

3. The Parties shall make every effort to reach agreement on any proposed amendment to the Convention by consensus. If all efforts at consensus have been exhausted, and no agreement reached, the amendment shall as a last resort be adopted by a three-fourths majority vote of the Parties present and voting at the meeting. The adopted amendment shall be communicated by the secretariat to the Depositary, who shall circulate it to all Parties for their acceptance.

4. Instruments of acceptance in respect of an amendment shall be deposited with the Depositary. An amendment adopted in accordance with paragraph 3 above shall enter into force for those Parties having accepted it on the ninetieth day after the date of receipt by the Depositary of an instrument of acceptance by at least three fourths of the Parties to the Convention.

5. The amendment shall enter into force for any other Party on the ninetieth day after the date on which that Party deposits with the Depositary its instrument of acceptance of the said amendment.

6. For the purposes of this Article, "Parties present and voting" means Parties present and casting an affirmative or negative vote.

Article 16

ADOPTION AND AMENDMENT OF ANNEXES TO THE CONVENTION

1. Annexes to the Convention shall form an integral part thereof and, unless otherwise expressly provided, a reference to the Convention constitutes at the same time a reference to any annexes thereto. Without prejudice to the provisions of Article 14, paragraphs 2 (b) and 7, such annexes shall be restricted to lists, forms and any other material of a descriptive nature that is of a scientific, technical, procedural or administrative character.

2. Annexes to the Convention shall be proposed and adopted in accordance with the procedure set forth in Article 15, paragraphs 2, 3 and 4.

3. An annex that has been adopted in accordance with paragraph 2 above shall enter into force for all Parties to the Convention six months after the date of the communication by the Depositary to such Parties of the adoption of the annex, except for those Parties that have notified the Depositary, in writing, within that period of their non-acceptance of the annex. The annex shall enter into force for Parties which withdraw their notification of non-acceptance on the ninetieth day after the date on which withdrawal of such notification has been received by the Depositary.

4. The proposal, adoption and entry into force of amendments to annexes to the Convention shall be subject to the same procedure as that for the proposal, adoption and entry into force of

annexes to the Convention in accordance with paragraphs 2 and 3 above.

5. If the adoption of an annex or an amendment to an annex involves an amendment to the Convention, that annex or amendment to an annex shall not enter into force until such time as the amendment to the Convention enters into force.

Article 17

PROTOCOLS

1. The Conference of the Parties may, at any ordinary session, adopt protocols to the Convention.

2. The text of any proposed protocol shall be communicated to the Parties by the secretariat at least six months before such a session.

3. The requirements for the entry into force of any protocol shall be established by that instrument.

4. Only Parties to the Convention may be Parties to a protocol.

5. Decisions under any protocol shall be taken only by the Parties to the protocol concerned.

Article 18

RIGHT TO VOTE

1. Each Party to the Convention shall have one vote, except as provided for in paragraph 2 below.

2. Regional economic integration organizations, in matters within their competence, shall exercise their right to vote with a number of votes equal to the number of their member States that are Parties to the Convention. Such an organization shall not exercise its right to vote if any of its member States exercises its right, and vice versa.

Article 19

DEPOSITARY

The Secretary-General of the United Nations shall be the Depositary of the Convention and of protocols adopted in accordance with Article 17.

Article 20

SIGNATURE

This Convention shall be open for signature by States Members of the United Nations or of any of its specialized agencies or that are Parties to the Statute of the International Court of
Justice and by regional economic integration organizations at Rio de Janeiro, during the United Nations Conference on Environment and Development, and thereafter at United Nations
Headquarters in New York from 20 June 1992 to 19 June 1993.

Article 21

INTERIM ARRANGEMENTS

1. The secretariat functions referred to in Article 8 will be carried out on an interim basis by the secretariat established by the General Assembly of the United Nations in its resolution 45/212 of 21 December 1990, until the completion of the first session of the Conference of the Parties.

2. The head of the interim secretariat referred to in paragraph 1 above will cooperate closely
with the Intergovernmental Panel on Climate Change to ensure that the Panel can respond to the
need for objective scientific and technical advice. Other relevant scientific bodies could also be
consulted.

3. The Global Environment Facility of the United Nations Development Programme, the United Nations Environment Programme and the International Bank for Reconstruction and Development shall be the international entity entrusted with the operation of the financial mechanism referred to in Article 11 on an interim basis. In this connection, the Global Environment Facility should be appropriately restructured and its membership made universal to
enable it to fulfill the requirements of Article 11.

Article 22

RATIFICATION, ACCEPTANCE, APPROVAL OR ACCESSION

1. The Convention shall be subject to ratification, acceptance, approval or accession by States and by regional economic integration organizations. It shall be open for accession from the day after the date on which the Convention is closed for signature. Instruments of ratification, acceptance, approval or accession shall be deposited with the Depositary.

2. Any regional economic integration organization which becomes a Party to the Convention without any of its member States being a Party shall be bound by all the obligations under the Convention. In the case of such organizations, one or more of whose member States is a Party to the Convention, the organization and its member States shall decide on their respective responsibilities for the performance of their obligations under the Convention. In such cases, the organization and the member States shall not be entitled to exercise rights under the Convention concurrently.

3. In their instruments of ratification, acceptance, approval or accession, regional economic integration organizations shall declare the extent of their competence with respect to the matters governed by the Convention. These organizations shall also inform the Depositary, who shall in turn inform the Parties, of any substantial modification in the extent of their competence.

Article 23

ENTRY INTO FORCE

1. The Convention shall enter into force on the ninetieth day after the date of deposit of the fiftieth instrument of ratification, acceptance, approval or accession.

2. For each State or regional economic integration organization that ratifies, accepts or approves the Convention or accedes thereto after the deposit of the fiftieth instrument of ratification, acceptance, approval or accession, the Convention shall enter into force on the ninetieth day after the date of deposit by such State or regional economic integration organization of its instrument of ratification, acceptance, approval or accession.

3. For the purposes of paragraphs 1 and 2 above, any instrument deposited by a regional economic integration organization shall not be counted as additional to those deposited by States
members of the organization.

Article 24

RESERVATIONS

No reservations may be made to the Convention.

Article 25

WITHDRAWAL

1. At any time after three years from the date on which the Convention has entered into force for a Party that Party may withdraw from the Convention by giving written notification to
the Depositary.

2. Any such withdrawal shall take effect upon expiry of one year from the date of receipt by the Depositary of the notification of withdrawal, or on such later date as may be specified in the notification of withdrawal.

3. Any Party that withdraws from the Convention shall be considered as also having withdrawn from any protocol to which it is a Party.

Article 26

AUTHENTIC TEXTS

The original of this Convention, of which the Arabic, Chinese, English, French, Russian and Spanish texts are equally authentic, shall be deposited with the Secretary-General of the United Nations.

IN WITNESS WHEREOF the undersigned, being duly authorized to that effect, have signed this Convention.

DONE at New York this ninth day of May one thousand nine hundred and ninety-two.

Annex I
Australia

Austria
Belarus
Belgium
Bulgaria
Canada
Croatia *
Czech Republic**an** *
Denmark
European Economic Community
Estonia
Finland
France
Germany
Greece
Hungary
Iceland
Ireland
Italy
Japan
Latvia
Liechtenstein*
Lithuania
Luxembourg
Monaco*
Netherlands
New Zealand
Norway
Poland
Portugal
Romania
Russian Federation
Slovakia*
Slovenia*
Spain
Sweden
Switzerland
Turkey
Ukraine
United Kingdom of Great Britain and Northern Ireland
United States of America

a Countries that are undergoing the process of transition to a market economy.

* *Publisher's note*: Countries added to Annex I by an amendment that entered into force on 13 August 1998, pursuant to decision 4/CP.3 adopted at COP.3.

Annex II

Australia
Austria
Belgium
Canada
Denmark
European Economic Community
Finland
France
Germany
Greece
Iceland
Ireland
Italy
Japan
Luxembourg
Netherlands
New Zealand
Norway
Portugal
Spain
Sweden
Switzerland
United Kingdom of Great Britain and Northern Ireland
United States of America

Publisher's note: Turkey was deleted from Annex II by an amendment that entered into force 28 June 2002, pursuant to decision 26/CP.7 adopted at COP.7.

- - - - -

APPENDIX 4

KYOTO PROTOCOL TO THE UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE

UNITED NATIONS
1998

KYOTO PROTOCOL TO THE UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE

The Parties to this Protocol,

Being Parties to the United Nations Framework Convention on Climate Change, hereinafter referred to as "the Convention",

In pursuit of the ultimate objective of the Convention as stated in its Article 2,

Recalling the provisions of the Convention,

Being guided by Article 3 of the Convention,

Pursuant to the Berlin Mandate adopted by decision 1/CP.1 of the Conference of the Parties to the Convention at its first session,

Have agreed as follows:

Article 1

For the purposes of this Protocol, the definitions contained in Article 1 of the Convention
shall apply. In addition:

1. "Conference of the Parties" means the Conference of the Parties to the Convention.

2. "Convention" means the United Nations Framework Convention on Climate Change, adopted in New York on 9 May 1992.

3. "Intergovernmental Panel on Climate Change" means the Intergovernmental Panel on Climate Change established in 1988 jointly by the World Meteorological Organization and the
United Nations Environment Programme.

4. "Montreal Protocol" means the Montreal Protocol on Substances that Deplete the Ozone
Layer, adopted in Montreal on 16 September 1987 and as subsequently adjusted and amended.

5. "Parties present and voting" means Parties present and casting an affirmative or negative
vote.

6. "Party" means, unless the context otherwise indicates, a Party to this Protocol.

7. "Party included in Annex I" means a Party included in Annex I to the Convention, as may be amended, or a Party which has made a notification under Article 4, paragraph 2 (g), of
the Convention.

Article 2

1. Each Party included in Annex I, in achieving its quantified emission limitation and reduction commitments under Article 3, in order to promote sustainable development, shall:

(a) Implement and/or further elaborate policies and measures in accordance with its
national circumstances, such as:

(i) Enhancement of energy efficiency in relevant sectors of the national economy;

(ii) Protection and enhancement of sinks and reservoirs of greenhouse gases not controlled by the Montreal Protocol, taking into account its commitments under relevant international environmental agreements; promotion of sustainable forest management practices, forestation and reforestation;

(iii) Promotion of sustainable forms of agriculture in light of climate change
considerations;

(iv) Research on, and promotion, development and increased use of, new and
renewable forms of energy, of carbon dioxide sequestration technologies
and of advanced and innovative environmentally sound technologies;

(v) Progressive reduction or phasing out of market imperfections, fiscal incentives, tax and duty exemptions and subsidies in all greenhouse gas emitting sectors that run counter to the objective of the Convention and application of market instruments;

(vi) Encouragement of appropriate reforms in relevant sectors aimed at promoting policies and measures which limit or reduce emissions of greenhouse gases not controlled by the Montreal Protocol;

(vii) Measures to limit and/or reduce emissions of greenhouse gases not controlled by the Montreal Protocol in the transport sector;

(viii) Limitation and/or reduction of methane emissions through recovery and

use in waste management, as well as in the production, transport and distribution of energy;

(b) Cooperate with other such Parties to enhance the individual and combined effectiveness of their policies and measures adopted under this Article, pursuant to Article 4, paragraph 2 (e) (i), of the Convention. To this end, these Parties shall take steps to share their experience and exchange information on such policies and measures, including developing ways of improving their comparability, transparency and effectiveness. The Conference of the Parties serving as the meeting of the Parties to this Protocol shall, at its first session or as soon as practicable thereafter, consider ways to facilitate such cooperation, taking into account all relevant information.

2. The Parties included in Annex I shall pursue limitation or reduction of emissions of greenhouse gases not controlled by the Montreal Protocol from aviation and marine bunker fuels, working through the International Civil Aviation Organization and the International Maritime Organization, respectively.

3. The Parties included in Annex I shall strive to implement policies and measures under this Article in such a way as to minimize adverse effects, including the adverse effects of climate change, effects on international trade, and social, environmental and economic impacts on other Parties, especially developing country Parties and in particular those identified in Article 4, paragraphs 8 and 9, of the Convention, taking into account Article 3 of the Convention. The Conference of the Parties serving as the meeting of the Parties to this Protocol may take further action, as appropriate, to promote the implementation of the provisions of this paragraph.

4. The Conference of the Parties serving as the meeting of the Parties to this Protocol, if it decides that it would be beneficial to coordinate any of the policies and measures in paragraph 1 (a) above, taking into account different national circumstances and potential effects, shall consider ways and means to elaborate the coordination of such policies and measures.

Article 3

1. The Parties included in Annex I shall, individually or jointly, ensure that their aggregate anthropogenic carbon dioxide equivalent emissions of the greenhouse gases listed in Annex A do not exceed their assigned amounts, calculated pursuant to their quantified emission limitation

and reduction commitments inscribed in Annex B and in accordance with the provisions of this
Article, with a view to reducing their overall emissions of such gases by at least 5 per cent below 1990 levels in the commitment period 2008 to 2012.

2. Each Party included in Annex I shall, by 2005, have made demonstrable progress in achieving its commitments under this Protocol.
3. The net changes in greenhouse gas emissions by sources and removals by sinks resulting from direct human-induced land-use change and forestry activities, limited to forestation, reforestation and deforestation since 1990, measured as verifiable changes in carbon stocks in
each commitment period, shall be used to meet the commitments under this Article of each Party
included in Annex I. The greenhouse gas emissions by sources and removals by sinks associated
with those activities shall be reported in a transparent and verifiable manner and reviewed in accordance with Articles 7 and 8.

4. Prior to the first session of the Conference of the Parties serving as the meeting of the Parties to this Protocol, each Party included in Annex I shall provide, for consideration by the
Subsidiary Body for Scientific and Technological Advice, data to establish its level of carbon stocks in 1990 and to enable an estimate to be made of its changes in carbon stocks in subsequent years. The Conference of the Parties serving as the meeting of the Parties to this Protocol shall, at its first session or as soon as practicable thereafter, decide upon modalities, rules and guidelines as to how, and which, additional human-induced activities related to changes in greenhouse gas emissions by sources and removals by sinks in the agricultural soils
and the land-use change and forestry categories shall be added to, or subtracted from, the assigned amounts for Parties included in Annex I, taking into account uncertainties, transparency
in reporting, verifiability, the methodological work of the Intergovernmental Panel on Climate
Change, the advice provided by the Subsidiary Body for Scientific and Technological Advice in
accordance with Article 5 and the decisions of the Conference of the Parties. Such a decision shall apply in the second and subsequent commitment periods. A Party may choose to apply such a decision on these additional human-induced activities for its first commitment period, provided that these activities have taken place since 1990.

5. The Parties included in Annex I undergoing the process of transition to a market economy whose base year or period was established pursuant to decision 9/CP.2 of the Conference of the Parties at its second session shall use that base year or period for the implementation of their commitments under this Article. Any other Party included in Annex I

undergoing the process of transition to a market economy which has not yet submitted its first national communication under Article 12 of the Convention may also notify the Conference of the Parties serving as the meeting of the Parties to this Protocol that it intends to use an historical base year or period other than 1990 for the implementation of its commitments under this Article. The Conference of the Parties serving as the meeting of the Parties to this Protocol shall decide on the acceptance of such notification.

6. Taking into account Article 4, paragraph 6, of the Convention, in the implementation of their commitments under this Protocol other than those under this Article, a certain degree of flexibility shall be allowed by the Conference of the Parties serving as the meeting of the Parties to this Protocol to the Parties included in Annex I undergoing the process of transition to a market economy.

7. In the first quantified emission limitation and reduction commitment period, from 2008 to 2012, the assigned amount for each Party included in Annex I shall be equal to the percentage inscribed for it in Annex B of its aggregate anthropogenic carbon dioxide equivalent emissions of the greenhouse gases listed in Annex A in 1990, or the base year or period determined in accordance with paragraph 5 above, multiplied by five. Those Parties included in Annex I for whom land-use change and forestry constituted a net source of greenhouse gas emissions in 1990 shall include in their 1990 emissions base year or period the aggregate anthropogenic carbon dioxide equivalent emissions by sources minus removals by sinks in 1990 from land-use change for the purposes of calculating their assigned amount.

8. Any Party included in Annex I may use 1995 as its base year for hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride, for the purposes of the calculation referred to in paragraph 7 above.

9. Commitments for subsequent periods for Parties included in Annex I shall be established in amendments to Annex B to this Protocol, which shall be adopted in accordance with the provisions of Article 21, paragraph 7. The Conference of the Parties serving as the meeting of the Parties to this Protocol shall initiate the consideration of such commitments at least seven years before the end of the first commitment period referred to in paragraph 1 above.

10. Any emission reduction units, or any part of an assigned amount, which a Party acquires from another Party in accordance with the provisions of Article 6 or of Article 17 shall be added to the assigned amount for the acquiring Party.

11. Any emission reduction units, or any part of an assigned amount, which a Party transfers to another Party in accordance with the provisions of Article 6 or of Article 17 shall be subtracted from the assigned amount for the transferring Party.

12. Any certified emission reductions which a Party acquires from another Party in accordance with the provisions of Article 12 shall be added to the assigned amount for the acquiring Party.

13. If the emissions of a Party included in Annex I in a commitment period are less than its assigned amount under this Article, this difference shall, on request of that Party, be added to the assigned amount for that Party for subsequent commitment periods.

14. Each Party included in Annex I shall strive to implement the commitments mentioned in paragraph 1 above in such a way as to minimize adverse social, environmental and economic impacts on developing country Parties, particularly those identified in Article 4, paragraphs 8 and 9, of the Convention. In line with relevant decisions of the Conference of the Parties on the implementation of those paragraphs, the Conference of the Parties serving as the meeting of the Parties to this Protocol shall, at its first session, consider what actions are necessary to minimize the adverse effects of climate change and/or the impacts of response measures on Parties referred to in those paragraphs. Among the issues to be considered shall be the establishment of funding, insurance and transfer of technology.

Article 4

1. Any Parties included in Annex I that have reached an agreement to fulfill their commitments under Article 3 jointly, shall be deemed to have met those commitments provided that their total combined aggregate anthropogenic carbon dioxide equivalent emissions of the greenhouse gases listed in Annex A do not exceed their assigned amounts calculated pursuant to their quantified emission limitation and reduction commitments inscribed in Annex B and in

accordance with the provisions of Article 3. The respective emission level allocated to each of
the Parties to the agreement shall be set out in that agreement.

2. The Parties to any such agreement shall notify the secretariat of the terms of the agreement on the date of deposit of their instruments of ratification, acceptance or approval of this Protocol, or accession thereto. The secretariat shall in turn inform the Parties and signatories to the Convention of the terms of the agreement.

3. Any such agreement shall remain in operation for the duration of the commitment period
specified in Article 3, paragraph 7.

4. If Parties acting jointly do so in the framework of, and together with, a regional economic
integration organization, any alteration in the composition of the organization after adoption of
this Protocol shall not affect existing commitments under this Protocol. Any alteration in the composition of the organization shall only apply for the purposes of those commitments under
Article 3 that are adopted subsequent to that alteration.
5. In the event of failure by the Parties to such an agreement to achieve their total combined level of emission reductions, each Party to that agreement shall be responsible for its own level
of emissions set out in the agreement.

6. If Parties acting jointly do so in the framework of, and together with, a regional economic
integration organization which is itself a Party to this Protocol, each member State of that regional economic integration organization individually, and together with the regional economic
integration organization acting in accordance with Article 24, shall, in the event of failure to achieve the total combined level of emission reductions, be responsible for its level of emissions
as notified in accordance with this Article.

Article 5

1. Each Party included in Annex I shall have in place, no later than one year prior to the start of the first commitment period, a national system for the estimation of anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol. Guidelines for such national systems, which shall incorporate the methodologies specified in paragraph 2 below, shall be decided upon by the Conference of the Parties serving as the meeting of the Parties to this Protocol at its first session.

2. Methodologies for estimating anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol shall be those accepted by the Intergovernmental Panel on Climate Change and agreed upon by the Conference of the Parties at its third session. Where such methodologies are not used, appropriate adjustments shall be applied according to methodologies agreed upon by the Conference of the Parties serving as the meeting of the Parties to this Protocol at its first session. Based on the work of, *inter alia*, the Intergovernmental Panel on Climate Change and advice provided by the Subsidiary Body for Scientific and Technological Advice, the Conference of the Parties serving as the meeting of the Parties to this Protocol shall regularly review and, as appropriate, revise such methodologies and adjustments, taking fully into account any relevant decisions by the Conference of the Parties. Any revision to methodologies or adjustments shall be used only for the purposes of ascertaining compliance with commitments under Article 3 in respect of any commitment period adopted subsequent to that revision.

3. The global warming potentials used to calculate the carbon dioxide equivalence of anthropogenic emissions by sources and removals by sinks of greenhouse gases listed in Annex A shall be those accepted by the Intergovernmental Panel on Climate Change and agreed upon by the Conference of the Parties at its third session. Based on the work of, *inter alia*, the Intergovernmental Panel on Climate Change and advice provided by the Subsidiary Body for Scientific and Technological Advice, the Conference of the Parties serving as the meeting of the Parties to this Protocol shall regularly review and, as appropriate, revise the global warming potential of each such greenhouse gas, taking fully into account any relevant decisions by the Conference of the Parties. Any revision to a global warming potential shall apply only to commitments under Article 3 in respect of any commitment period adopted subsequent to that revision.

Article 6

1. For the purpose of meeting its commitments under Article 3, any Party included in Annex I may transfer to, or acquire from, any other such Party emission reduction units resulting from projects aimed at reducing anthropogenic emissions by sources or enhancing anthropogenic

removals by sinks of greenhouse gases in any sector of the economy, provided that:

(a) Any such project has the approval of the Parties involved;

(b) Any such project provides a reduction in emissions by sources, or an enhancement of removals by sinks, that is additional to any that would otherwise occur;

(c) It does not acquire any emission reduction units if it is not in compliance with its
obligations under Articles 5 and 7; and

(d) The acquisition of emission reduction units shall be supplemental to domestic actions for the purposes of meeting commitments under Article 3.

2. The Conference of the Parties serving as the meeting of the Parties to this Protocol may, at its first session or as soon as practicable thereafter, further elaborate guidelines for the implementation of this Article, including for verification and reporting.

3. A Party included in Annex I may authorize legal entities to participate, under its responsibility, in actions leading to the generation, transfer or acquisition under this Article of emission reduction units.

4. If a question of implementation by a Party included in Annex I of the requirements referred to in this Article is identified in accordance with the relevant provisions of Article 8, transfers and acquisitions of emission reduction units may continue to be made after the question has been identified, provided that any such units may not be used by a Party to meet its commitments under Article 3 until any issue of compliance is resolved.

Article 7

1. Each Party included in Annex I shall incorporate in its annual inventory of anthropogenic
emissions by sources and removals by sinks of greenhouse gases not controlled by the Montreal
Protocol, submitted in accordance with the relevant decisions of the Conference of the Parties,
the necessary supplementary information for the purposes of ensuring compliance with Article 3,
to be determined in accordance with paragraph 4 below.

2. Each Party included in Annex I shall incorporate in its national communication, submitted under Article 12 of the Convention, the supplementary information necessary to demonstrate compliance with its commitments under this Protocol, to be determined in accordance with paragraph 4 below.

3. Each Party included in Annex I shall submit the information required under paragraph 1 above annually, beginning with the first inventory due under the Convention for the first year of the commitment period after this Protocol has entered into force for that Party. Each such Party shall submit the information required under paragraph 2 above as part of the first national communication due under the Convention after this Protocol has entered into force for it and after the adoption of guidelines as provided for in paragraph 4 below. The frequency of subsequent submission of information required under this Article shall be determined by the Conference of the Parties serving as the meeting of the Parties to this Protocol, taking into account any timetable for the submission of national communications decided upon by the Conference of the Parties.

4. The Conference of the Parties serving as the meeting of the Parties to this Protocol shall adopt at its first session, and review periodically thereafter, guidelines for the preparation of the information required under this Article, taking into account guidelines for the preparation of national communications by Parties included in Annex I adopted by the Conference of the Parties. The Conference of the Parties serving as the meeting of the Parties to this Protocol shall also, prior to the first commitment period, decide upon modalities for the accounting of assigned amounts.

Article 8

1. The information submitted under Article 7 by each Party included in Annex I shall be reviewed by expert review teams pursuant to the relevant decisions of the Conference of the Parties and in accordance with guidelines adopted for this purpose by the Conference of the Parties serving as the meeting of the Parties to this Protocol under paragraph 4 below. The information submitted under Article 7, paragraph 1, by each Party included in Annex I shall be reviewed as part of the annual compilation and accounting of emissions inventories and assigned amounts. Additionally, the information submitted under Article 7, paragraph 2, by each Party included in Annex I shall be reviewed as part of the review of communications.

2. Expert review teams shall be coordinated by the secretariat and shall be composed of experts selected from those nominated by Parties to the Convention and, as appropriate, by intergovernmental organizations, in accordance with guidance provided for this purpose by the Conference of the Parties.

3. The review process shall provide a thorough and comprehensive technical assessment

of all aspects of the implementation by a Party of this Protocol. The expert review teams shall
prepare a report to the Conference of the Parties serving as the meeting of the Parties to this Protocol, assessing the implementation of the commitments of the Party and identifying any potential problems in, and factors influencing, the fulfillment of commitments. Such reports shall be circulated by the secretariat to all Parties to the Convention. The secretariat shall list those questions of implementation indicated in such reports for further consideration by the Conference of the Parties serving as the meeting of the Parties to this Protocol.

4. The Conference of the Parties serving as the meeting of the Parties to this Protocol shall adopt at its first session, and review periodically thereafter, guidelines for the review of implementation of this Protocol by expert review teams taking into account the relevant decisions of the Conference of the Parties.

5. The Conference of the Parties serving as the meeting of the Parties to this Protocol shall, with the assistance of the Subsidiary Body for Implementation and, as appropriate, the Subsidiary Body for Scientific and Technological Advice, consider:

(a) The information submitted by Parties under Article 7 and the reports of the expert
reviews thereon conducted under this Article; and

(b) Those questions of implementation listed by the secretariat under paragraph 3 above, as well as any questions raised by Parties.

6. Pursuant to its consideration of the information referred to in paragraph 5 above, the Conference of the Parties serving as the meeting of the Parties to this Protocol shall take decisions on any matter required for the implementation of this Protocol.

Article 9

1. The Conference of the Parties serving as the meeting of the Parties to this Protocol shall periodically review this Protocol in the light of the best available scientific information and assessments on climate change and its impacts, as well as relevant technical, social and economic information. Such reviews shall be coordinated with pertinent reviews under the Convention, in particular those required by Article 4, paragraph 2 (d), and Article 7, paragraph 2 (a), of the Convention. Based on these reviews, the Conference of the Parties serving as the meeting of the Parties to this Protocol shall take appropriate action.
2. The first review shall take place at the second session of the Conference of the Parties serving as the meeting of the Parties to this Protocol. Further reviews shall take place at regular
intervals and in a timely manner.

Article 10

All Parties, taking into account their common but differentiated responsibilities and their specific national and regional development priorities, objectives and circumstances, without introducing any new commitments for Parties not included in Annex I, but reaffirming existing
commitments under Article 4, paragraph 1, of the Convention, and continuing to advance the implementation of these commitments in order to achieve sustainable development, taking into
account Article 4, paragraphs 3, 5 and 7, of the Convention, shall:

a) Formulate, where relevant and to the extent possible, cost-effective national and, where appropriate, regional programmes to improve the quality of local emission factors,
activity data and/or models which reflect the socio-economic conditions of each Party for the preparation and periodic updating of national inventories of anthropogenic emissions by sources
and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol, using comparable methodologies to be agreed upon by the Conference of the Parties, and consistent
with the guidelines for the preparation of national communications adopted by the Conference
of the Parties;

(b) Formulate, implement, publish and regularly update national and, where appropriate, regional programmes containing measures to mitigate climate change and measures
to facilitate adequate adaptation to climate change:

(i) Such programmes would, *inter alia*, concern the energy, transport and industry sectors as well as agriculture, forestry and waste management. Furthermore, adaptation technologies and methods for improving spatial
planning would improve adaptation to climate change; and

(ii) Parties included in Annex I shall submit information on action under this
Protocol, including national programmes, in accordance with Article 7; and other Parties shall seek to include in their national communications, as appropriate, information on programmes which contain measures that
the Party believes contribute to addressing climate change and its adverse
impacts, including the abatement of increases in greenhouse gas emissions, and enhancement of and removals by sinks, capacity building and adaptation measures;

(c) Cooperate in the promotion of effective modalities for the development, application and diffusion of, and take all practicable steps to promote, facilitate and finance, as appropriate, the transfer of, or access to, environmentally sound technologies, know-how, practices and processes pertinent to climate change, in particular to developing countries, including the formulation of policies and programmes for the effective transfer of environmentally sound technologies that are publicly owned or in the public domain and the creation of an enabling environment for the private sector, to promote and enhance the transfer
of, and access to, environmentally sound technologies;

(d) Cooperate in scientific and technical research and promote the maintenance and the development of systematic observation systems and development of data archives to reduce
uncertainties related to the climate system, the adverse impacts of climate change and the economic and social consequences of various response strategies, and promote the development
and strengthening of endogenous capacities and capabilities to participate in international and
intergovernmental efforts, programmes and networks on research and systematic observation,
taking into account Article 5 of the Convention;

(e) Cooperate in and promote at the international level, and, where appropriate, using existing bodies, the development and implementation of education and training programmes, including the strengthening of national capacity building, in particular human and institutional
capacities and the exchange or secondment of personnel to train experts in this field, in particular
for developing countries, and facilitate at the national level public awareness of, and public access to information on, climate change. Suitable modalities should be developed to implement
these activities through the relevant bodies of the Convention, taking into account Article 6 of
the Convention;

(f) Include in their national communications information on programmes and activities undertaken pursuant to this Article in accordance with relevant decisions of the Conference of the Parties; and
(g) Give full consideration, in implementing the commitments under this Article, to Article 4, paragraph 8, of the Convention.

Article 11

1. In the implementation of Article 10, Parties shall take into account the provisions of Article 4, paragraphs 4, 5, 7, 8 and 9, of the Convention.

2. In the context of the implementation of Article 4, paragraph 1, of the Convention, in accordance with the provisions of Article 4, paragraph 3, and Article 11 of the Convention, and through the entity or entities entrusted with the operation of the financial mechanism of the Convention, the developed country Parties and other developed Parties included in Annex II to the Convention shall:

(a) Provide new and additional financial resources to meet the agreed full costs incurred by developing country Parties in advancing the implementation of existing commitments under Article 4, paragraph 1 (a), of the Convention that are covered in Article 10, subparagraph (a); and

(b) Also provide such financial resources, including for the transfer of technology, needed by the developing country Parties to meet the agreed full incremental costs of advancing the implementation of existing commitments under Article 4, paragraph 1, of the Convention that are covered by Article 10 and that are agreed between a developing country Party and the international entity or entities referred to in Article 11 of the Convention, in accordance with that Article.

The implementation of these existing commitments shall take into account the need for adequacy and predictability in the flow of funds and the importance of appropriate burden sharing among developed country Parties. The guidance to the entity or entities entrusted with the operation of the financial mechanism of the Convention in relevant decisions of the Conference of the Parties, including those agreed before the adoption of this Protocol, shall apply *mutatis mutandis* to the provisions of this paragraph.

3. The developed country Parties and other developed Parties in Annex II to the Convention may also provide, and developing country Parties avail themselves of, financial resources for the implementation of Article 10, through bilateral, regional and other multilateral channels.

Article 12

1. A clean development mechanism is hereby defined.

2. The purpose of the clean development mechanism shall be to assist Parties not included in Annex I in achieving sustainable development and in contributing to the ultimate objective of the Convention, and to assist Parties included in Annex I in achieving compliance with their quantified emission limitation and reduction commitments under Article 3.

3. Under the clean development mechanism:

(a) Parties not included in Annex I will benefit from project activities resulting in certified emission reductions; and

(b) Parties included in Annex I may use the certified emission reductions accruing from such project activities to contribute to compliance with part of their quantified emission limitation and reduction commitments under Article 3, as determined by the Conference of the Parties serving as the meeting of the Parties to this Protocol.

4. The clean development mechanism shall be subject to the authority and guidance of the Conference of the Parties serving as the meeting of the Parties to this Protocol and be supervised by an executive board of the clean development mechanism.

5. Emission reductions resulting from each project activity shall be certified by operational entities to be designated by the Conference of the Parties serving as the meeting of the Parties to this Protocol, on the basis of:

(a) Voluntary participation approved by each Party involved;

(b) Real, measurable, and long-term benefits related to the mitigation of climate change; and

(c) Reductions in emissions that are additional to any that would occur in the absence of the certified project activity.

6. The clean development mechanism shall assist in arranging funding of certified project

activities as necessary.

7. The Conference of the Parties serving as the meeting of the Parties to this Protocol shall, at its first session, elaborate modalities and procedures with the objective of ensuring transparency, efficiency and accountability through independent auditing and verification of project activities.

8. The Conference of the Parties serving as the meeting of the Parties to this Protocol shall ensure that a share of the proceeds from certified project activities is used to cover administrative expenses as well as to assist developing country Parties that are particularly vulnerable to the adverse effects of climate change to meet the costs of adaptation.

9. Participation under the clean development mechanism, including in activities mentioned in paragraph 3 (a) above and in the acquisition of certified emission reductions, may involve private and/or public entities, and is to be subject to whatever guidance may be provided by the executive board of the clean development mechanism.

10. Certified emission reductions obtained during the period from the year 2000 up to the beginning of the first commitment period can be used to assist in achieving compliance in the first commitment period.

Article 13

1. The Conference of the Parties, the supreme body of the Convention, shall serve as the meeting of the Parties to this Protocol.

2. Parties to the Convention that are not Parties to this Protocol may participate as observers in the proceedings of any session of the Conference of the Parties serving as the meeting of the Parties to this Protocol. When the Conference of the Parties serves as the meeting of the Parties to this Protocol, decisions under this Protocol shall be taken only by those that are Parties to this Protocol.

3. When the Conference of the Parties serves as the meeting of the Parties to this Protocol, any member of the Bureau of the Conference of the Parties representing a Party to the Convention but, at that time, not a Party to this Protocol, shall be replaced by an additional member to be elected by and from amongst the Parties to this Protocol.

4. The Conference of the Parties serving as the meeting of the Parties to this Protocol shall keep under regular review the implementation of this Protocol and shall make, within its mandate, the decisions necessary to promote its effective implementation. It shall perform the functions assigned to it by this Protocol and shall:

(a) Assess, on the basis of all information made available to it in accordance with the provisions of this Protocol, the implementation of this Protocol by the Parties, the overall effects of the measures taken pursuant to this Protocol, in particular environmental, economic and social effects as well as their cumulative impacts and the extent to which progress towards the objective of the Convention is being achieved;

(b) Periodically examine the obligations of the Parties under this Protocol, giving due consideration to any reviews required by Article 4, paragraph 2 (d), and Article 7, paragraph 2, of the Convention, in the light of the objective of the Convention, the experience gained in its implementation and the evolution of scientific and technological knowledge, and in this respect consider and adopt regular reports on the implementation of this Protocol;

(c) Promote and facilitate the exchange of information on measures adopted by the Parties to address climate change and its effects, taking into account the differing circumstances, responsibilities and capabilities of the Parties and their respective commitments under this Protocol;

(d) Facilitate, at the request of two or more Parties, the coordination of measures adopted by them to address climate change and its effects, taking into account the differing circumstances, responsibilities and capabilities of the Parties and their respective commitments under this Protocol;

(e) Promote and guide, in accordance with the objective of the Convention and the provisions of this Protocol, and taking fully into account the relevant decisions by the Conference of the Parties, the development and periodic refinement of comparable methodologies for the effective implementation of this Protocol, to be agreed on by the Conference of the Parties serving as the meeting of the Parties to this Protocol;

(f) Make recommendations on any matters necessary for the implementation of

this Protocol;

(g) Seek to mobilize additional financial resources in accordance with Article 11, paragraph 2;

(h) Establish such subsidiary bodies as are deemed necessary for the implementation of this Protocol;

(i) Seek and utilize, where appropriate, the services and cooperation of, and information provided by, competent international organizations and intergovernmental and non-governmental bodies; and

(j) Exercise such other functions as may be required for the implementation of this Protocol, and consider any assignment resulting from a decision by the Conference of the Parties.

5. The rules of procedure of the Conference of the Parties and financial procedures applied under the Convention shall be applied *mutatis mutandis* under this Protocol, except as may be otherwise decided by consensus by the Conference of the Parties serving as the meeting of the Parties to this Protocol.

6. The first session of the Conference of the Parties serving as the meeting of the Parties to this Protocol shall be convened by the secretariat in conjunction with the first session of the Conference of the Parties that is scheduled after the date of the entry into force of this Protocol. Subsequent ordinary sessions of the Conference of the Parties serving as the meeting of the Parties to this Protocol shall be held every year and in conjunction with ordinary sessions of the Conference of the Parties, unless otherwise decided by the Conference of the Parties serving as the meeting of the Parties to this Protocol.

7. Extraordinary sessions of the Conference of the Parties serving as the meeting of the Parties to this Protocol shall be held at such other times as may be deemed necessary by the Conference of the Parties serving as the meeting of the Parties to this Protocol, or at the written request of any Party, provided that, within six months of the request being communicated to the Parties by the secretariat, it is supported by at least one third of the Parties.

8. The United Nations, its specialized agencies and the International Atomic Energy

Agency, as well as any State member thereof or observers thereto not party to the Convention,
may be represented at sessions of the Conference of the Parties serving as the meeting of the Parties to this Protocol as observers. Anybody or agency, whether national or international, governmental or non-governmental, which is qualified in matters covered by this Protocol and which has informed the secretariat of its wish to be represented at a session of the Conference of the Parties serving as the meeting of the Parties to this Protocol as an observer,
may be so admitted unless at least one third of the Parties present object. The admission and participation of observers shall be subject to the rules of procedure, as referred to in paragraph 5
above.

Article 14

1. The secretariat established by Article 8 of the Convention shall serve as the secretariat of this Protocol.

2. Article 8, paragraph 2, of the Convention on the functions of the secretariat, and Article 8, paragraph 3, of the Convention on arrangements made for the functioning of the secretariat, shall apply *mutatis mutandis* to this Protocol. The secretariat shall, in addition, exercise the functions assigned to it under this Protocol.

Article 15

1. The Subsidiary Body for Scientific and Technological Advice and the Subsidiary Body
for Implementation established by Articles 9 and 10 of the Convention shall serve as, respectively, the Subsidiary Body for Scientific and Technological Advice and the Subsidiary
Body for Implementation of this Protocol. The provisions relating to the functioning of these two bodies under the Convention shall apply *mutatis mutandis* to this Protocol. Sessions of the
meetings of the Subsidiary Body for Scientific and Technological Advice and the Subsidiary Body for Implementation of this Protocol shall be held in conjunction with the meetings of, respectively, the Subsidiary Body for Scientific and Technological Advice and the Subsidiary
Body for Implementation of the Convention.

2. Parties to the Convention that are not Parties to this Protocol may participate as observers
in the proceedings of any session of the subsidiary bodies. When the subsidiary bodies serve as
the subsidiary bodies of this Protocol, decisions under this Protocol shall be taken only by those

that are Parties to this Protocol.

3. When the subsidiary bodies established by Articles 9 and 10 of the Convention exercise their functions with regard to matters concerning this Protocol, any member of the Bureaux of those subsidiary bodies representing a Party to the Convention but, at that time, not a party to this Protocol, shall be replaced by an additional member to be elected by and from amongst the Parties to this Protocol.

Article 16

The Conference of the Parties serving as the meeting of the Parties to this Protocol shall, as soon as practicable, consider the application to this Protocol of, and modify as appropriate, the multilateral consultative process referred to in Article 13 of the Convention, in the light of any relevant decisions that may be taken by the Conference of the Parties. Any multilateral consultative process that may be applied to this Protocol shall operate without prejudice to the procedures and mechanisms established in accordance with Article 18.

Article 17

The Conference of the Parties shall define the relevant principles, modalities, rules and guidelines, in particular for verification, reporting and accountability for emissions trading. The Parties included in Annex B may participate in emissions trading for the purposes of fulfilling their commitments under Article 3. Any such trading shall be supplemental to domestic actions for the purpose of meeting quantified emission limitation and reduction commitments under that Article.

Article 18

The Conference of the Parties serving as the meeting of the Parties to this Protocol shall, at its first session, approve appropriate and effective procedures and mechanisms to determine

and to address cases of non-compliance with the provisions of this Protocol, including through
the development of an indicative list of consequences, taking into account the cause, type, degree
and frequency of non-compliance. Any procedures and mechanisms under this Article entailing
binding consequences shall be adopted by means of an amendment to this Protocol.

Article 19

The provisions of Article 14 of the Convention on settlement of disputes shall apply *mutatis mutandis* to this Protocol.

Article 20

1. Any Party may propose amendments to this Protocol.

2. Amendments to this Protocol shall be adopted at an ordinary session of the Conference
of the Parties serving as the meeting of the Parties to this Protocol. The text of any proposed amendment to this Protocol shall be communicated to the Parties by the secretariat at least six months before the meeting at which it is proposed for adoption. The secretariat shall also communicate the text of any proposed amendments to the Parties and signatories to the Convention and, for information, to the Depositary.

3. The Parties shall make every effort to reach agreement on any proposed amendment to
this Protocol by consensus. If all efforts at consensus have been exhausted, and no agreement reached, the amendment shall as a last resort be adopted by a three-fourths majority vote of the
Parties present and voting at the meeting. The adopted amendment shall be communicated by the secretariat to the Depositary, who shall circulate it to all Parties for their acceptance.

4. Instruments of acceptance in respect of an amendment shall be deposited with the Depositary. An amendment adopted in accordance with paragraph 3 above shall enter into force for those Parties having accepted it on the ninetieth day after the date of receipt by the Depositary of an instrument of acceptance by at least three fourths of the Parties to this Protocol.

5. The amendment shall enter into force for any other Party on the ninetieth day after the date on which that Party deposits with the Depositary its instrument of acceptance of the said amendment.

Article 21

1. Annexes to this Protocol shall form an integral part thereof and, unless otherwise expressly provided, a reference to this Protocol constitutes at the same time a reference to any annexes thereto. Any annexes adopted after the entry into force of this Protocol shall be restricted to lists, forms and any other material of a descriptive nature that is of a scientific, technical, procedural or administrative character.

2. Any Party may make proposals for an annex to this Protocol and may propose amendments to annexes to this Protocol.

3. Annexes to this Protocol and amendments to annexes to this Protocol shall be adopted at an ordinary session of the Conference of the Parties serving as the meeting of the Parties to this Protocol. The text of any proposed annex or amendment to an annex shall be communicated to the Parties by the secretariat at least six months before the meeting at which it is proposed for adoption. The secretariat shall also communicate the text of any proposed annex or amendment to an annex to the Parties and signatories to the Convention and, for information, to the Depositary.

4. The Parties shall make every effort to reach agreement on any proposed annex or amendment to an annex by consensus. If all efforts at consensus have been exhausted, and no agreement reached, the annex or amendment to an annex shall as a last resort be adopted by a three-fourths majority vote of the Parties present and voting at the meeting. The adopted annex or amendment to an annex shall be communicated by the secretariat to the Depositary, who shall circulate it to all Parties for their acceptance.

5. An annex, or amendment to an annex other than Annex A or B, that has been adopted in accordance with paragraphs 3 and 4 above shall enter into force for all Parties to this Protocol six months after the date of the communication by the Depositary to such Parties of the adoption of the annex or adoption of the amendment to the annex, except for those Parties that have notified the Depositary, in writing, within that period of their non-acceptance of the annex or amendment to the annex. The annex or amendment to an annex shall enter into force for Parties which withdraw their notification of non-acceptance on the ninetieth day after the date on which withdrawal of such notification has been received by the Depositary.

6. If the adoption of an annex or an amendment to an annex involves an amendment to this Protocol, that annex or amendment to an annex shall not enter into force until such time as the amendment to this Protocol enters into force.

7. Amendments to Annexes A and B to this Protocol shall be adopted and enter into force in accordance with the procedure set out in Article 20, provided that any amendment to Annex B shall be adopted only with the written consent of the Party concerned.

Article 22

1. Each Party shall have one vote, except as provided for in paragraph 2 below.

2. Regional economic integration organizations, in matters within their competence, shall exercise their right to vote with a number of votes equal to the number of their member States that are Parties to this Protocol. Such an organization shall not exercise its right to vote if any of its member States exercises its right, and vice versa.

Article 23

The Secretary-General of the United Nations shall be the Depositary of this Protocol.

Article 24

1. This Protocol shall be open for signature and subject to ratification, acceptance or approval by States and regional economic integration organizations which are Parties to the Convention. It shall be open for signature at United Nations Headquarters in New York from 16 March 1998 to 15 March 1999. This Protocol shall be open for accession from the day after the date on which it is closed for signature. Instruments of ratification, acceptance, approval or accession shall be deposited with the Depositary.

2. Any regional economic integration organization which becomes a Party to this Protocol without any of its member States being a Party shall be bound by all the obligations under this Protocol. In the case of such organizations, one or more of whose member States is a Party to this Protocol, the organization and its member States shall decide on their respective responsibilities for the performance of their obligations under this Protocol. In such cases, the

organization and the member States shall not be entitled to exercise rights under this Protocol concurrently.

3. In their instruments of ratification, acceptance, approval or accession, regional economic integration organizations shall declare the extent of their competence with respect to the matters governed by this Protocol. These organizations shall also inform the Depositary, who shall in turn inform the Parties, of any substantial modification in the extent of their competence.

Article 25

1. This Protocol shall enter into force on the ninetieth day after the date on which not less than 55 Parties to the Convention, incorporating Parties included in Annex I which accounted in total for at least 55 per cent of the total carbon dioxide emissions for 1990 of the Parties included in Annex I, have deposited their instruments of ratification, acceptance, approval or accession.

2. For the purposes of this Article, "the total carbon dioxide emissions for 1990 of the Parties included in Annex I" means the amount communicated on or before the date of adoption of this Protocol by the Parties included in Annex I in their first national communications submitted in accordance with Article 12 of the Convention.

3. For each State or regional economic integration organization that ratifies, accepts or approves this Protocol or accedes thereto after the conditions set out in paragraph 1 above for entry into force have been fulfilled, this Protocol shall enter into force on the ninetieth day following the date of deposit of its instrument of ratification, acceptance, approval or accession.

4. For the purposes of this Article, any instrument deposited by a regional economic integration organization shall not be counted as additional to those deposited by States members of the organization.

Article 26

No reservations may be made to this Protocol.

Article 27

1. At any time after three years from the date on which this Protocol has entered into force
for a Party, that Party may withdraw from this Protocol by giving written notification to the Depositary.

2. Any such withdrawal shall take effect upon expiry of one year from the date of receipt by
the Depositary of the notification of withdrawal, or on such later date as may be specified in the
notification of withdrawal.
3. Any Party that withdraws from the Convention shall be considered as also having withdrawn from this Protocol.

Article 28

The original of this Protocol, of which the Arabic, Chinese, English, French, Russian and Spanish texts are equally authentic, shall be deposited with the Secretary-General of the United Nations.

DONE at Kyoto this eleventh day of December one thousand nine hundred and ninety-seven.

IN WITNESS WHEREOF the undersigned, being duly authorized to that effect, have
affixed their signatures to this Protocol on the dates indicated.

Annex A

Greenhouse gases

Carbon dioxide (C02)
Methane (CH4)
Nitrous oxide (N20)
Hydrofluorocarbons (HFCs)
Perfluorocarbons (PFCs)
Sulphur hexafluoride (SF6)

Sectors/source categories

Energy
- Fuel combustion
  - Energy industries
  - Manufacturing industries and construction

Transport
Other sectors
Other

Fugitive emissions from fuels
Solid fuels
Oil and natural gas
Other

Industrial processes

Mineral products
Chemical industry
Metal production
Other production
Production of halocarbons and sulphur hexafluoride
Consumption of halocarbons and sulphur hexafluoride
Other

Solvent and other product use
Agriculture
Enteric fermentation
Manure management
Rice cultivation
Agricultural soils
Prescribed burning of savannas
Field burning of agricultural residues
Other

Waste
Solid waste disposal on land
Wastewater handling
Waste incineration
Other

Annex B

Party	**Quantified emission limitation or reduction commitment (percentage of base year or period)**
Australia	108
Austria	92
Belgium	92

Bulgaria*	92
Canada	94
Croatia*	95
Czech Republic*	92
Denmark	92
Estonia*	92
European Community	92
Finland	92
France	92
Germany	92
Greece	92
Hungary*	94
Iceland	110
Ireland	92
Italy	92
Japan	94
Latvia*	92
Liechtenstein	92
Lithuania*	92
Luxembourg	92
Monaco	92
Netherlands	92
New Zealand	100
Norway	101
Poland*	94
Portugal	92
Romania*	92
Russian Federation*	100
Slovakia*	92
Slovenia*	92
Spain	92
Sweden	92
Switzerland	92
Ukraine*	100
United Kingdom of Great Britain and Northern Ireland	92
United States of America	93

* Countries that are undergoing the process of transition to a market economy.

APPENDIX 5

NIGER BASIN WATER CHARTER

The Niger Basin Water Charter

PREAMBLE

The Republic of Benin,

Burkina Faso,

The Republic of Cameroon,

The Republic of Ivory Coast,

The Republic of Guinea,

The Republic of Mali,

The Republic of Niger,

The Federal Republic of Nigeria,

The Republic of Chad,

State Parties to the present Niger Basin Water Charter,

CONSIDERING the Act of Niamey concerning navigation and economic cooperation between the Niger Basin States, signed on 26 October 1963;

CONSIDERING the agreement concerning the River Niger Commission and navigation and transport on the River Niger signed in Niamey on 25 November 1964, revised in Niamey on 2 February 1968 and 15 June 1973, and in Lagos on 26 January 1979;

CONSIDERING the Convention creating the Niger Basin Authority (NBA) signed on 21 November 1980 in Faranah (Guinea), revised on 29 October 1987 in N'djamena;

CONSIDERING decision nO.7 of the seventh Summit of the Heads of State and Government concerning information exchange between NBA Member States held in Abuja (Nigeria) on 16 February 2002;

CONSIDERING the fundamental right of each individual for access to water;

CONSIDERING that water is an ecological, social and economic asset whose preservation is of general interest;

CONSIDERING the existing programmes and projects and the new development projects in the River Niger Basin slated in the SDAP and the Investment Programme.

Bearing in mind the progress made in the development and consolidation of international water law initiated by the Helsinki Rules of 1966 relating to the use of international river waters;

Based in particular on the conclusions of the United Nations International Conference on the Environment and Development (Rio de Janeiro, 1992), through the Rio Declaration on the Environment and Development and Agenda 21 (Chapter 18); as well as the programme relating to the continued implementation of Agenda 21 (New York 1997); on the decision concerning the sustainable management of freshwater of the Sustainable Development

Commission (New York 1998) and; the Millennium Declaration (New York, September 2000);

Taking as its inspiration the relevant provisions of the Convention on wetlands adopted in Ramsar (Iran) on 2 February 1971 and the African Convention on the conservation of nature and natural resources amended in Maputo (Mozambique) on 11 July 2003;

Referring to the 17th March, 1992 Helsinki Convention on the protection and use of transboundary water streams and international lakes and to the Convention on the law of non-navigational uses of international watercourses, adopted in New York on 21 May 1997;

Recalling the bilateral and multilateral agreements governing the use of certain parts of the Niger Basin;

Wishing to develop close cooperation founded on a policy of placing in common their means for sustainable and coordinated use of the Niger Basin water resources;

Convinced of the need for coordination and ecologically rational management of the Niger Basin water resources in order to promote the economic and social progress of their country, combat poverty and ensure sustainable development;

Determined to implement the Paris Declaration on the principles of management and good governance for a sustainable and shared development of the Niger Basin of 26th April, 2004.

Have agreed as follows:

CHAPTER I: GENERAL PROVISIONS

Article 1. Definitions

For the purposes of the Present Charter and unless otherwise stipulated, the following terms mean:

1. "Authority": the Niger Basin Authority;
2. "Hydrographic catchment area": a geographic area extending over two or several States and determined by the limits of the area supplying the hydrographic network, including groundwater and surface waters flowing to a common terminus;

3. "Charter": the present document and its annexes. The Charter is a written international agreement between the Niger Basin Authority Member States which is governed by international law;

4. "Sub-basin Commissions" : in charge of proposing the modalities relating to the use of water resources at the level of each hydrographic sub-basin, contributing to the settlement of all issues relating to the use of water resources and collaborating in the planning and execution of any project or programme of interest to the hydrographic sub-basin.

5. "Permanent Technical Committee": the Permanent Technical Committee of the Niger Basin Authority;

6. "Council of Ministers": the Council of Ministers of the Niger Basin Authority;

7. "Watercourse": a system of surface waters and ground waters which by virtue of their physical relationship constitute a unitary whole and flow to a terminus;

8. "International watercourse": a watercourse the parts of which are situated in different States;

9. "Paris Declaration": the Declaration by the Heads of State and Government of the Niger Basin Authority which sets out nine principles of management and good governance for the sustainable and shared development of the Niger Basin;

10. "Delegation": a specific mission for which the delegating entity temporarily deprives itself of a competence to the benefit of the entity in whom this mission is entrusted and which exercises it autonomously during the period of its mission;

11. "Right to water": the fundamental right to a sufficient and physically accessible supply at an affordable cost of safe water of a quality that is acceptable for personal and domestic use by everyone.

12. "Groundwater": the water contained in porous, permeable and/or fissured geological formations which total and/or partial renewal is dependent on the Niger Basin hydrological regime;

13. "Transboundary waters": any surface water and groundwater which mark the boundary between two States or more, cross them or are located on these boundaries;

14. "State party": a State which ratifies this Charter and for which it becomes effective;

15. "Integrated Water Resources Management" or IWRM: the process which encourages the coordinated development and management of water, land and related resources with a view to maximizing, in an equitable manner, the resulting economic and social welfare without compromising the sustainability of essential ecosystems;

16. "Regional Advisory Group": in charge of implementation of the principles of management and good governance for the sustainable and shared development of the River Niger Basin;

17. "Transboundary impact": any significant prejudicial impact, such as a change to transboundary water caused by a human activity;

18. "Owner": legal entity on whose behalf work is executed and to whom ownership of a facility reverts. It consists of State co-owners or the Niger Basin Authority in the case of common facilities, and State owners or the Niger Basin Authority in the case of national facilities and facilities of common interest.

19. "Delegated Owner": the Niger Basin Authority acting on behalf of Member States concerning common facilities or facilities of common interest.

20. "Observatory of the River Niger Basin": Structure in charge of monitoring the evolution of the basin with regard to its hydrological, environmental and socio-economic aspects, to produce periodic information on the basin development;

21. "Common facility": a facility the Member States of the Niger Basin Authority have decided by a legal instrument to be their common and indivisible ownership;

22. "Facilities of common interest": a facility in which two or several Niger Basin Authority Member States have an interest and which coordinated management has been decided by mutual agreement between the NBA Member States;

23. "SDAP": the Sustainable Development Action Plan for the Niger Basin;

24. "Panel of Experts": a group of independent experts in charge of giving specific technical opinions on issues relating to development in the basin;

25. "Pollution of an international watercourse": any change harmful to the composition or the quality of the water of an international watercourse resulting directly or indirectly from human behaviour, which is likely to cause harm to one or other watercourse States or their environment, including harm to the health or the safety of humans, or to any use of water, or to the biological resources of the watercourse;

26. "Transboundary pollution": any pollution which is caused by activities carried out on the territory or under the control of a State and generates harmful effects for the environment of one or several other States;

27. "Project or programme of common interest": a transboundary project or programme carried out in the Niger Basin and of interest to two or several Member States of the Niger Basin Authority;

28. "Public": populations, autochtonous communities, associations, women, young and any persons who use or are likely to use the water resources;

29. "Executive Secretariat": the Executive Secretariat of the Niger Basin Authority;

30. "Summit of Heads of State and Government": the Summit of the Heads of State and Government of the Niger Basin Authority Member States;

31. "National Focal Structure" in charge of coordinating the NBA activities in each state party through the involvement of all the stakeholders on the one hand and among the State parties on the other hand;

32. "Subsidiary principle": the principle which leads to a search for the appropriate level for the exercise of competences;

33. "Urgency": a situation which causes or threatens to cause in an imminent manner serious harm in the Basin States or other States and which is due to natural causes, or human activity;

34. "Use": the utilization of the resource in a given sector;

35. "Domestic uses": extraction to satisfy the needs of individuals, and limited to the quantities necessary for food, health and livestock, or vegetable production for family use;

36. "Users": natural or legal persons, present or future users of the resource;

37. "Shared Vision": the Decision adopted at the time of the extraordinary Council of Niger Basin Authority Ministers held in Abuja in May 2005 and which consists in making "the Niger Basin, a common area of sustainable development by the integrated management of the water resources and associated ecosystems for the improvement of living conditions and the prosperity of the populations.";

Article 2: Purpose

The purpose of the present Charter is to encourage cooperation based on solidarity and reciprocity for a sustainable, equitable and coordinated use of the Niger Basin hydrographic catchment area. To this end it aims to:

-reinforce solidarity and promote integration and sub-regional economic cooperation between the Member States;

-promote integrated management of the Niger Basin water resources;

-promote the harmonization and monitoring of national policies for the preservation and protection of the Niger Basin hydrographic catchment area;

-define the procedures for examination and approval of new projects which use water or which could affect the quality of water;

-provide a framework to the principles and procedures for the allocation of water resources between the various use sectors and the associated benefits;

-determine the rules related to the protection and preservation of the environment in accordance with the sustainable development objectives;

-maintain the integrity of ecosystems through protection of aquatic ecosystems against the deterioration of basins;

-protect public health through control of disease vectors;

-define the principles and rules for the prevention and settlement of disputes regarding the use of Niger Basin water resources;

-define the procedures for the participation of water users in decision-making processes regarding Basin water resources management;

-promote and facilitate dialogue and consultation between the Member States in the design and execution of programmes, projects and all other development activities affecting or which could affect the Basin water resources;

-promote research and technological development, information exchange, reinforcement of capacities, in particular as regards the IWRM and the use of adequate technologies for the management of the Niger Basin hydrographic catchment area;

Article 3: Scope

This Charter covers all the activities meant for the knowledge, governance, preservation, protection, mobilization and use of the water resources of the River Niger Basin.

In this respect, the River Niger including its tributaries, sub-tributaries and distributaries, is declared an international watercourse.

The provisions of the present Charter apply only to the Niger Basin.

CHAPTER II: GENERAL PRINCIPLES

Article 4. Equitable and Reasonable Participation and Use

The use of the River Niger water shall consider the principle of equitable and reasonable participation and use. To this end, the following relevant circumstances and factors are to be taken into account:

- the relevant geographical, hydrological and climatic data in the territory of each Basin State; - the planned development to meet needs;

- the previous, present and future uses of the Basin water resources;

- the economic and social needs of the States and the populations;

- the sharing of water resources between all users, aquatic systems and associated ecosystems;

- the population dependent on the watercourse in each Basin State;

- the availability of other resources and the cost of a possible substitution;

- the need to avoid waste in the use of Basin water;

- the principle of compensation to a State that is obliged to waive an activity in order to reconcile divergent uses;

- the harm that could be caused by a new or broader use;

- the effects of the Niger Basin use by one Basin State on other Basin States;

- the right of Basin populations to water;

- the preservation, protection, development and economy in the use of water resources as well as the costs of the measures taken to achieve this;

- the existence of a minimum environmental flow to be preserved so as to maintain the services of the River Niger Basin and the Wetlands;

- the existence of other options, of comparable value, which could replace a particular present or envisaged use.

There is no hierarchy between these factors. Therefore, the importance to be assigned to each one of them is based on the particular circumstances of each sub-basin.

Article 5: Do no harm

The State parties shall see to the fact that the activities conducted on their territories do not cause harm to other State Parties in accordance with article 4 of the revised Convention creating the Niger Basin Authority.

Article 6: Precaution

The State Party shall not defer the implementation of measures intended to avoid any situation likely to have a transboundary impact on the grounds that scientific research has not shown causality between these substances and a possible transboundary impact.

Article 7: Prevention

The State parties shall take into account the principle of preventive and corrective action of harm caused to the environment, in priority at the source, by using the best available techniques at a cost which is economically acceptable.

Article 8: Polluter-payer

The State parties shall take into account the polluter-payer principle, applied to both legal persons and individuals, and under which the costs of prevention, control and pollution reduction are borne by the polluter. The Member States undertake to set up tax incentives to

help economic operators who implement procedures to use water resources in a manner which respects the environment.

Article 9: Off-taker-payer

The State parties shall take into account the off-taker-pays principle, applied both to legal and individual persons, under which water use tariffs are set depending on the kind of use. Water use is subjected either to a tax or a fee. However, the right to water should be secured.

CHAPTER III: GENERAL OBLIGANONS

Article 10: Preservation of the quantity and quality of water resources

The State parties shall manage the Niger Basin water resources in a manner which maintains the quantity and the quality of the resources at the highest possible level. To this end, they shall take all measures to:

1° preserve essential hydro-ecological processes and essential minimum flows and protect human health against pollutants and water-borne diseases;

2° prevent damages due to discharges of pollutants which could have harmful effects on human and animal health or on the natural resources in another State;

3° prevent excessive withdrawal from these resources.

Article 11: Planning, Protection, Management and Development of Water **Resources Policies**

The State parties shall develop and implement planning, protection, management, use and development policies for groundwater and surface water, as well as policies for the collection and use of rainwater, and endeavour to guarantee the populations sufficient and continuous supply of water of an appropriate quality by taking adequate measures in view of:

1° the study of the water cycles and inventories per catchment;

2° integrated water resources management;

3° the preservation of forestry, wetlands and other areas of the catchment and the coordination and planning of projects for the development of water resources;

4° the inventory and management of all water resources, including the administration and control of all forms of water use;

5° the prevention and control of pollution inter alia by the creation of standards regarding effluents and the quality of water. **Article 12: Preservation and Protection of the Environment**

The State Parties undertake to:

-prevent any further deterioration, preserve and improve the state of aquatic and terrestrial ecosystems, and meet their water needs, together with the wetlands which depend on the Niger Basin;

-promote the sustainable use of water, based on the long-term protection of available water resources;

-reinforce protection of the aquatic environment, ensure the progressive reduction of transboundary pollution and prevent the aggravation of pollution;

-contribute to the mitigation of harmful situations such as floods, droughts, siltation and climate change;

-resort systematically to environmental assessments;

-ensure the control of invasive aquatic species;

-guarantee the priority preservation of aquatic ecosystems;

-consolidate and improve knowledge on the state of the catchment area water and other natural resources through reinforcement of information system;

-develop and manage catchment areas;

-ensure the preservation of the biological diversity of the Niger hydrographic catchment area;

-implement the master plan concerning the fight against siltation;

-reverse the trends towards the deterioration of land and water in the Niger Basin;

-promote sustainable agro-sylvo-pastoral and fishing practices;

-determine the standards for drinkability and discharges into the Niger Basin;

-prevent and manage emergency situations.

To this end, the State Parties shall take domestic measures necessary to prevent and repress any breach of the present Charter's provisions.

Article 13: Water Policing

The State Parties shall make sure that any part of the Basin which extends over their respective territory is protected and preserved by policing measures in conformity with the provisions of this charter.

The State Parties are supported in this effort by the Niger Basin Authority bodies through training and the placing of adequate practical and technical resources at the State Parties' disposal.

CHAPTER IV: USES AND RELANONS BETWEEN USES

Article 14: Uses and Needs

Basin water uses shall aim at the satisfaction in a just and equitable manner of:

- the water requirements of the populations;

- the needs of agriculture, livestock rearing, fishing, industry, navigation, mining, energy, tourism, fish farming, transport and communications, forestry and the environment in general;

- any other need that the Authority deems necessary.

Article 15: Priority between Uses

In the use of the Niger Basin water resources, no use shall have priority over the others, but in the event of a competition between several uses, particular attention shall be paid to essential human needs.

Notwithstanding the provisions of the above paragraph, the State Parties can jointly agree to establish a priority order in the use of the said basin's water resources.

CHAPTER V: ORGANS OF NIGER BASIN WATER RESOURCES MANAGEMENT

Article 16: Permanent Technical Committee

A Permanent Technical Committee is created in order to pursue the aims of the present Charter.

Article 17: Missions of the Permanent Technical Committee

The Permanent Technical Committee is an advisory body of the Executive Secretariat. It is in charge, in particular, of:

- ensuring the Niger Basin water rational and equitable use under the rules agreed upon by the Member States;

- developing information tools to enable the organization of consultations on any project or programme planned within the Niger Basin;

- participating in the meetings of the Regional Advisory Unit with a view to provide it with the necessary clarifications on cases submitted for its assessment;

- issuing advisory opinions intended for the Council of Ministers on any project or programme which significantly affects the Niger Basin water regime;
- giving an enlightened opinion on the technical aspects of projects, economic and social studies and their consistency with the Niger Basin Sustainable Development Action Plan and this Water Charter;
- facilitating dialogue, consultation, negotiation and mediation in the event of controversies or disputes which may arise on the occasion of the use of the Niger Basin waters.

Article 18: Support to the Permanent Technical Committee

In pursuance of its missions, the Permanent Technical Committee is supported by the Niger Basin Observatory, the National Focal Structures, the Sub-basin Commissions, the Regional Advisory Unit and the Panel of Experts.

The creation, assignment and operation of these organs shall be subject to a decision to be taken by the Chairman of the Council of Ministers.

CHAPTER VI: PLANNED MEASURES

Article 19: Information Exchange

The State Parties shall exchange information and consult each other and, if necessary, negotiate on the possible effects of measures planned on the River Niger Basin.

Article 20: Notification of Planned Measures

Before a State Party implements or permits the implementation on its territory of measures that may have significant adverse effects upon other Basin States, it shall provide the latter with timely notification through the Executive Secretariat. Such notification shall be accompanied by the available technical data and information, including the results of any environmental and social impact assessment, in order to enable the Authority to evaluate the possible effects of the planned measures.

After receiving the notification, the Executive Secretariat shall submit the notification to the Permanent Technical Committee which issues a reasoned opinion. The latter shall be sent by the Executive Secretariat to the Council of Ministers or it's President in case of emergency.

Subject to the provisions of the present Charter, a State Party which provides notification under the terms of the paragraph of the present article shall allow the Authority's Executive Secretariat a three month period at least within which to study and evaluate the possible effects of the planned measures.

Such period may be extended for a further period of one month on the request of the Executive Secretariat.

During the period between the notification and, the deadline for a reply, the notifying State shall collaborate with the Executive Secretariat, providing it on request with all available additional data and information within a reasonable time.
During this period, the notifying State shall not implement or permit the implementation of the planned measures.

The notification shall also be passed on to any State that could be affected by the planned measures by providing the same information within the same time period.

Article 21: Absence of Reply to Notification

If the notifying State receives no reply to the notification within the above-mentioned period, it may proceed with the implementation of the planned measures in a manner consistent with the notification and the technical data and information provided, and in compliance with the principle of equitable and reasonable use.

Article 22: Consultations and Negotiations

If the State which has received the notification, or the Executive Secretariat, considers that the proposed measures are likely to have a significant harmful effect, consultations and possibly negotiations shall be started in order to reach an equitable consensual settlement.

Consultations and negotiations shall proceed based on the principle of good faith and take account of the legitimate interests of any other State Party to this Charter. They are organized and conducted by the Executive Secretariat.

Comment [ZM1]:

Article 23: Absence of Notification

If a State Party or the Authority has reasonable grounds to believe that another Basin State is planning measures which could have a significant adverse effect on its own uses or the condition of the resource, it may request that the latter meets the notification requirement.

In the event the State which plans the measures considers that it is not under obligation to provide a notification, it shall so inform the Executive Secretariat and any State that could be affected by providing a documented statement explaining its decision. If the decision does not satisfy the Executive Secretariat and the States that could be affected, consultations and negotiations shall be engaged between the Parties.

Article 24: Emergency Situations

In the event the implementation of planned measures is of the utmost urgency in order to protect public health, public safety or other equally important interests, the State planning the measures may immediately proceed to their implementation, notwithstanding the obligation to issue a notification.

In such cases, a formal declaration of the urgency of the measures is required. Such declaration shall be supplemented by any necessary information and conveyed to the Executive Secretariat and the other Basin States.

The State planning the measures shall engage consultations at the request of any State Party which is not convinced of the emergency of the said measures.

CHAPTER VII: PUBLIC PARTICIPANON

Article 25: Access to Information

The State Parties shall ensure to any user the right to be informed on the quality of water resources and participate in the development and the implementation of the decision relating to the valorization of the basin.

In this effect, the information regarding the condition of the transboundary water, the allocation of water to the different sectors, and the measures adopted or planned to prevent, control and reduce transboundary impacts should be accessible to the public.

Article 26: Terms of Public Participation

Public participation shall include the following aspects:

- communication of information in an efficient manner right from the beginning of the decision making process;
- allocation of reasonable time at every different stage of the public's participation;

- participation must begin at the start of the procedure;

- in the event of a new project, the public shall be quickly.

- the public shall submit in writing any observation, information, suggestion, proposal, counterproposal, analysis or opinion which is believed relevant;

- the State Parties and the Authority shall ensure that when the decision is taken, the results of public participation are duly taken into account;

- the State Parties shall ensure that the public is informed promptly once a decision has been taken.

CHAPTER VIII: COMMON FACILITIES AND FACILITIES OF COMMON INTEREST

Article 27: General Principles

Facilities built on the Niger Basin and which have been the subjects of a declaration to the Authority, by the State owners or joint-owners, may obtain the status of common facilities or facilities of common interest.

The Authority, in agreement with the owners, shall be able to determine the procedures for delegation or retrocession to the Authority.

The previous provision shall not constitute an obstacle to the Authority being the delegated owner when it finances and orders the execution of a facility within the framework of common facilities.

Article 28: Future Provisions

Specific agreements shall determine the status of common facilities and facilities of common interest, as well as the conditions for participation in the funding, the management and the sharing of the benefits resulting from the construction or the use of these facilities.

CHAPTER IX: SETTLEMENT OF DISPUTES

Article 29: Amicable Settlement

In the event of a dispute between two or several State Parties concerning the interpretation or the application of the present Charter, the Parties shall seek a settlement by the good offices of the Authority, mediation or conciliation, or by any other peaceful means of dispute settlement.

Article 30: Resort to the Permanent Technical Committee

If no solution has been found on completion of the good offices, mediation and conciliation procedures, the dispute shall be submitted to the Permanent Technical Committee which shall propose a settlement to the Council of Ministers and the Summit of the Heads of State and Government after six (6) months from the time the Executive Secretariat request it to propose a settlement.

Article 31: Sub-regional and Jurisdictional Settlement

In the event of no satisfactory settlement at this level, the Parties to the dispute shall refer the matter to the Conciliation Commission of the African Union as a first step, before any referral to the International Court of Justice.

Article 32: Opposability of Non-disputed Provisions

During the time of the dispute settlement and until it is settled, all the non-disputed provisions of the Charter shall apply. Moreover, the Council of Ministers of the Authority can decide on any provisional measure at the Executive Secretariat's instigation.

CHAPTER X: FINAL PROVISIONS

Article 33: Amendments

Any State Party may propose amendments to the present Charter.

The Parties shall not spare any effort to reach an agreement by consensus on any proposed amendment.

Proposals for amendments of the present Charter shall be addressed to the President of the Council of Ministers who shall communicate them to the State Parties sixty (60) days at the latest after receipt and at least thirty (30) days before the meeting during which the amendment are to be proposed for adoption.

Any amendment to the present Charter shall come into force in the same conditions as the Charter.

The Charter may envisage annexes dealing with technical, financial or administrative matters.

Such annexes shall enter into force after their adoption by the Council of Ministers.

Article 34: Withdrawal

Any State Party may withdraw from the present Charter after the expiry of a five-year (5) period beginning on the date the present Charter enters into force.

Withdrawal shall be made by written notification sent to the Government of Niger which shall acknowledge receipt and inform the Governments of the other Member States.

Withdrawal shall take effect one (1) year after the date of receipt unless prior retraction of the withdrawal notification.

The State Party shall comply with all the obligations which rest with it under the present Charter and which arise from its capacity as a Party before the date the denunciation takes effect.

Article 35: Entry into Force

The present Charter shall enter into force sixty (60) days after the ratification instruments have been deposited by two thirds of the Member States of the Authority.

Article 36: Authentic Texts and Depositary Government

The original of the present Charter, of which the English and French texts are equally authentic, is deposited with the Government of the Republic of Niger which shall communicate certified true copies to all the State Parties, and notify them of the date when the instruments of ratification and accession are deposited, and register the present Charter with the African Union and the United Nations Organization.

THE CONVENTION ESTABLISHING THE NIGER BASIN AUTHORITY

PREAMBLE

The President of the People's Republic of BENIN;

The President of FASO;

The President of the Republic of CAMEROON;

The President of the Republic of COTE D'IVOIRE;

The President of the Republic of GUINEA, Head of State;

The President of the Supreme Military Council, Head of State

Of the Republic of NIGER;

The President of the Federal Republic of NIGERIA;

The President of the Republic of CHAD

REFERRING to the Niamey Act on navigation and economic cooperation among the States of the Niger Basin signed on 20th October 1963,

CONSIDERING the Agreement on the River Niger Commission, navigation and transportation on the River Niger signed in Niamey on 25th February 1964, and revised in Niamey on 2nd February 1968 and on 15th June 1973 and in Lagos on 26th January 1979,

REFERRING to the Convention on establishment of the Niger Basin Authority signed on 21st November 1980 in FARANAH, Republic of Guinea;

REFERRING to decisions N°s 1, 2 and 3 of the 5th Summit of Heads of State and Government held in N'Djamena, Republic of CHAD on 28th October 1987;

CONSCIOUS of the need to promote the economic and social progress of their countries with a view to raising the living standard of the Peoples;

CONVINCED that the economic and social progress of their countries depends on an effective economic cooperation based on a resolute and concerted policy of combining their individual resources for the search for a collective well-being,

CONVINCED of the need to promote the development of economies of their countries through integrated development of the Niger Basin;

RE-AFFIRMING their desire for unity and solidarity in organizing the development of the entire Niger basin;

DECIDE to revise the Convention on establishment of the Niger Basin Authority signed on 21st November 1980 in FARANAH, Republic of Guinea.

SECTION ONE

Establishment and Composition

Article I

Establishment and Headquarters

1. The High Contracting Parties, by this Convention, decide to transform the River Niger Commission into a « Niger Basin Authority », hereinafter referred to as « the Authority».

2. The Authority is instituted in replacement of the River Niger Commission established by the Agreement on the River Niger Commission, Navigation and Transportation on the River Niger signed in Niamey on 25th November 1964 and revised in Niamey on 2nd February 1968 and on 15th June 1973, and in Lagos on 26th January 1979.

3. The Authority inherits all the assets and assumes all the obligations of the River Niger Commission.

4. The Headquarters is located in Niamey, Republic of Niger.

Article 2

Composition of the Authority

Are members of the Authority and referred to as «Member States» the States bordering on the River Niger, its tributaries and sub-tributaries and are signatories of this Convention.

SECTION TWO

Article 3

Aim

The aim of the Authority is to promote cooperation among the member countries and ensure an integrated development of the Niger Basin in all the fields of energy, water resources, agriculture, livestock, fishing and fish-fanning, forestry and forestry exploitation, transport and communications and industry.

Article 4

I. For the purpose of Article 3 above, the Authority is mandated:

a) to harmonize and co-ordinate national water resources development policies of the Niger Basin;

b) to participate in development planning through preparation and implementation of an integrated development plan of the basin;

c) to promote and participate in the design and exploitation of works and projects of common interest.

d) in conformity with the Niamey Act, to ensure control and regulation of any form of navigation on the river, its tributaries and sub-tributaries;

e) to participate in formulation of applications for assistance and in mobilization of financing for studies and works needed for the development of the resources of the Basin.

2. The Authority shall maintain permanent contact with the member States in order to acquaint themselves with the development plans, notably, their aspects affecting the Niger Basin.

They also undertake to refrain from carrying out, on the section of the river, its tributaries and sub-tributaries situated within their territorial jurisdiction, any works likely to pollute the waters or adversely change the biological characteristics of the fauna and flora.

SECTION III

The Permanent Organs of the Authority

Article 5.

The permanent organs of the Authority are the following:

a) the Summit of Heads of State and Government

b) the Council of Ministers

c) the Technical Committee of Experts

d) the Executive Secretariat.

Article 6.

The Summit of Heads of State and Government.

1. The Summit of Heads of State and Government of the Authority, hereinafter referred to as « the Summit» is the Supreme orientation and decision-making Organ...

2. The Summit is composed of Heads of State and Government or, their duly-accredited representatives.

3. The Summit defines the general orientation of the development policy of the Authority and controls the latter's executive functions with a view to attaining its objectives.

4. It meets once every two years in Ordinary Session in the Member State assuming the chairmanship. Quorum is formed by simple majority.

5 The Summit may meet in extraordinary session at the request of the current chairman or a member State.

6. The decisions and directives of the Summit are binding on all the institutions of the Authority.

7. The Summit gives final ruling on any issue that has not been resolved at the level of the Council of Ministers.

8. Unless it decides otherwise, the Summit elects a Chairman, in turns, among the Heads of State and Government of the member countries following the alphabetical order of the name of the States in French, for a two-year term. In between two Sessions the Chairman represents the Summit and takes decisions falling within his competence in the interest and for the smooth running of the Organization.

Article 7

The Council of Ministers

1. The Council of Ministers of the Authority, hereinafter referred to as «the Council », is the control organ of the Authority. It is composed of Ministers or their duly accredited

representatives at the rate of one vote per Member State. Each Minister may be assisted by experts.

2. The Council is responsible for monitoring the activities of the Executive Secretariat and reports to the Summit on the activities. It prepares the Sessions of the Summit, examines all issues, deals with matters submitted to it and, in turns, submit recommendations to the Summit.

3. The Council meets once a year in ordinary session. Quorum is formed by simple majority. Recommendations and resolutions are adopted by consensus.

4. The Council meets in the countries assuming the current Chairmanship, failing that, in the Headquarters country or in any other place as may be indicated by the Chairman of the Summit. The Chairman has a two-year term. In between the sessions, he represents the Council.

5. He takes decisions in accordance with the directives of the Summit and within the limits of the powers delegated to him. The chairmanship is assumed in turns following the alphabetical order of the name of the countries in French.

Article 8

The Technical Committee of Experts

1. The Technical Committee of Experts is composed of representatives of the Member States. Its mandate is:

a) to prepare the sessions of the Council of Ministers;

b) to submit reports and recommendations to the Council of Ministers.

2. The Technical Committee of Experts meets at the request of the Executive Secretariat according to a calendar approved by the Council of Ministers.

3. Any other meeting of the Technical Committee of Experts should be approved by the Chairman of the Council of Ministers.

Article 9.

The Executive Secretariat

1. The Executive Secretariat is the Executing Organ of the Authority.

2. It is directed by an Executive Secretary appointed by the Summit of Heads of State and Government, upon the recommendation of the Council of Ministers, for a period of four years renewable only once. Each Member State can present a candidate for the post of Executive Secretary.

3. The Executive Secretary is the Chief Executive of the Executive Secretariat of the Authority.

4. The Executive Secretary is relieved of his functions by the Summit upon the recommendation of the Council of Ministers.

5. In the appointment of officers to the different posts of the Executive Secretariat, due consideration is given to qualification and the need to maintain equitable sharing of posts among the Member Countries.

6. In the exercise of his functions, the Executive Secretary is answerable to the High Authorities of the Authority. The other officers of the Secretariat are answerable to the Executive Secretary.

7. The Executive Secretary is in charge of the administration of the Authority and all its structures for implementation of the decisions taken by the Higher Authorities.

To this end, he is mandated particularly:

a) to undertake all works and studies to ensure attainment of the objectives of the Authority.

b) to make all appropriate proposals capable of contributing to harmonious development of the Authority.

SECTION IV

Financial provisions

Article 10:

The Authority's Budget

1. A recurrent budget of the Authority is prepared each year.

2. The operating budget of the Authority is fed by contributions from Member States, determined equitably.

3. All the expenditures of the Authority, including those on the specialized organs of the Executive Secretariat, are approved, for each Financial Year, by the Council of Ministers and are charged to the budget whose execution conditions and modalities are spelt out in the Financial Regulations of the Authority.

4. The Member States undertake to pay their annual contributions to the budget of the Authority regularly.

Article 11:

Currency for payment of contributions

1. The contribution assigned to a Member State of the Authority by virtue of this

Convention shall be paid in convertible currency.

2 The unit of account in which the budget of the Authority is prepared is that of the Headquarters country.

3. Are considered as «convertible currencies» for the purpose of this Article, currencies declared as such by the International Monetary Fund and all other currencies the Council may also designate as such.

4. The exchange rate of the currencies of the Member States of the Authority for the purpose of payment of the contributions assigned to them by virtue of this Convention, is the official rate declared at the International Monetary Fund on the date of the payment. In a case where the currency of a Member State may be floating, the basic average of the selling and buying rates of the Central Bank of the Member State shall be used.

Article 12:

Financial Regulations

The Council of Ministers institutes the Financial Regulations for application of the provisions of this section.

Article 13:

The Audit Board and Financial Controller

1. An Audit Board composed of two Inspectors of Finance designated for a period of two years by two (2) Member States which rotates in alphabetical order in French, audits the accounts of the Executive Secretariat at the end of each Financial Year. The Financial

Controller is directly under the Council of Ministers to which he presents the audit report of the Secretariat.

2. The functions of the Financial Controller and the responsibilities of the Audit Board are spelt out by the Financial Regulations.

SECTION V

Staff Rules and Regulations

Article 14:

The Council of Ministers institutes rules and regulations applicable to the staff of the Niger Basin Authority.

SECTION VI

Legal Status, privileges and immunities

Article 15:

Legal Status

1. The Authority, as an Intergovernmental Organization enjoys legal status and has the necessary capacity:

- to enter into contract
- to acquire movable and immovable properties needed for realization of its objectives
- to go to court
- to borrow

- to accept gifts and legacies.

2. In the exercise of its rights defined in this Article, the Authority is represented by the Executive Secretary within the bounds of the powers conferred and the decision taken by the Council of Ministers.

Article 16:

Privileges and Immunities

1) The privileges and immunities granted to the Executive Secretary of the Niger Basin Authority are the same as those enjoyed by Heads of diplomatic missions in the Headquarters country of the Authority and in the Member States.

2) The privileges and immunities granted to the officers of the Niger Basin Authority are the same as those enjoyed by the officers of diplomatic missions in the Headquarters country and in the Member States.

SECTION VII - Miscellaneous provisions

Amendments and Revisions

1. Any member State can call for amendment or revision of this Convention.

2. All proposals for amendment or revision are addressed to the Chairman of the Council who communicates same to the Member States, latest, sixty days after their receipt.

3. Any amendment or any revision of this Convention shall come into force under-the same conditions as the Convention itself.

Article 18:

Termination

1. Any Member State may denounce the Convention after expiry of a period of ten (10) years starting from the date of its coming into force.

2. The termination shall be consummated in the form of a written notice addressed to the depository Government which shall acknowledge receipt of the notice and inform the Governments of the other Member States accordingly.

3. The termination shall take effect a year after the date of receipt provided the notice of termination had not been previously withdrawn. It shall not derogate, except where there is prior contrary agreement, from commitments on a program of studies, projects or other commitments, on which an agreement had been signed before the termination.

4. The Member State is expected to honor all the obligations entered into by virtue of this Convention and emanating from its capacity as member before the effective date of the termination.

Article 19:

The Depository Government

The Convention and all the instruments of ratification and membership shall be

deposited with the Government of the Republic of Niger which shall forward some certified true copies of them to all the Member States, notify them of the date of submission of the instruments of ratification and membership and register the Convention with the Organization of African Unity and the United Nations Organization.

Artricle20:

Settlement of Disputes

Any dispute that may arise between the Member States, out of the interpretation or application of this Convention shall be settled amicably through direct negotiations. Failing that, the dispute shall be brought by one of the parties before the Summit which shall give the final ruling.

Article 21:

Coming into effect

This Convention which revises and replaces the Convention signed in FARANAH on 21st November 1980, shall come into effect right from its ratification by two-thirds of the signatory Member States.

DONE IN N'Djamena on the 29th Day of October 1987 in only one original in French and in English, both texts being equally authentic.

For the President of the People's Republic of BENIN

His Excellency SOULEY DANKORO

Minister of Equipment and Transport

For the President of FASO

For the President of the Republic of CAMEROON

His Excellency SADOU HAYATOU

Minister of Planning and Territorial Administration

For the President of the Republic of COTE D'IVOlRE

For the President of the Republic of GUINEA

His Excellency JEAN TRAORE

Minister of Foreign Affairs

For the President of the Republic of MALI

His Excellency General MOUSSA TRAORE

For the Republic of NIGER

His Excellency HAMID ALGABID

Prime Minister

For the President of the Federal Republic of Nigeria

His Excellency Major General MG NASCO

Minister of Agriculture, Water Resources and Rural Development

The President of the Republic of CHAD

His Excellency EL HADJ HISSEIN HABRE

APPENDIX 6

Summary of Data on Surface and Ground Water in the Niger Basin

Surface Water

In the Upper Niger, it has been observed that the average inter-annual flow volume at Koulikoro (Mali) of 1,350 m3/s (average 1929-1970) or 42 billion m3/year is now only around 1,039 m3/s (average 1971-2002) accounting for approximately 33 billion m3/year, or a decrease of 23%. This trend for flows to decrease on all tributaries is closely correlated with the fall in rainfall observed since the 1970s.

The hydrological functioning of the Inner Delta is largely dependent on the flows from the basins of the Upper Niger basins, its tributary Bani and its own morphological and hydro-climatic conditions. The significant losses of water, in particular to the ecosystems of the Inner Delta (principally by evaporation and infiltration), reach approximately 20 billion m3 in a wet year, 13 billion m3 in an average year and 11 billion m3 in a dry year. The contributions of the zone itself, which are extremely modest (direct precipitation into lakes and run-off), do not offset the zone's natural water losses. The average loss is 38% of input (calculated using the stations of Ke-Macina, Douna and Dire over the period 1953-2005). Average annual agricultural withdrawals in the zone are currently 3.2 billion m3, (2.7 billion m3 for the Niger Office), or almost 12% of the flow volume per year in a dry decade.

In the Middle Niger, most tributaries have a temporary regime (exception: la Sota), which is a very considerable restriction, aggravated by low rainfall, particularly in the north of the

zone. The Niger's average interannual flow rate at Niamey between 1971 and 2002 was 704 m3/s only compared to 1062 m3/s for the period of 1929-11970, that is, an overall fall of around 34%. The flow is permanent but can reach very low values at low-water times. We can mention the complete halt of surface flow of the Niger for one week in June 1985 at Niamey; the population of Niamey was supplied with water through a small temporary dam constructed in the bed of the river.

In the lower Niger, the problem of availability of surface water arises mainly in the Upper Bemoue, where severe water shortages are recorded. In fact, the Mayo Kebi basin (3 billion m3), has zero flow rate on its tributaries: for 4 to 6 months on the Mayo Louli (which also has violent floods), for 4 to 5 months (from December to May) on the Mayo Oulo; zero flows can also be observed on the Mayo Kebi, but its low water levels are generally sustained by the emptying of lake Lere. Like the Upper Niger and Middle Niger, the Lower Niger is experiencing significant falls in flow. The average for 1929-1970 was 6,055 m3/s compared to 5,066 m3/s (1971-2001), that is, a decrease of approximately 17%.

Ground water

The little-known ground water resources are currently an important issue for the Niger basin, where less than 60% of the population has sufficient access to drinking water. Currently, over 75% of the basin's drinking water comes from ground water, which therefore properly supplies approximately 45% of the population. The data on ground water relating to national portions of the basin are almost non-existent.

Village water supply essentially uses aquifers in intermittent environments in the zones concerned. As the water depth and average flow rate for drill-wells tends to be heterogeneous, the specific flow rates and the failure rates of drilling are highly variable (30 to 70%).

Generally in the Niger basin, ground water, with few exceptions, has acceptable physical and chemical characteristics. The large majority of the population uses it, not only for their own supply, but for supplying livestock and in some· cases for small-scale irrigation.

Climate Variability

Studies on climate variation throughout Western Africa and information provided by the various national reports (NAP) show a significant decline in the volume of annual precipitation and the duration of rainy seasons. This insufficient rainfall situation even in forest or coastal regions of the basin has led, since 1970, to a serious hydro-ecological imbalance characterized by a reduction in surface flow of approximately 20 to 50%, with sometimes severe low-water levels, going as far as the stopping of flow, for example from Bani to Douna (Mali) in 1983, 1984 and 1987 and from Niger to Niamey in 1985.

Due to the aridity prevailing over the majority of the basin, the availability of water and its distribution in time and space play a major role in the changes to ecosystems and to the development of the basin. It is in response to this drought and its implications that the major development program for the River Niger Basin was developed through the planned construction of three new, large multi-use dams: Fomi (Guinea), Taoussa (Mali) and

Kandadji (Niger). Whilst it is undeniable that these structures secure water availability and support the low-water level, a permanent system for monitoring their impact still needs to be implemented to support the Environmental and Social Management Plan (ESMP) for each dam. In addition to this pressure on water resources, in recent years climatic variability and change have come into play in a context of high population growth and varied productive activities, leading to repercussions on the basin's natural environment and its ecological diversity.

Source: NBA/GEF: SAP (2011-2027) Document

APPENDIX 7

INTERVIEW WITH NBA'S TECHNICAL DIRECTOR

DR. ABDOU GUERO

On Tuesday 4TH September 2012

AT THE TECHNICAL DEPARTMENT NIGER BASIN AUTHORITY, NIAMEY NIGER REPUBLIC

Thank you sir for your time, as mentioned in my letter of introduction I am a student doing a research on the topic: Assessment of the Risks of Climate Change Induced Inter-riparian Conflict over the Niger River of West Africa. The research project is inspired by the concerns that climate change is likely to adversely affect the availability of water resources in West Africa.

Interviewer: Sir what is the situation of water availability in the Niger River in the last two decades?

Respondent: The data on the situation of water in the Niger River indicate that the river discharge has been declining since around 1969/1970 to date in all the stations where we collect data i.e. here in Niamey, in Mali other stations. There is a decrease of rainfall of about 15-20% and the flow has also decreased by 50 to 55%. However research has shown that, in past that is the distance past, there were periods where severe variations had occurred. For example paleonto-climatic data have shown that there were periods of very long drought, even my PhD research is on that. So, what is happening now is not new.

Interviewer: So, what can this decline in rainfall and the river discharge be attributed to?

Respondent: Yes climate change has impacted on the water resources of the Niger River. As I mentioned to you this is not something new, climate variability have happened over the Niger even many thousands years ago, that means the natural variability of the climate can also cause the decline and it will continue to happen most especially that population is increasing and the demand for water is also increasing. And global warming will also make evaporation to increase and that means decrease in the water in the Niger. You will meet the director of climatology and you can get all the details on climate change from them.

Interviewer: So if I understand you sir it means it is caused by the natural climate variability and the man-made climate change?

Respondent: Yes.

Interviewer: As you know this is a research work I will need data to back up my findings…

Respondent: Yes, you will meet the Heads of the departments to collect the data that you need.

Interviewer: Thank you very Sir

APPENDIX 8

INTERVIEW WITH HEAD OF NBA'S OBSERVATORY

Engineer Dessouassi Y. Robert

On Wednesday 5TH September 2012

Thank you sir for your time, as mentioned in my letter of introduction I am a student doing a research on the topic: Assessment of the Risks of Climate change Induced Inter-riparian Conflict over the Niger River of West Africa. The research project is inspired by the concerns that climate change is likely to adversely affect the availability of water resources in West Africa.

Respondent: Okay, we are happy to receive you to our organization, you are welcome.

Interviewer: Thank you sir. My first question to you sir is; as the head of the observatory Department, what is the situation of water availability over the Niger River?

Respondent: Yes, in terms of the records of rainfall in the Niger basin area, the data indicate a steady decline in the amount of rainfall in the basin area and the West African region as a whole. And this has affected the River discharge of the Niger as well, as you can see from the hydrograph behind you. That is indicating aggregate of the flow records of the Niger River from all the observatory stations of the NBA since 1960. As you can see, except for the few variations in some years, the trend is showing decline in water availability.

Interviewer: What is responsible for this decline?

Respondent: Well, there are several factors that we consider. First there is the natural variability factor. The climate from time to time varies considerably, but the most important

factor we are looking at is the climate change factor. This is because the changes we are observing have by and large continue on the same trajectory.

Interviewer: How confident are you that the changes are attributable to climate change?

Respondent: We very confident about that. Other centers have also made similar conclusions. So we are sure about this.

Interviewer: As you know in a research like this we will need some of the data you have to back up our findings of the study, can you make the data available to us?

Respondent: Yes, we can give you our data, but you are not train to handle the raw data that we have. You will need to have some coaching on how to make sense of the data we have and that will take some days to do.

Interviewer: That will be difficult do sir, because I don't have enough resources left to stay for much longer.

Respondent: Well unless you will make use of the summary of the data which I think can sufficient for your purpose.

Interviewer: That may be enough for our purpose.

APPENDIX 9

INTERVIEW WITH HEAD OF NBA'S PLANNING AND STUDIES

Dr. Henri-Claude Enoumba

On Thursday 6TH September 2012

Thank you sir for your time, as mentioned in my letter of introduction I am a student doing a research on the topic: Assessment of the Risks of Climate Change Induced Inter-riparian Conflict over the Niger River of West Africa. The research project is inspired by the concerns that climate change is likely to adversely affect the availability of water resources in West Africa.

Interviewer: Sir, my first question is on the impacts of climate change over the Niger, what is the situation over Niger River basin?

Respondent: So, I wanted to say that, let us have a sort of frame to tackle this. So if you say watershed, eco-system services I am used to that, because water is just the main commodity, but we also have climate which induce…water regulate; you have provisional, you have also regulatory service where the climate and all this regulation…then you have also supporting services also all this soil formation, degradation and nutrient. Then you have cultural services, because some people have the river where they do ecstatic as parts of their culture like you have the festival in Calabar. All of these are combine to indicate the problem you are talking about with climate change…. To solve all these problems you have sustainable development and long term development, I hope you understand the difference between the two in order to be resilient. It is an intergenerational thing that is you have to plan for the children. So when we start we usually make assessment study on how it will be

sustainable…so that is why adaptation comes in. adaptation came to include all generations, this one and the next one; we have to have new behavior to adapt to the future which simply means that, instead of talking about conflict generation now climate change comes to make us resistance to all around to the future. This is the main difference. Now when we come to see climate change roadmap for Africa, UNECA has developed a roadmap for Africa, that roadmap has emphasized on model, because model will…the roadmap of UNECA I can give it to you. So the roadmap is very clear and in the roadmap they say we have to base on models projections and scenario…you can understand that, it is crucial to have very clear understanding assumptions and to understand the uncertainties to the use of those assumptions. If you come to NBA, in the case of NBA we are nine countries and you can even understand that, there is no one fit model, it has to be case by case and we are nine countries. So to build confidence and to avoid conflict, first the tools we have to use….we don't have to have an optimal scenario…in our sustainable development we have said we need three dams…but we are working with uncertainties and those assumptions and unfortunately we accept all those assumptions…..

So it means to avoid conflict data collection is crucial in a coalition….so we have to prepare through adaptation to avoid conflict.

Interviewer: What can we say exactly is the situation on the impacts of climate change over the Niger basin?

Respondent: The situation is critical….sometimes you cannot say exactly how things are. As I said you are working on uncertainties.

Interviewer: Okay sir. But can you provide us with any kind of data that you think will help us with our research from your department?

Respondent: I can give you all the data that you need.

Interviewer: Thank you sir. However, specifically we need data on all the dams that over the Niger River including those that are under construction or are in the pipeline before 1990 and the period after 1990 up to date.

Respondent: We don't have the data on the exact number of dams. But I can refer you to a website that can help you with that.

Interviewer: That will be okay. Thank you sir.

APPENDIX 10

INTERVIEW WITH NBA'S HYDROLOGIST

Mr. Ibraheem Olomoda

On Tuesday 4TH September 2012

Thank you sir for your time, as mentioned in my letter of introduction I am a student doing a research on the topic: Assessment of the Risks of Climate Change Induced Inter-riparian Conflict over the Niger River of West Africa. The research project is inspired by the concerns that climate change is likely to adversely affect the availability of water resources in West Africa.

Interviewer: Thank you sir for the warm hospitality. Sir in view of the threats posed by climate change to the availability of environmental resources, my first question on the situation of water availability over the Niger basin, what is the situation?

Respondent: First let me refer you to m paper which I wrote for the general meeting of WINN. In it I said it all that the Niger is drying up and we have very reason to be concerned about this situation. So in short the situation is bad and is getting worse.

Interviewer: why is it getting worse?

Respondent: The main reason of course is climate change. Let me give that paper I wrote. You will see everything in it.

Interviewer: As a hydrologist, if this situation continues what do you think will happen in the coming years?

Respondent: I have said it all in my paper. As it is now the countries are all rushing to build dams, and this will affect Nigeria. They are building dams everywhere-you have the Fomi dam, the Salengi dam and several others. So the situation is bad.

Interviewer: Okay sir, if the situation is attributed to climate change, what do you think need to be done to halt or even reverse the situation?

Respondent: I think the governments of the basin must sit up to this challenge. And the NBA is putting up some measures to tackle the situation, if you get our Strategic Action Program you will see what we intend to put in place.

Interviewer: Okay thank you sir

APPENDIX 11

INTERVIEW WITH NBA'S LEGAL ADVISOR

Mr. Drissa Naman Keita

On Monday 3rd September 2012

OPENING REMARK

Thank you sir for your time, as mentioned in my letter of introduction I am a student doing a research on the topic: Assessment of the Risks of Climate change Induced Inter-riparian Conflict over the Niger River of West Africa. The research project is inspired by the concerns that climate change is likely to adversely affect the availability of water resources in West Africa.

Respondent: Yes thank you.

Interviewer: I have three categories of questions for you.

Respondent: I will take all the questions and then I will respond to them.

Interviewer: The first category has to do with the past interactions of the nine member countries of the NBA.

Interviewer: How have the interactions of the member countries of the Niger River basin been interacting in the past? Are there for example any incidences of disputes or any kind of problem between these countries?

Interviewer: The second category concerns the rule books of the NBA:

Interviewer: How comprehensive is the Convention and the Water Charter of the Niger River basin in terms of for example the allocation of the water resources of the Niger River between the countries?

Interviewer: Another one is that, I have read all the documents but I have not come across any form of sanctions that can be applied to any member country that decide to break the rules, are there any sanctions for non-compliance to the rules against any member? Or is the treaty rule just a 'gentlemen agreement'?

Interviewer: The third category has to do with the relationship between the NBA and the member countries of the Niger River basin.

Interviewer: Is there any kind of problems between the NBA any member terms of non-compliance to the guidelines of the NBA?

Interviewer: I also have other questions that I want ask, so can we take them now or do leave them to when we are done with those that I have asked so far?

Respondent: No let us answer these ones first. What is your name again?

Interviewer: O.k. My name is Daiyabu Muhammad Hassan

Respondent: Thank you for the interest you have over the Niger River basin. Let me provide a background before I answer the questions. The first effort to bring together the countries of the Niger basin has a long history, i.e. since the colonial time. The first colonial exercise to bring them together was aimed at carrying out what is called development studies

that was after the Berlin Conference of 1884. That was to facilitate navigation on the Niger and Congo Rivers.

So currently the nine riparian countries that are members of the NBA are Benin, Burkina Faso, Cameroon, Chad, Côte d'Ivoire, Guinea, Mali, Niger, and Nigeria. And the first attempt to have an agreement between them came about in October 1963, called the Niamey Act relating to navigation. This agreement was primarily meant to organize navigation. Then they decided to establish an intergovernmental organization that will intensify cooperation between them. That is to implement and coordinate their activities and to ensure the development of the basin. Then one year after in 1964 the countries came together again in to sign the agreement called the Niamey accord. And established the Niger River Commission in November 1964 with the main objective of facilitating navigation and transportation on the Niger River and also to enhance the integrated development of the River in terms economic activities, communication etc.

However in 1980 the objectives of the NBA were elaborated, and the NBC was converted into the NBA to enable it facilitate the new objectives. The first is to coordinate national policies of water development of all the member countries. The second one is to coordinate the integrated development of the basin. The third one is to participate in the drawing up of projects; common projects that interest at least two countries. The last one is to facilitate financing of projects. However the outcome of that objective has not been realized because of the absence of the political will from the member countries. So in 1987 the Convention was revised in order to realize the objectives by remaking the NBA into a holistic organ under the idea of a share vision.

Now to your questions, the relationship between the countries of the Niger River basin has been cordial there are no problems between them all through. Even the disputes between Nigeria and Cameroon are dispute over territory which has nothing to do with water resources of the Niger. The same thing is with the dispute between Niger and Benin over the ownership of the Lete Island. And all these have not affected their relationship over the Niger River. The Water Charter is meant to ensure the coordinated development of the water resources of the Niger, and all the countries have signed it. And one of the principles of the Charter is to ensure the equitable use of the water resources. And for any country to carry out any project it has to notify the Authority and all the other countries.

Interviewer: I read an interview in which it was stated that Nigeria has not informed the NBA over the dredging project of the Lower Niger which it is undertaking, can you confirm that? And what was the response of the NBA to that?

Respondent: Yes, it is true, but you know we are in international relations, when a country engages in a project we expect it to respect its obligations. If a country did not notify the NBA we will write to the country to ask the country to respect its obligation, that's it.

Interviewer: So, what if Nigeria makes the claim that it did not inform the NBA because it is the last riparian country and that its activities will not affect any other country?

Respondent: The claim that the project will not affect other riparian states is not tenable, because the project will increase the dimension of the river and the water flow to Nigeria will increase and this will invariably affect the other upstream countries.

Interviewer: So, what do you think is the implication of this action by Nigeria? Being the biggest country in the basin and the last downstream country, what if another country for example Guinea the first upstream country decides to do something similar?

Respondent: No no, the role of the NBA is to mediate at the instance of the Water Chart we will do everything to make the country understand and cooperate and Nigeria has rectified that, by sending a notification on the project on erosion control… Also Niger has notified on its project to construct the Kandadji dam in November and all the countries have replied remaining Nigeria….

Interviewer: As a student of international politics the way I see things might not be the same with the way you see the same thing. For example the problem of water scarcity is increasing; there is increase in demand due to population increase and improvement in the standard of living of people and more importantly the issue of climate change generating the problem of supply induced scarcity, I feel that unless there are clear provisions which stipulate the quantity each country is to withdraw in the form of allocation and there are clear sanction mechanisms in the laws, then it is likely that there may be some problems in the future or if a country for example Guinea decides to withdraw from the treaty what will happen?

Respondent: No, you see all the countries of the Niger basin are poor with exception of Nigeria and Cameroon therefore they are obliged to work together. Even if a country decides to go out of the treaty it should recognize its obligation. Right now we are conducting a study, the aim of which is to arrive at a legal instrument which will make all the countries to

coordinate the management of all the dams of the Niger River which lead to the allocation of water in the river according to the flow. And we will come up with rules to take care of the periods of flood and during scarcity.

Interviewer: How soon will that be in place?

Respondent: We are conducting the study…. The relationship of countries of the Niger is very good….

Interviewer: what are challenges that the NBA faces in executing her mandate?

Respondent: The most important problem we have is the problem of contribution and the Summit of Heads of State will try and find a new mechanism for autonomous financing for the NBA.

Interviewer: Okay, I don't know if you have additional document that will be helpful to our research?

Respondent: I can give you our document on our strategic action program. You will see what the NBA is planning to do. I am sure you will have all the answers you need there.

Interviewer: Thank you very much for your time

Respondent: Thank you

APPENDIX 12

INTERVIEW WITH THE EXECUTIVE SECRETARY OF THE NIGER BASIN AUTHORITY

Major General Collins Ihekire (rtd).

On Friday 7th September 2012

Let me start by expressing my gratitude to you sir for granting us the permission to conduct our research in your organization and also for the wonderful hospitality offered to us. Sir as mentioned in my letter of introduction my research topic is entitled: Assessment of the Risks of Climate Change Induced Inter-riparian Conflict over the Niger River of West Africa. And the research project is purely for academic purposes.

Interviewer: Sir there is a growing concern across the world that shared or international water courses are likely to become sources of inter-riparian disputes and conflicts in the coming decades. And the argument is put that unless international waters are govern by treaty agreements that are resilient to new challenges like the threats posed by climate change, the disputes that may arise in some international watercourses will degenerate into conflicts. And having gone through the legal instruments that govern the inter-riparian interactions of the Niger Basin it appears to me that one of important principles that help to reduce tension in riparian states' water interactions that is the allocation of the resources by country is not contained in the NBA's Convention or Water Charter. Will it be correct to describe the current arrangement of water sharing of the Niger River between the riparian states as one that is based on a gentlemen's agreement?

Respondent: Well, thank you for your interest in the NBA. With regard to the issues you raised, let me first of all say that it will not be correct to describe the current arrangement

among the countries that share the water resources of the Niger basin as defective. This is because, the NBA as the organization that oversees the affairs of the Niger basin has evolved over the years and throughout these years of its evolution, a lot of improvements have been made with regards to the rules governing the activities of member states; from the mandate of the Niger River Commission to now the NBA we have not had any serious incidence of disputes over the sharing of the water resources of the Niger basin between the states. All the states have largely cooperated with us we have no reason to be apprehensive from what some describe as impending problems. Even the issue about climate change we are fully aware of what it might bring and we have put in place several mechanisms that we are confident will help ameliorate any problem that may arise in the future.

Interviewer: But sir, don't you think it will be better to have in place an arrangement that clearly spells out what each country is allowed to take out of the Niger based on what is available than to rely on the good relationships of the states since it is difficult to predict what will happen in the future?

Respondent: Yes, as I mentioned we have our own arrangements to take care of what may come in the future. For example under our Strategic Action Program our emphasis is on the development of the resources of the basin as a whole for the benefit of all the member countries and that includes the sharing of benefits between the states such as in projects that may affect two or more countries, the state concerned will have to make provisions in such a way that the benefits that may accrue from the project can be beneficial to other states as well. We are confident that this will help enhance the cordial relationship that exists between all the countries of the Niger basin.

Interviewer: In an interview granted by your predecessor to the Punch newspaper in Nigeria, he stated that Nigeria did not inform the NBA about its project of dredging the Lower Niger which is an infringement of the rules of the Niger Basin Authority, I am referring to the requirement of the member countries to inform the NBA on projects that they intend to carry out. What have your organization done to call Nigeria to order?

Respondent: Well the issue has been rectified, a letter was sent to us by the Nigerian authorities notifying us on the dredging project. I will make a copy of the letter available to you. So that problem has been solved.

Interviewer: Okay sir. Thank you very much for your time and for all your assistance to us. We are very grateful.

Respondent: Thank you too.