

**ENVIRONMENTAL ETHICS CHALLENGES IN THE CASE OF CONGO
BASIN DEFORESTATION: A THEOLOGICAL ETHICAL PERSPECTIVE**

by

DIDIER NGANGANI BUWANI

Submitted in accordance with the requirements
for the degree of

MASTER OF THEOLOGY

in the subject

THEOLOGICAL ETHICS

at the

UNIVERSITY OF SOUTH AFRICA

SUPERVISOR: PROF RTH DOLAMO

JUNE 2017

DECLARATION

Student number 5571-889-2

I declare that ENVIRONMENTAL ETHICS CHALLENGES IN THE CASE OF CONGO BASIN DEFORESTATION: A THEOLOGICAL ETHICAL PERSPECTIVE is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

Signature

A handwritten signature in black ink, appearing to be 'B. Smith', written in a cursive style.

Date: 2017- 06 - 10

DEDICATION

I dedicate my dissertation to:

All the persons of good will and those who are able to help other persons to fulfil their dreams without any profit.

Lievin BUWANI, my father (who passed away in 1985) and Christine MAYELEBE, my mother for their love.

ACKNOWLEDGEMENTS

I would like to express my gratitude to the people involved in the completion of my Master's dissertation. Firstly, I thank God my Creator for the breath of life and the strength He has given me.

I am grateful to Prof. Dr Ramathate Dolamo, my supervisor who taught me the pathway towards an ethical theology. He guided me through a multidisciplinary process that covers literature in theology, creation, environment and ecology. I learned and acquired an excellent experience in the field of ethics from him.

My gratitude goes also to Professors E. Gaziaux, J. Geldhof and D. Yves of the Department of Katholieke Universiteit Leuven and Louvain-la-neuve (Belgium), and T. Kibanga, R. Mika, S. Muyengo, A. Kabasele, L. Santedi, D. Nshole, M. Libambu, B. Fansaka, P. Buetubela, R. Mugaruka, F. Mapwar and M. Malu of the Department of Theology at the Catholic University of Congo (DRC), who initiated and offered me a theological base.

I am indebted to Fathers John Maneschg, Jeremiah and Mario of the Comboni House in Johannesburg for their spiritual and material support when I need it. I am grateful to all members in the Department of Philosophy, Practical and Systematic Theology at Unisa and to my personal librarian Ms Elsabe Nell and all the library assistants for showing me the resources that have been important for my dissertation. I owe my gratitude to the financial service of the University of South Africa for their assistance.

I deeply thank these persons: Joel Maseki, Patience Lukeso, Baudouin Mukabi, Nazaire Nduku, Bienvenu Boleko, Deo Bikopo, Senghor Papa, Giselle Buwani, Kadia Prigol, Sisters Maria De Lurdes, Thérèse Musau, and Melanie for their support and assistance.

Pretoria, 10th June 2017

DIDIER N BUWANI

1. SUMMARY

Environmental issues such as climate change, deforestation, loss of biodiversity are of concern worldwide. Several conflicts on environmental resources management are raised between governments, multinational companies and the local population. Particularly in developing countries, natural resources management is one of the crises where most experiment takes place. Lack of natural resources management can cause war and contribute to poverty. As is observed in the indigenous population of the Congo Basin. This research project aims to investigate the causes of deforestation in the Congo Basin and the environmental ethics challenges, when the researcher focuses on the policies related to the forest management in the region. A consideration of the ethical aspects is motivated by the fact that indigenous communities depend directly on the forests' services and resources, and therefore are the most affected by the impact of deforestation. To establish an ethics on the participative approach on forest management could strengthen collaboration between local communities, multinational companies and government.

2. KEYWORDS:

Environmental Ethics; Challenges; Congo Basin; Deforestation; Theological; Ethical; Perspective.

3. LIST OF ABBREVIATIONS

- AIDS - Acquired Immunodeficiency Syndrome.
- AU - African Union.
- CARPE - Central African Regional Program for the Environment.
- CBFF - Congo Basin Forest Fund.
- CBFP - Congo Basin Forest Partnership.
- CDSC - Compendium of the Social Doctrine of the Church.
- CIFOR - Center for International Forestry Research.
- CoFACCA - Congo Basin Forest and Climate Change Adaptation.
- COMIFAC - Forestry Commission of Central Africa.
- CO₂ - Carbon Dioxide.
- Deut - Deuteronomy.
- DRC - Democratic Republic of Congo.
- Ezek - Ezekiel.
- FAO - Food and Agriculture Organisation of the United Nations.
- FSC - Forest Stewardship Council.
- Gen - Genesis.
- GHG - Greenhouse gas.
- Heb - Hebrews.
- HIV - Human Immunodeficiency Virus.
- IPCC - Intergovernmental Panel on Climate Change.
- Jn - John.
- Lk - Luke.
- Matt - Matthew.
- MECNT - Ministry for Environment, Nature, Conservation and Tourism.
- MODIS - Moderate Resolution Imaging Spectroradiometer.

- Phil - Philippians.
- Ps - Psalm.
- REDD+ - Reducing Emission from Deforestation and Forest Degradation Plus.
- UDHR - Universal Declaration of Human Right.
- UN - United Nations.
- UNEP - United Nations Environment Program.
- UNFCCC - United Nations Framework Convention on Climate Change.
- UNISA - University of South Africa.
- US - United States
- UV - Ultraviolet.
- WCED - Wold Commission on Environment and Development.
- WWF - World Wildlife Fund.

TABLE OF CONTENTS

| | |
|--------------------------------|------------|
| DECLARATION | i |
| DEDICATION | ii |
| ACKNOWLEDGEMENTS | iii |
| 1. SUMMARY | iv |
| 2. KEYWORDS : | v |
| 3. LIST OF ABBREVIATIONS | v |
| TABLE OF CONTENTS | VII |

CHAPTER 1. GENERAL INTRODUCTION AND THE KEY CAUSES OF THE DEFORESTATION OF THE CONGO BASIN 1

| | |
|--|----|
| 1.1. Introduction..... | 1 |
| 1.2. Study contribution and motivation | 1 |
| 1.3. Aim & Objectives | 2 |
| 1.4. Research Hypothesis | 3 |
| 1.5. Methodology | 3 |
| 1.6. Limitation..... | 3 |
| 1.7. Research Delimitation..... | 3 |
| 1.8. Chapter outline..... | 4 |
| 1.9. Research Ethics | 4 |
| 1.10. Literature Review..... | 5 |
| 1.11. Congo Basin description and Rainforest Ecosystem | 12 |
| 1.11.1. Biodiversity aspect | 14 |
| 1.11.2. Forest Management | 15 |
| 1.12. Ecological role of the Forest | 20 |
| 1.12.1. Fuel wood | 20 |
| 1.12.2. Climate Regulation | 21 |
| 1.12.3. Livelihood of the local population | 23 |
| 1.13. Causes of Congo Basin Deforestation | 24 |

| | |
|--|-----------|
| 1.13.1. Agriculture Sector | 25 |
| 1.13.2. Construction of the Road..... | 26 |
| 1.13.3. Charcoal Collection | 27 |
| 1.13.4. Logging Sector | 28 |
| 1.13.5. Mining sector..... | 29 |
| 1.13.6. Ethical Aspect | 30 |
| 1.14. Conclusion | 32 |
| CHAPTER 2. ETHICAL CHALLENGES TO THE ENVIRONMENT | 33 |
| 2.1. Introduction..... | 33 |
| 2.2. The Impacts of Industrialisation on the Environment and the Ecological crisis ... | 33 |
| 2.2.1. Global warming | 34 |
| 2.3. Indigenous Communities’ role in the Protection of the Congo Basin | 36 |
| 2.3.1. The Role of Indigenous Communities..... | 36 |
| 2.3.2. The Rights of Indigenous Communities..... | 38 |
| 2.3.3. The virtue of equity | 39 |
| 2.3.4. The Principle of Sustainability | 40 |
| 2.4. From Injustice to Justice | 42 |
| 2.4.1. Climate Change: Myth or Reality?..... | 44 |
| 2.4.2. Climate Change Justice | 45 |
| 2.4.4. Climate Change and Migration | 53 |
| 2.4.5. Climate Change Action | 54 |
| 2.5. Dominant Religions’ Response to Climate Change | 56 |
| 2.5.1. Christianity and Climate Change | 56 |
| 2.5.2. Buddhism and Climate Change..... | 61 |
| 2.5.3. Hinduism and Climate Change..... | 64 |
| 2.5.4. Judaism and Climate Change | 66 |
| 2.5.5. Islam and Climate Change..... | 67 |
| 2.6. Conclusion | 69 |
| CHAPTER 3. ETHICAL THEOLOGY OF CREATION | 70 |
| 3.1. Introduction..... | 70 |
| 3.2. Creator and creation..... | 71 |
| 3.2.1. The Care of Creation | 74 |
| 3.2.2. The Protection of the creation | 76 |
| 3.3. Root of creation stewardship in the Bible..... | 78 |
| 3.4. Steward Responsibility | 79 |

| | |
|---|----|
| 3.5. Theology of the creation | 80 |
| 3.5.1. Human beings and Nature | 84 |
| 3.5.2. Safeguarding Creation | 85 |
| 3.5.3. Management of Nature | 87 |
| 3.5.4. Natural Environment and Peace | 88 |
| 3.5.5. Natural Law | 91 |
| 3.6. Social Doctrine of the Catholic Church..... | 93 |
| 3.6.1. Roman Catholic Church and Climate Change | 94 |
| 3.6.2. Human Dignity | 96 |
| 3.7. Conclusion | 97 |

CHAPTER 4. CONCLUSION AND RECOMMENDATIONS FOR ETHICAL NORMS..... 99

| | |
|---|-----|
| 4.1. Introduction..... | 99 |
| 4.2. Protection of the Environment..... | 100 |
| 4.3. Contributions of Indigenous Communities..... | 101 |
| 4.4. Rights of Indigenous Communities | 102 |
| 4.5. Climate Change Impact and Recommendations..... | 105 |
| 4.6. Reduction of Global Warming..... | 107 |
| 4.7. Reforestation | 109 |
| 4.8. Recycle, Reduce and Re-use..... | 111 |
| 4.9. Use of Renewable Energy..... | 113 |
| 4.10. Environmental Ethics and the Future Generations | 115 |
| 4.11. Climate Change and Prosperity | 116 |
| 4.12. Climate Change and the Rights of Future Generations | 117 |
| 4.13. The Care for Future Generations | 119 |
| 4.14. Ethical Norms for Environmental Ethics..... | 120 |
| 4.15. Climate Change and Moral Obligation..... | 122 |
| 4.16. Lessons and Education for a Sustainable Future | 124 |
| 4.17. Critical Aspects..... | 125 |

| | |
|---|------------|
| 4.18. Conclusion | 128 |
| 4.19. GENERAL CONCLUSIONS: AN EPILOGUE | 130 |
| BIBLIOGRAPHY | 132 |

CHAPTER 1

GENERAL INTRODUCTION AND THE KEY CAUSES OF THE DEFORESTATION OF THE CONGO BASIN

This chapter gives an overview and a geographical aspect of the Congo Basin countries; it will include the study contribution and motivation. In addition, Congo Basin rainforest ecosystem will be described by underlining the ecological role of the forest. Lastly, several causes of the deforestation of the Congo Basin will be analysed and discussed.

1.1. Introduction

In Central Africa, the Congo Basin forest is a great opportunity for its population it is classified to be a quarter of the world's tropical rainforest. Through its ecological functions such as the climate regulation, the forest plays a key role in supporting human life and the biodiversity. However, unfortunately, the Congo Basin forest is subject of massive deforestation. This deforestation leads to several consequences like the loss of biodiversity, desertification and flooding. In developing countries, major causes of the deforestation are: agriculture, road construction, charcoal collection, logging sector and mining sector. As the forest provides many resources for our own survival, the necessity to protect it becomes an obligation at local and international levels. To do so ethical considerations and proper forest management will be required.

1.2. Study contribution and motivation

The Congo Basin is geographically located in Central Africa and is one of the most important tropical rainforests which covers six countries including Democratic Republic of Congo, Gabon, The Republic of Congo, Equatorial Guinea, The Central African Republic, and Cameroon.

To date, many complaints have been lodged from local communities of the Congo Basin about mismanagement of the forest. The local population is deprived of the forest resources by multinational companies. This situation is worsened by the lack of legal regulation in protecting local population from multinational companies' activities in the

sector. For centuries, the local population in the Basin of Congo was living there with a low ecological footprint. The indigenous knowledge has contributed in the good management of the forest, currently; deforestation is increasingly observed and has challenged. The causes of the deforestation:

Are complex and cannot easily be reduced to a few variables the interplay of several proximate as well as underlying factors drives deforestation in a synergetic way. Expansion of subsistence activities (agriculture and wood collection) is the most commonly cited proximate cause of deforestation in the Congo Basin (Megevand, 2013: 3).

Indigenous communities depend directly upon goods and services from the forest. As the deforesting is taking place, these communities are facing several challenges.

This investigation could contribute to the good management of forest, based on the sustainable development principles. Such management will bring balance between natural resources exploitation by multinational companies and the wellness of the local population. A prominent critic who discussed the causes of deforestation is Megevand. This researcher states that “agriculture and wood collection” represent the main causes of the deforestation in the Congo Basin (Megevand, 2013: 3). It is therefore important to analyse the causes of the deforestation in the Congo Basin and the effectiveness of the environmental laws for the implementation of proper policies. Establishing an environmental ethics could strengthen collaboration between local communities, multinational companies and government. The most significant output of this research project could help decision making in implementing forest management policies based on sustainable development philosophy.

1.3. Aim & Objectives

The aim of this research is to investigate the ethics challenges and key environmental issues as expressed by the local population concerning the deforestation of the Congo Basin.

The following objectives will be addressed:

- To identify the causes of deforestation
- To analyse the legal documents and describe the ethical gap of these policies in protecting local population against the impact of deforestation
- To determine ethical values which can promote good management focusing on equilibrium between goods and services as provided by the forest
- To recommend good forest management practices based on ethical values.

1.4. Research Hypothesis

In addressing the issues as raised by the deforestation of the Congo Basin, the main hypothesis of this project examines whether the local and international policies in forest management consider the local population's interests or not. Has the current system as established by international policies contributed in a better management of the forest?

1.5. Methodology

The main methodology in conducting this investigation will include the critical and ethical analysis focusing on the key environmental issue facing by the local population and potential policies for sustainable development. Ethical analysis will consist of collecting data within several legal documents related to the Congo Basin management and identifying the main policies of deforestation in the region.

1.6. Limitation

One of the important limitations in this study is that not much literature written by researchers in the Congo Basin is available. One of the few documents available is that by Megevand who focuses on the deforestation of the Congo Basin. Most of the documents on deforestation in the Congo Basin do not report on ethical issues as expressed by the population. The ethical analysis in this context is challenging based on the lack of information within the reports.

1.7. Research Delimitation

Though the Congo Basin covers many countries, this investigation will be limited to the context of the Democratic Republic of Congo forest management. The focus will be on

the policies and legal actions as undertaken by Congolese jurisdiction in protecting the interest of local population against the deforestation.

1.8. Chapter outline

This research will be divided into four chapters:

The first chapter will be the General introduction and the key causes of the deforestation of the Congo Basin.

The second chapter will focus on ethical challenges to the environment.

The third chapter will deal with the ethical theology related to the creation.

And the fourth chapter will conclude and will make recommendations on ethical norms in order to enhance local population's lives through a sustainable development philosophy.

1.9. Research Ethics

Today, the world is facing many conservation threats which endanger the environment. Human behaviour is determined by a sense of morality. Actions are dependent on ethical judgement. This dissertation discusses the deforestation in the Congo Basin, particularly in the Democratic Republic of Congo. This deforestation leads to many serious consequences, like the loss of biodiversity, climate change and pollution. Those consequences threaten people's lives. A code of ethics must be practised to safeguard the environment. Reduce mostly the emission of the carbonic gas or the greenhouse effect. The international community and government must take decisions to implement some measures to contain the threats. Therefore, Hans states:

Just as human kind's very future is threatened, the ethics of responsibility results in an imperative to human existence, man imperative is to be, and to lead a life worthy of being called human. The preservation of nature is the condition of our own survival (Hans, 1979).

The decision, we have to take must obviously be an imperative which allows us to tackle the threats we are facing.

1.10. Literature Review

God gave human beings responsibility to rule nature: “be masters over the fish of the sea, the birds of heaven, and all the living creatures that move on the earth” (Gen 1: 28). Human beings have the obligation to take care, to subdue and to protect God’s creation. Among all the species, human beings are the most important because God created them in his own image. That is the reason that justifies human beings’ responsibility towards creation.

In a Christian context, stewardship means that human beings must not damage the creation. Creation has been damaged in various ways and now threatened by severe damage on a global scale. But, Christian stewardship should be more than the avoidance of damage (Berry, 2000: 129). Human beings should not exploit nature in order to satisfy human need only. They are allowed to be God’s faithful stewards to care or tend creation, enabling it to fulfil its purpose. The Bible regards it as man’s duty to use nature, not to abstain from using it. But, he is supposed to use it like a son of God and in obedience to God’s will (Cooper & Carling, 1996:71).

We know that, “in the beginning, God created the heaven and earth” (Gen 1: 1). “The earth is the Lord’s and all that is in it, the world, and those who live in it” (Ps 24: 1). Human beings, must respect and care for creation because it is God’s creation. God is the source of creation (Toly & Block, 2010: 247). Furthermore, Pope John Paul II points out that:

Instead of carrying out his role as a co-operator with God in the work of creation, man sets himself up in place of God and thus ends up provoking a rebellion on the part of nature, which is more tyrannized than governed by him. Not only has God given the earth to man, who must use it with respect for the original good purpose for which it was given to him, but man too is God’s gift to man. He must therefore respect the natural and moral structure with which he has been endowed (John Paul II, 1991: n. 37-38).

However, human beings have dominion over creation. People have the duty to care for creation and use its goods in such a way that the needs of all people are met. Humans should safeguard creation not because it is God's or because it has an intrinsic value in itself, but because doing so will benefit humankind (Hart, 2004: 11.16). In this regard, the Presbyterian Eco-Justice Task Force suggests that our resources are part of elements of the creation that comes from God. He gives them graciously, not as property with which a few owners may do whatever they please, but as sources of sustenance for the whole human beings, which are to be kept with care (Presbyterian Eco-Justice Task Force, 1989: 5). Pope Benedict XVI wrote in the message for the celebration of the world day of peace that "if you want to cultivate peace, protects creation". According to Pope Benedict XVI, the respect for creation is of immense consequence, not only because creation is the beginning and the foundation of all God's works and its preservation has become essential for the pacific coexistence of mankind. But, man's inhumanity to man has given rise to numerous threats to peace and to integral human development (Benedict XVI, 2014: 38).

The environment is God's gift to everyone, and in our use of it we have a responsibility towards the poor, towards future generations and towards humanity as a whole. Reducing nature to a collection of contingent data ends up doing violence to the environment and even encouraging activity that fails to respect human nature (Benedict XVI, 2009: 48).

The major problems on which Popes John Paul II and Benedict XVI have written are the degradation of the Earth that is affecting vulnerable people today. And throughout their pontificates, they underscored the moral responsibility the faithful have to mitigate these adverse effects, in order to live in harmony with God's creation. The magisterium (Church authority body) speaks for the Catholic Church; theologians speak from the Church when addressing the loss of biological diversity, the degradation of ecological systems, threats to the biosphere, and their effects on humans. And theologians bring their specialised fields of inquiry to the service of the Christian faith by reinterpreting the language used so it adequately reflects the faith (Schaefer & Winright, 2013: XIX).

Human activity is affecting climatic and atmospheric change at a rate unprecedented in earth's history. Greenhouse effect and depletion of the ozone layer are the most visible example of these changes resulting in global warming (Desjardins, 1993: 80).

Today, it is impossible to deny the impact of the big threat like climate change. The issue of climate change is not only scientific, political and economic problem, but it is also an ethical concern. Christians have responsibility towards creation. In this regard, Pope Francis claimed:

Climate change is a global problem with grave implications: environmental, social, economic, and political and for the distribution of goods. It represents one of the principal challenges facing humanity in our day. Its worst impact will probably be felt by developing countries in coming decades. Many of the poor live in areas particularly affected by phenomena related to warming, and their means of subsistence are largely dependent on natural reserves and ecosystemic services such as agriculture, fishing and forestry. They have no other financial activities or resources which can enable them to adapt to climate change or to face natural disaster, and their access to social services and protection is very limited (Francis, 2015: n. 8).

Pope Francis' statement remains a general observation and He did not give specification in terms of examples. In the case of the Congo Basin, there is the indigenous population called "pygmies". The pygmies live in the forest and their livelihood depends on the forest. In most instances, the pygmies are neglected. As human beings they deserve the right to be protected.

Hence, we need to understand that the greenhouse effect is a problem. But, without some greenhouse effect, the earth would be much less hospitable for life as we know it. The problem is the enhanced, human induced greenhouse effect. It is not the greenhouse effect in isolation that causes the climate problem; it is an increase in the concentration of greenhouse gases that cause the warming. It depends on how the immediate effects of an increase in low frequency radiation play out in the overall climate system (Gardiner, 2010: 4).

Environmental degradation is a result of many people, some of whom are consuming too much, using powerful technologies that frequently damage nature's ecosystems, supported by economic and political systems that permit and encourage degradation (Horrell, 2010: 5). Therefore, what should we do? Can we remain indifferent before the threats of our planet, such as climate change, desertification, loss of productivity in vast agricultural areas, the pollution of rivers and aquifers, loss of biodiversity? (Benedict XVI, 2014: 41).

According to the researcher, Horrell and Benedict XVI are right when they observe that powerful technologies and climate change are threatening nature. It is important to take action in order to protect future generations against the impact of climate change. The problem is that those who are harming the world do not care. The decision makers need to exert pressure on them in order to change their behaviour.

Horrell (2010) sees the danger that is facing the world through the use of "powerful technologies". Pope Benedict XVI (2014) questions the behaviour of those who are using these powerful technologies. This research project highlights man's responsibility to reduce greenhouse gases in the atmosphere; to preserve the earth for future generations.

We ought to keep the creation as God keep us. The Lord blesses us and keeps us (Num.6:24-26); we in turn are expected to keep the earth like the Lord does for us (Gen 2: 15; Berry, 2000: 65-66). A similar view is presented by the Pastoral Constitution on the Church in the modern world *Gaudium et Spes* who states that:

man was created to the image of God, is capable of knowing and loving is creature, and was appointed by Him as master of all earthly creatures that he might subdue them and use them to God's glory (*Gaudium et Spes*, 1965: n. 12).

Scientific literature has underlined many factors contributing to the development and agriculture in the Congo Basin. Congo Basin is home to more than twenty four million people, most of whom depend on the forest for their livelihoods. The livelihood of these people is under threat by the loss of the forest (CBFP, 2006).

The relationship of indigenous peoples to their lands and resources deserves particular attention, since it is a fundamental expression of their identity. Due to powerful agro-industrial interests or the powerful processes of assimilation and urbanization, many of these peoples have already lost or risk losing the lands on which they live, land tied to the very meaning of their existence. The rights of indigenous peoples must be appropriately protected. The peoples offer an example of a life lived in harmony with the environment that they have come to know well and to preserve. Their extraordinary experience, which is an irreplaceable resource for all humanity, runs the risk of being lost together with the environment from which they originate (CDSC, 2004: n. 471).

One of the main challenges for the natural resources management in the Congo Basin is the re-establishment of systems where local populations retain control over land use on an ethical self-regulation basis (CBFP, 2006). The Rio Declaration on environment and development points out that:

Indigenous people and their communities and other local communities have vital role in environmental management and development because of their knowledge and traditional practices. States should recognize and duly support their identity, culture and interests and enable their effective participation in the achievement of a sustainable development (Rio De Janeiro, 1992: 5).

Furthermore, agriculture stills a vital sector in the Congo Basin as state by Megevand. It remains the region's largest employer. In Cameroon, The Central African Republic, The Democratic Republic of Congo, and Equatorial Guinea, more than half of the population is still engaged in agricultural activities. Agriculture is the significant contributor to gross domestic product particularly within these countries. Despite its importance, the agriculture sector has been neglected for the past few decades (Megevand, 2013: 4). Maathai also emphasised that it is contributing increasingly in the deforestation of the region. For the poor who live in the Congo Basin, hunting for bush meat and the collection and burning of firewood for charcoal are the highest sources of

income. Wood and charcoal constitute four-fifths of the energy used in the households of the DRC, while bush meat has provided the people of the Congo forest with a vital source of food for centuries (Maathai, 2009: 264).

The rainforest provides ecosystem services such as: food, medicines and livelihood to local people and carbon storage, habitat, biodiversity, regulation of the water cycle to the global population (Celine et al., 2012: 1173). Manganda reports that the forest is also a source of income for peasants and many households in DRC (Manganda, 2004: 249).

Research has demonstrated that the forest plays a major role in determining weather around the continent and the world. Here the Congo Basin provides a good example of the complexities and interconnections of the planet's weather systems (Maathai, 2009: 262).

The deforestation leads to the emission of the greenhouse gas and carbon dioxide which persist in the atmosphere for long time, contributing to negative climate change impacts for centuries (IPCC, 2007). Gardiner qualifies the consequence of the deforestation as “a perfect moral storm” for the storm makes us vulnerable to moral corruption and it is an event constituted by an unusual convergence of independently harmful factors where this convergence is likely to result in substantial, and possibly catastrophic, negative outcomes (Gardiner et al., 2010: 88).

Critics observe that the function of the rainforest is productive in terms of environmental and social needs of the local population. Forests serve a combination of functions and can generate additional revenue for local populations and national economies through ecotourism. Forests also have aesthetic, scientific, and religious values. Furthermore, the importance of the forest and their vegetation in maintaining ambient temperatures or relative humidity are thought to affect both local and regional climatic conditions. This may be important for maintaining or enhancing the productivity of agriculture in adjacent areas (Montagnini et al., 2005: 1.10).

The researcher observes that the forest represents the source of livelihood for the people who are living in it. The preservation of the forest remains a *sine qua non* condition

because the forest provides goods and services for indigenous communities. Thus, the forest should be protected and conserved.

In this regard, environmental economists have put forward the existence of environmental goods like tropical forest areas, biological species or beautiful landscapes that have a positive value in terms of consumer preferences (Amelung, 1992: 2). The forest is also important when it improves quality of life for those struggling to escape poverty and provide for many of the spiritual and aesthetic needs of local people. It is important to view trees and forests like potential tools for poverty alleviation as it is to understand the connection between poverty and deforestation. This point of view seems to be relevant to the poor, and sometimes viewed as anti-environment. It is clear that the sustainable use of forests is the tool to use in fighting poverty (Schmidt et al., 1999: 170).

German points out that the forest in the national context of the DRC is among the world's top megabiodiverse countries. And the ecological role of the forest is well known. The forest contributes to meeting people's needs and to creating wealth and jobs at the national level. Forests are known to generate close to one third of the non-agricultural revenue in rural areas. The so-called secondary forest products have not been well studied; forest-dwellers are known to derive essential food supplements and medicines from the leaves, bark, and fruit and by products of forest resources (German, 2010: 161).

The UNEP reports showed that the DRC itself possesses an outstanding mega biodiversity reservoir that ranks fifth in importance at the global level and is unequalled in Africa. It boasts five natural world heritage sites and many flagship and endemic species. Although not qualified, species depletion from uncontrolled hunting and increasing habitat fragmentation is a major concern as it may lead to irreversible losses. The armed conflict in DRC has threatened protected areas, and ecotourism, once a booming industry, is almost non-existent (UNEP, 2011). Thus, the lack of the right policies and immediate action, the Congo Basin forest will be destroyed. The effects on climate will be disastrous (CBFF, 2009).

To avoid the disaster, the researcher suggests the implementation of some policies in the field of conflict resolution in DRC and in the Congo Basin region. For instance, proper

policies will help to avoid the illegal logging in the Congo Basin's forests. An analysis of existing literature and documentation on biodiversity in the Congo Basin has revealed that more research in the field of environment studies for the Congo Basin should be undertaken by future researchers.

1.11. Congo Basin description and Rainforest Ecosystem

Situated in the centre of Africa (Figure 1), the Congo Basin rainforest remains a relevant source of life for the people who are living in it. It is also a great benefit for all people around the world in terms of climate regulation. The Congo Basin represents great forests in Central Africa and its wide spread prevalence in different countries is given in Figure below. Conserving this forest offer an opportunity to local and international community (Maathai, 2009: 260). The Congo Basin contains 70 percent of Africa's forest cover: 530 million hectares of land, 300 million are covered by forest. And 99 percent of the forested area is primary and 46 percent is lowland dense forest (Megevand, 2013: 1).

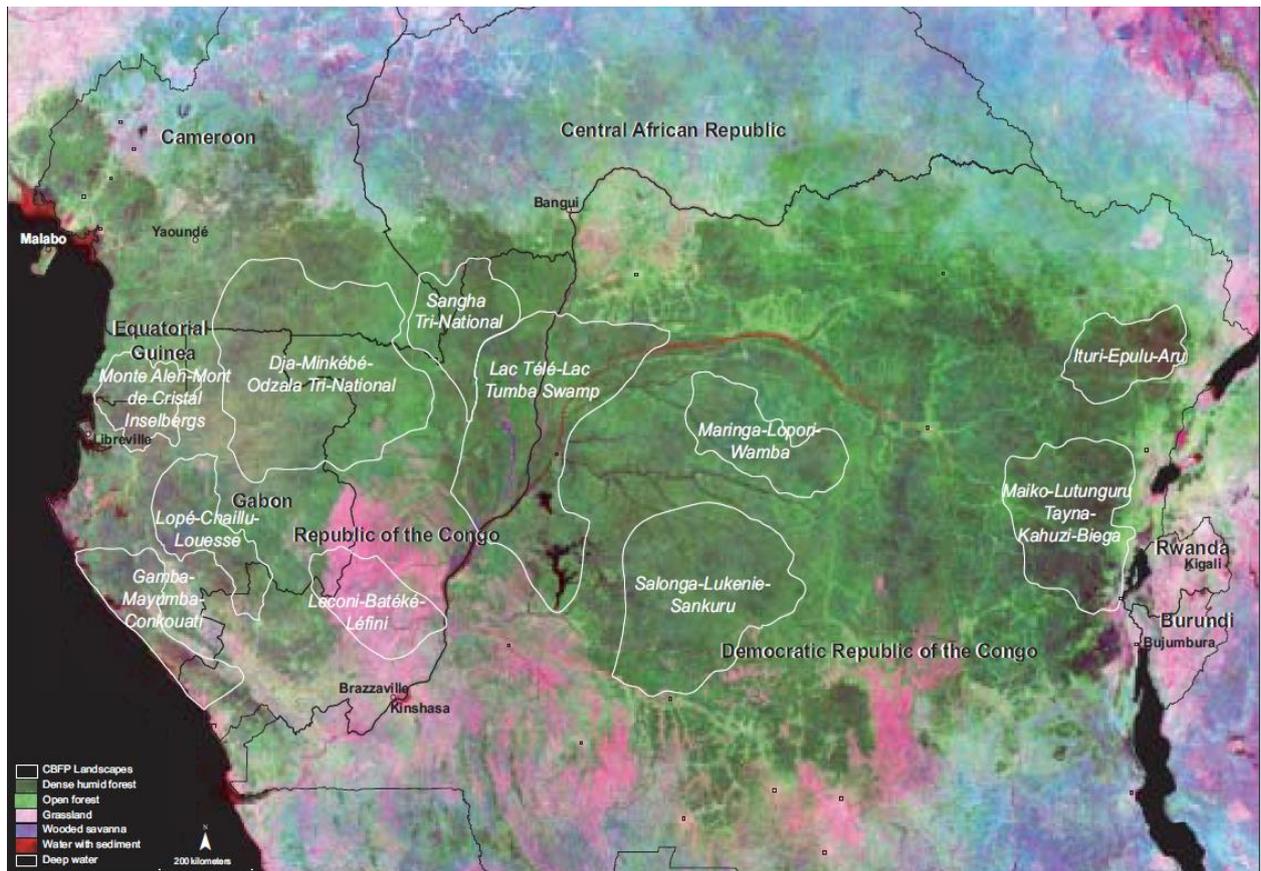


Figure 1. Congo Basin (Source: CARPE, 2005 adapted from MODIS satellite images collected between 1999 and 2002).

The Basin's Ecosystem is a vast expanse of 7 hundred thousand square miles. The ecosystem constitutes a quarter of the world's remaining tropical rainforest, and it provides a third of all of Africa's vegetation cover. The Congo Basin includes a large number of forests, as well as savannah, woodlands, and aquatic and riverine habitats (Maathai, 2009: 260).

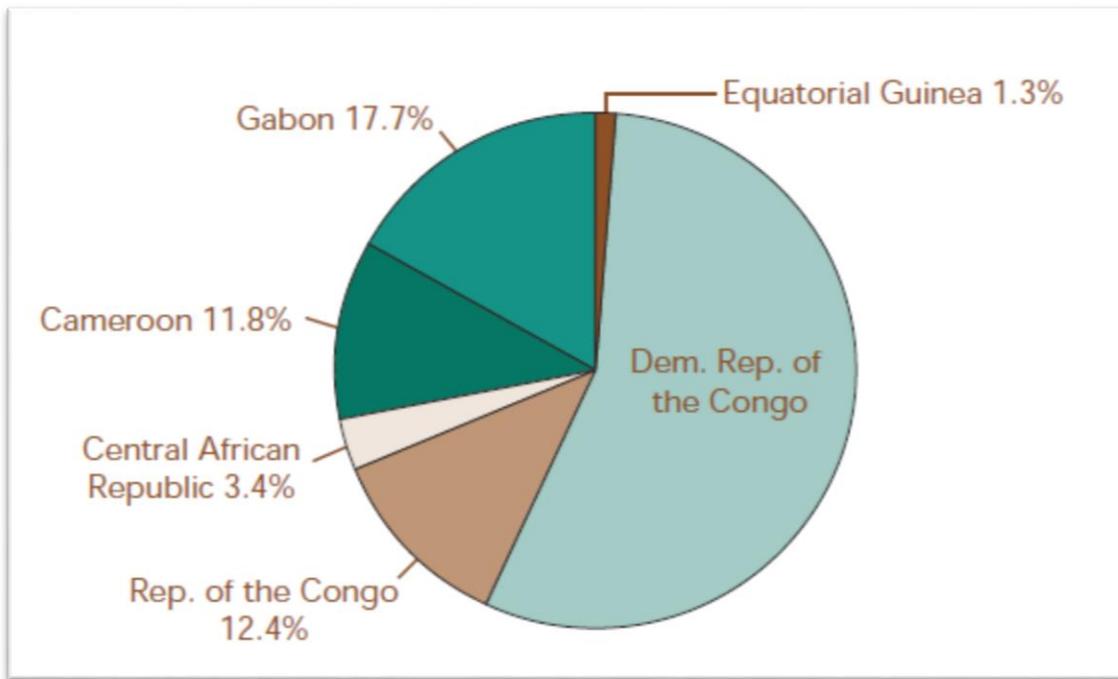


Figure 2. Share of the forest cover by CBFP country (source: **CARPE, 2005** The Forests of the Congo Basin – CARPE Homecarpe.umd.edu/Documents/2005/focb_aprelimassess_en.pdf).

1.11.1. Biodiversity aspect

Biodiversity means “the variety of life”. It is a way to talk about the vast variety of life, a way to note the differences and distinctions between individuals, species (O’Brien, 2010: 21).

Maathai states that the Congo Basin contains the most biodiversity in Africa. It holds ten thousand species of plants, of which 30 percent are endemic; more than a thousand species of birds; nine hundred varieties of birds of butterflies; four hundred mammal species of reptiles and amphibians. The Congo Basin is also home to lowland and mountain gorillas, around four thousand elephants, nine thousand chimpanzees. The Basin is home to the bonobo an endangered primate, and the threatened okapi, a cousin of the giraffe present only in DRC (Maathai, 2009: 261). Furthermore, the same researcher highlights that out of its wide range of biotic life, the ecosystem provides a home for up to half a million Batwa (the pygmies). Their culture has been traced back some twenty thousand years. Evidence suggests that humans have occupied the forests of the Congo Basin for at least fifty thousand years. Today, around 50 million people

from more than 150 distinct micro-nations live in the ecosystem, including farmers and hunters; and more than 100 million people depend on the Congo Basin forests for their livelihoods, shelter and food (Maathai, 2009: 261). In fact, destroying this forest could be a crime against humanity as long as people's lives depend on the forest. Consequently, destroying the forest means destroying humanity.

About twenty-four and thirty-four billion tons of carbon are contained within the region's forest. Through their natural cycle of degradation and regeneration, the forests already release 237 million tons of carbon into the atmosphere annually. And, in case of the all forest is cutting down, an astonishing 135 billion tons of carbon dioxide would be released (Maathai, 2009: 261).

The most relevant goals of biodiversity prospecting are to conserve or maintain and manage the fertile, fragile diversity of people, plants, cultures and ecosystems around the world that are under threat of extinction (Moran et al., 2001: 521). In the case of Congo Basin, Gauer claims that all partnership members argue that biodiversity in the Congo Basin need an action to preserve it. For example, CBFP meeting held in June 2005 on the occasion of the council meeting of the international tropical timber organisation, with the support of the United States led to a number of new partners (Italy, the Netherlands development agency and the global mechanism of the UN convention to combat desertification). Gauer stressed that the better use of the protected areas is to take in serious the forest management plans and the implementation of the strict enforcement of legislation, the training of staff and adequate mobilisation of resources (Gauer, 2006: 132).

1.11.2. Forest Management

In 2002, a new forest code was adopted by the interim government. It provides a legal skeleton framework for the management of the DRC. The code provided a legal protection of traditional users' right in the forests; the right for local people to manage local community forests; sustainable management for production forests; revenue sharing with local governing bodies, social responsibility clauses attached to concession

contracts, expanding the protected areas network; promoting environmental services, and the code sets basic principles (Counsell, 2006: 16).

Forestry institutions of any kind are notably absent. The task of building from scratch government agencies that could diligently implement an entirely new forestry legal framework, against a context of decades of corruption and resource mismanagement is immense and will take many years (Counsell, 2006: 17). The basic legal framework for forestry was provided by a decree dating from 1949 and two other decrees dating from 1950. During 1949 forest regulation, the DRC government's had complete discretion to issue authorisations for prospecting in an area defined by the company itself, which were converted into 25 years of exploitation permits or establish strictly protected areas without any consultation with local communities (counsell, 2006: 20).

According to Debroux, the 2002 code sets the framework for equitable forest management: it maintains traditional user rights, those of indigenous people; implementation of forest management; the right of local communities to manage forests they own under customary right; return of 40 per cent of the area fee to province and territories; mandatory implementation of social responsibility contracts; consultation with local people; a target of 15 per cent of the area of the country under protection status and promoting of non-extractive forest uses such as environmental services. The challenge remains to bring this innovation into practice (Debroux, 2007: XIV).

In 2005, the moratorium on new concessions was confirmed by presidential decree, supply on the Congolese side and demand on the international side for non-extractive forest service's seem to exist. The connection between the two does not work yet. The Problem is to establish the connection through public or private financing systems that can provide potential benefits for the DRC (Debroux, 2007: XIV). The legislative structure of the 2002 code is incomplete, and many application decrees are still required in order to make the 2002 forest code operational (Hoare, 2008).

There are some organisations that support and provide help for the Congo Basin forests, like, COMIFAC (the forestry commission of central Africa) which was founded in 1999 by all of the Basin countries in order to implement a sustainable forest management. It was founded to provide guidance, coordination and decision making in conservation,

sustainable management of forest ecosystem. During the second summit of the Heads of state in February 2005 in Brazzaville, COMIFAC adopted a plan called in French, “plan de convergence”, for forest management and conservation in Central Africa. They reaffirmed also their determination by deciding to create a COMIFAC treaty and install the commission independent resources (Gauer, 2006: 130; Megevand, 2013: 41).

According to Maathai, in September 2002, at the UN world summit on sustainable Development in Johannesburg (South Africa) and the United States with twenty-seven partners, launched the Congo Basin Forest Partnership (CBFP). The purpose of this meeting was to conserve the Basin through economic development, poverty alleviation, better governance, and the establishment of a network of protected areas. The Congo Basin Forest Partnership (CBFP) issued a code to ensure that any contracts awarded to private corporations by the region’s governments seeking to exploit the forests’ resources were well managed. Also, all companies should consult local people, allow them to keep all their rights as traditional users of the forest, and even ensure that 15 percent of the concession area was protected (Maathai, 2009: 265-266).

Political instability in the region, especially in the Central African Republic, in the Republic of Congo and in the DRC has paralysed the economic development (Megevand, 2013: 49).

Megevand highlights that a second aspect that needs to be taken into consideration is the poor infrastructure in the Congo Basin which has stopped the development of the economies, particularly in the agriculture sector. We noticed inadequate market access throughout the region, feeder roads in the humid forest are difficult to maintain under wet conditions. And in the DRC, river transport is the one of the most efficient. But it works intermittently, depending on the water level. Furthermore, the poor governance and the lack of clear regulatory frameworks have discouraged private investments. There is also, complex, arbitrary and predatory taxation rules in the Congo Basin Countries (Megevand, 2013: 49-50).

In 2007, the Government (DRC), through the Ministry for environment, nature, conservation and tourism (MECNT), initiated pilot projects on community forestry. These projects contributed to establishment of the institutional and legal frame works

for the creation and management of community forests in DRC. In particular, the project sought to contribute to the development of a legal and policy framework for community forestry that would be appropriate for the country (Forests Monitor, 2010: 2).

In June 2008, the multi-donor Congo Basin Forest Fund (CBFF) was created to take preventive measures to protect the Congo Basin Forests (CBFF, 2009). Among all the organisations in Congo Basin, especially in the DRC, WWF (World Wild Fund) is the most visible. It consists of (WWF, 2014):

- It supports and work with partners has enabled local authorities to increase anti-poaching measures in the Congo Basin.
- It plays a great role in fighting illegal trade through its partnership with TRAFFIC, the world's largest wildlife trade monitoring network.
- It collaborates with local governments and communities to sustainably manage the forests and protect wildlife.
- It works to ensure more sustainable methods of extracting resources, such as trees, oil, and minerals, with minimal impact to wildlife and forests. And to reduce the pressure for fuel wood, WWF has been part of tree plantation program outside Virunga National Park in the DRC. According to this organisation, more than 10 million trees have been planted to help meet the needs of local people and preserve mountain gorilla habitat. And it provides also, fuel efficient stoves and works with communities to find alternative wood sources through private and community forest.
- It works toward Forest stewardship council (FSC). Certification in all critical forests throughout the Congo Basin. This certification ensures good forest management.
- To protect this area, WWF is working to implement, low-impact logging practices and it reduces the effects of iron-ore mines and stop poaching and bush meat trade that may result from the influx of workers and roads. WWF continues to empower the local communities to conserve their resources and even improve their style of life.

Many organisations are working inside the Congo Basin Forests to conserve, to protect the forests against all kind of mismanagement. The researcher thinks that to reach a sustainable forests management, it will be important to put all the decisions in practice and involve the local communities when we need to make a decision about the forests management. Local communities got a long relationship with the forests and those people know the secret of their forests.

Today the management tropical forest must find strategies to alleviate pressure on the rest of the forests and techniques to enhance forest regeneration even restore neglected lands. And, sustainable forestry in tropical countries must be supported by local and international policies which can promote and maintain specific activities at local and regional scales. Therefore, any kind of efforts to manage, conserve and restore tropical forests must be compatible with local livelihood needs of the local people (Montagnini, et al., 2005: 16).

The strategies that provide various ecosystem services and fulfil the needs of local people, in order to promote the conservation of the forest resources, will definitely succeed. Understanding the ecosystem products and services of the forests are essential for adequate conservation and management strategies, as well as for the development and the maintenance of the policies that sustain them (Montagnini, et al., 2005: 16).

Moreover, another researcher observes that forests well managed can sustain the livelihood of poor people in the forest, and the management must be carefully tailored to specific human and forest conditions. For instance, through ecosystem management. The people themselves must participate fully in decisions made in pursuit of better management. Access, ownership, and property rights issues are often the determinants of whether forests sustain or degrade the livelihood of smallholders. The forest management is embedded in larger context of culture, politics, and trade, as are the smallholders themselves. In this context, forests provide a useful metaphor for sustainable development on a large scale because of their complexity, longevity, and multiple outputs and benefit (Schmidt, 1999: 172). It is important to think about the living condition of our ancestors in Africa. They were living in harmony with the forest but, today; the arrival of powerful technology is ignoring ancestors' customs. Recent technology does not respect human's life, for example, industrial fumes are very toxic

to human's life, also the mismanagement of the forest or the cutting down of the trees without taking in account the livelihood of the people that live in the forest.

Scientists estimate that education is a key to all levels of activity in sustainable forestry. The development of usable technology and an explanatory and predictive science base are particularly necessary for ecosystem management leading to sustainable forest use. Therefore, an interdisciplinary approach that involves biological, environmental, economic, cultural, and social research and that produces integrated answers to questions must be developed for the conditions and the goals of the country producing the integrated forest strategy (Schmidt, 1999: 172).

German observes that in post-conflict times, the production of timber should be substantially increased and well managed in order to improve livelihoods in the rural areas by contributing to economic development and poverty alleviation. In addition, in August 2002, the forest code (DRC) which replaced the colonial forest regime of 1949, was adopted. The code includes innovative measures that encourage new economic activity, forest sustainability, poverty alleviations and forest management decentralisation. And the government is committed to carry out a priority reform agenda that, in global terms, seeks to eradicate the mismanagement of the past and lay the grounds for transparent forest management and equitable distribution of profit from forest resources (German, 2010: 160).

1.12. Ecological role of the Forest

This section will present the ecological key role plays by the forest in terms of fuel wood (the population depends on fuel wood for cooking); climate regulation (the forest absorbs carbon from the atmosphere); livelihood of the local population (the forest represents the source of food for the local population).

1.12.1. Fuel wood

Biomass energy, which includes wood fuels, agricultural residues, and animal wastes, provides nearly 30% of total primary energy supply in developing countries (Montagnini, et al., 2005:1). And more than 2 billion people depend directly on biomass fuels as their primary and source of energy. In developing countries, wood fuel account

for more than half the biomass energy consumption. Also, half the total timber cut in these countries is used as fuel for cooking and heating (Montagnini, et al., 2005: 1-3). In DRC, fuel wood and charcoal collection has been classified as a key driver for deforestation, and it covers 95% of the population's energy needs. The population's dependence on fuel wood for energy brings at once rings of fragmented forest in urban areas, which calls for longer and longer forest excursions to supply a new ending demand for fuel wood (Deforestation in DRC, 2015).

United Nations Environment Program's Post-conflict Environmental Assessment synthesis for policy makers reported that approximately 89 hectares of forest was lost each day due to illegal fuel wood harvesting during the peak of the post-second Congo war conflict. Charcoal or makala (charcoal in DRC language), is difficult to produce but is a preferred source of energy in DRC, while it is virtually free to use fuel wood (Deforestation in DRC, 2015). Charcoal is also mostly smokeless and is not liable to deterioration by insects which attack fuel wood. With these benefits, charcoal is particularly popular in cities. Regardless of the purposes, commercial or personal, fuel wood and charcoal are mostly collected by woman and children in most regions in Africa. And the price of the charcoal increases especially in large cities, such as Kinshasa, because vast amounts of forest are deforested close to the city that is why the cost of transportation increases as the distance of wood sources are farther away (Deforestation in DRC, 2015).

In order to avoid deforestation, it is crucial to supply or to use alternative clean energy in developing countries. It is the task of the government to ensure that families are able to afford solar energy so that the forest will be protected against the deforestation.

1.12.2. Climate Regulation

Researchers highlight that the regulation of climate has local and global effects. The role of forests and their vegetation is to maintain lower temperatures or higher relative humidity that is affecting local and regional climatic conditions. When an amount of forest is cut down, the rest of the forest is less able to evaporate and transpire; causing a decrease in rainfall that may result in changes in the vegetation from forest to savannah. Deforestation also changes the surface albedo and aerodynamic drags, which in turn

affect temperature cloudiness, air circulation. The deforestation has been considered responsible for declines in rainfall in several areas of the humid tropics (Montagnini, et al., 2005: 10-11).

The impact of deforestation on hydrologic flows is a major concern, soil aggregates break down and the soil becomes less water stored in the soil and more erosion and surface run off during rainstorms. As a consequence, floods are more common during rainstorms and water flow in streams decreases during dry spells (Montagnini, et al., 2005: 11).

The poor sectors are particularly vulnerable to climate change. The poor are those who are suffering from rising temperatures and sea levels and they don't have financial and technical resources that could allow them to adjust to global warming (Montagnini, et al., 2005: 11). In the global effects, carbon dioxide is the principal gas responsible for the "greenhouse effect". And the forest plays an important role in ameliorating the greenhouse, in absorbing carbon from the atmosphere, by reducing the building of carbon dioxide. It produces energy in the form of visible light and ultraviolet (UV) rays from the sun passes through the atmosphere. It heats up the earth, but is restricted in its ability to escape when in the form of infrared radiation because it is absorbed by carbon dioxide and other gases contained in the earth's atmosphere (Montagnini, et al., 2005: 12).

These researchers state that green plants take up carbon dioxide from the atmosphere and use it in photosynthesis to produce sugar and other compounds for growth and metabolism. Long-lived woody plants store carbon in wood, and through the process of decomposition the carbon in wood may be released to the atmosphere after the plant die in the form of carbon dioxide or methane. As plant material decomposes in the soil, part of the carbon in plant tissue can form part of the soil organic matter, serving as another permanent carbon sink. And when a forest is cleared for agriculture or other purposes, all the carbon stored in the trees and soil is released into the atmosphere (Montagnini, et al., 2005: 12). Therefore, it is important to replant the trees. This process means "reforestation". According to Chibuko:

reforestation attempts to undo the wrongs and devastations of deforestation replanting as much more trees and plants as are destroyed in the in the environment(Chibuko, 2010: 194).

It means, replacing and planting more trees for the sake of having a safe and good environment (Chibuko, 2010: 194).

Even if the reforestation occurs to ameliorate the devastation of forestation, we notice that the forest will not be the same, the natural forest is already lost, and the original forest with its potential. Thus, it means the reforestation cannot keep the forest hundred percent as it was at the beginning.

Another researcher observes that the Congo Basin forest' effect on the climate is not limited to the reduction or increase of carbon dioxide in the atmosphere. It plays a role in determining weather around the continent. The Congo Basin provides a good example of the complexities and interconnections of the planet's weather systems. As the deforestation in West Africa has affected rainfall in Central Africa, so deforestation in the Congo Basin has an impact on weather patterns, not only locally but also throughout the continent and beyond its shores. Scientists estimate that the clearing of the forest in the Congo basin has led to an average 5 to 15 percent drop in the amount of rain that falls in the Great Lakes region of the United States, reaching a peak of 35 percent less each February (Maathai, 2009: 262). In this regard, the loss of the forest in the Congo Basin will affect not only local citizens in the continent, but all citizens in the world. It is the duty of everyone to take action, to provide and spread information on how to avoid the massive deforestation in the continent.

1.12.3. Livelihood of the local population

Megevand takes recognisance of the fact that the Congo Basin forests are home to more than 30 million people. 75 million people rely on the Basin for their livelihoods. And more than 150 ethnic groups rely on the local natural resources for food, medicine and other needs. Modern humans have occupied the Basin for at least 50,000 years. Evidence of the pygmy culture, which has adapted well to the forest; date back 20,000 to 25,000 years. And today, most of the population living in the Congo Basin forest is indigenous (Megevand, 2013: 36). Research shows that the ancestors of the pygmies who live now

in Congo Basin were the first inhabitants of African rain forests (Montagnini, et al., 2005: 14).

Furthermore, the tropical countries recognised their forest as a major economic resource that should be exploited to enhance economic development. The forests provide land reserves for agricultural production, mineral commodities and wood used as an input for the development of a domestic wood industry (Amelung, 1992: 3).

The rainforest offers many opportunities such as timbers for construction, furniture, plywood, paper and other uses like fuel woods, fibres, canes, resins, oils and drugs; fruits and spices. It is also considered as a solar engine, it absorbs more sunshine than other living land cover, moderating surface temperatures and reducing heat reflection into the atmosphere (Guppy, 1984: 928).

According to Megevand the Congo Basin forest performs valuable ecological services at local and regional levels. Such services include maintaining the hydrological cycle (water quantity and quality). And controlling flood in a high-rainfall region. The biodiversity of the forest provides timber, non-timber products, and medicine to millions. An additional regional benefit is regional-scale climate regulation, crucial for fostering resilience to climate change. Healthy forest ecosystems facilitate regional-scale cooling through evapotranspiration and provide natural buffers against regional climate variability. Congo Basin Forests also provide ecological services to the global population through their capacity to store huge amount of carbon” (Megevand, 2013: 32-33). Moreover, we cannot keep quiet about the danger we are facing. The loss of the forest means the loss of our life, for human life is linked to the forest. Evidence shows that the forest provides cultural and economic resources to the forest inhabitants. We should slow and stop cutting down our forest.

1.13. Causes of Congo Basin Deforestation

This section will describe the main drivers of the deforestation of the Congo Basin, which is agriculture; construction of the road; charcoal collection; logging and mining sectors.

1.13.1. Agriculture Sector

In the Congo Basin more countries rely on agriculture. They cut down the forests, and this process is called “deforestation”:

Deforestation means deliberate elimination of trees and plants in the environment without a corresponding effort to replant them (Chibuko, 2010:192).

Deforestation is a major concern for all developing countries. Deforestation describes changes in different ecosystems. The widespread deforestation has global repercussions. For instance, large scale loss of forest area has been implicated in changes in wood supply, the hydrographic balance, genetic resources and global cycles of carbon.... Also, the degree of impact varies with the amount of forest area lost (Allen & Barnes, 1985: 163-164).

The United Nations Environment Program (UNEP) has already identified slash and burn agriculture which produces reduced fall periods, as the most pressing issue related to the deforestation of the DRC. It is the process of clearing land for agricultural use through burning the forest. This situation has deep roots, because the DRC’s population is depending on this type of slash and burn rain-fed agriculture for its sustenance. This style of intensive agriculture with short periods of soil rest leads to soil degradation and desertification (Deforestation in DRC, 2015).

As the soil degrades and desertification occurs, most of the farmers are obliged to continually move farther and farther to find new land to farm which repeats the process time to time, and the farmers are often exacerbating the clearing of natural forests. Current farming practices are inefficient and unsustainable. Then, when, farmers move far away from the workable land, they are at the same time increasing the distance between themselves and the markets where they are supposed to sell their products. Currently the DRC is heavily reliant on imported food, which further places pressure on the forest lands to be cleared for agricultural purposes. For example, in 2010 the DRC’s top import from the United States was meat, while they exported oil resources (Deforestation in DRC, 2015).

Agriculture is a vital yet neglected sector in the Congo Basin. Agriculture remains by far the region's largest employer. In Cameroon, the Central African Republic, and Equatorial Guinea more than of the economically active population is still engaged in agriculture activities. Agriculture is also a significant contributor to gross domestic product (Megevand, 2013: 4).

The rural households in the Congo Basin rely on agriculture. But, it still neglected. The research and infrastructure and development are neglected also. In most of the cases, the agriculture sector is dominated by smallholders who cultivate 2 to 3 hectares of crops on 2 years cultivation and 7 to 10 years fallow pattern. Usually, maize, groundnuts, taro, yams, cassava and plantains are grown for their own consumption, and sold in their local market (Megevand, 2013: 68-70).

1.13.2. Construction of the Road

The road construction represents one of the robust predictors of tropical deforestation. There is a correlation between road infrastructure and deforestation in the tropical forest. The roads accelerate forest fragmentation and reduce forest regrowth. The creation of transportation infrastructure has direct and indirect impact on the forests. Direct impact is limited and encompasses a strip of few meters on each side of the transport line. And indirect impact is correlated with population density (Megevand, 2013: 95). The construction of roads has greatly facilitated access to the interior of the forest and many people have relocated close to roads. But logging, oil palm plantations, population growth and road development have strained the traditional resource management system (WWF, 2014).

Mining and logging create secondary deforestation through road construction. Logging companies construct new roads into previous inaccessible forest areas which facilitates the conversion of logged forests by into agriculture land. This has led to the immigration of landless farmers in particular from eastern savannah regions, to enter primary forest areas through logging roads. Incoming farmers cause extensive land degradation in converting the natural forest into farmlands. Further, it has been suggested that increases in returns can lead to substantial increase in farm sizes shortening of the fallow period,

which in turn leads to large scale and severe natural forest area destruction (Deforestation in DRC, 2015).

1.13.3. Charcoal Collection

Megevand' analysis shows that charcoal collection constitutes a serious threat to forests in densely populated areas. The impact of the charcoal collection in rural areas is offset by natural regeneration, but it can become a severe cause of forest degradation and eventual deforestation when demand comes from concentrated markets such as urban households and businesses. Wood biomass energy is supplied by an inefficient sector. Charcoal is produced using traditional techniques, with low transformation efficiencies. The organisation of the charcoal supply chain is inefficient, relying on poor regulatory frameworks that lead to massive informality (Megevand, 2013: 7).

The major cause of the destruction of the forests is the collection of the wood for burning to make charcoal, used for cooking in urban areas. This activity has become a key source of income for most peasants as well as for many Kinshasa city households (Manganda, 2004: 248-249). In addition, the lack of employment opportunities and poverty are among the many causes of deforestation. The unemployed went to the "Plateau de Bateke" (next to Kinshasa) in order to clear the forest and make charcoal that allow them to earn money for their survival.

The local residents recognised deforestation as a great concern. It is contributing to flood and drought. Charcoal production is also a cause of the deforestation, and poverty is seen as the cause of deforestation because only poverty leads a person to make charcoal (Eckholm, 1984: 28).

Kinshasa, a big city of 8-10 million inhabitants, is located in a forest and savannah mosaic environment on the Bateke Plateau in the Democratic Republic of Congo. The city's wood energy supply of about 5 million cubic meters per year is informally harvested from degraded forest galleries within a radius of 200 kilometers off Kinshasa. The forest beyond the 200 kilometres radius are experiencing gradual degradation, while the per urban area within a radius of 50 kilometres of Kinshasa has suffered total deforestation. However, there have been several attempts to develop plantations around the megacity to help provide wood energy on a sustainable basis (Megevand, 2013: 9).

1.13.4. Logging Sector

The Central Africa represents the most extensive use of land. The portion of the forest designated for logging is high in the Republic of Congo (74 percent), and the Central African Republic (44 percent). The formal logging in Central Africa produces an average of 8 million cubic meters of timber per year, used for exports to Europe and Asia. The Gabon is the largest producer, followed by Cameroon and the Republic of Congo. And the DRC's vast forest, represent more than 60 percent of the total forest in Congo Basin, is the smallest producer in the Basin, with 310,000 cubic meters of formal timber production. This result is due to the conflict in the DRC over the past decade as well as other problems, such as a lack of infrastructure (Megevand, 2013: 37).

Artisanal logging is profitable, it is also deemed to be illegal. However, corruption in the local government allows the logging to continue. To perform artisanal logging, the logger needs to obtain permit from the local government with approval by the community chief, loggers can obtain a permit. Although artisanal logging provides some income for the community in the short-run, it ultimately does not improve local living conditions. In the end, the communities receive payments which are not large enough to cover the cost of their natural resources (Deforestation in DRC, 2015).

Since, there is no monitoring mechanism, the logger reports lower harvested amounts than they actually do in order to pay less tax to the local government. Some loggers cut one tree within the woods and leave the rest intact to mimic natural disturbance. To improve the situation, the DRC government needs better monitoring and better forest code to manage the logging activities (Deforestation in DRC, 2015).

The industrial logging sector is one of the major contributors to the gross domestic product in some of the Congo Basin Countries. The forest played an important role in the Congo Basin. With the development of oil in the Basin countries over the last decade, the forest sector's contribution to overall gross domestic product has decreased. Evidence shows that projected declines in oil production in Gabon over the next decade may lead to renewed growth in logging for export (Megevand, 2013: 38).

1.13.5. Mining sector

The Congo Basin is home to various mineral resources: copper, cobalt, uranium, iron, Colton, niobium, and tin. Mining activities are present at several countries in the Basin. The major mineral provinces are Katanga, the auriferous province (DRC); the bauxite (aluminium) province (Central north region of Cameroon); the iron province located between Cameroon, Gabon, and Republic of Congo; the nickel and cobalt province of Cameroon. The DRC remains the richest deposits of mining in the Basin, and it still underdeveloped (Megevand, 2013: 107).

The Basin has faced many problems (Megevand, 2013: 108):

- The region has experienced numerous rebellions and civil conflicts. The investment capital flowed out of the region because of the climate of instability. The Republic of Congo, the Central African Republic, and the DRC struggled with armed groups who have used mineral as a source of funding for their activities.
- The lack of infrastructure and the consequence of civil unrest, armed conflicts, such as in the DRC, sporadic looting and two periods of armed conflict have destroyed the infrastructure. In addition, the lack of reliable transportation infrastructure has been a major setback to the exploitation of mineral resources in the Basin.
- Poor governance; the climate of investment was not conducive for business. Complex, arbitrary and predatory, taxation discourages investment.
- Heavy reliance on oil. “Dutch disease” syndromes have distracted the government in most of the Basin countries from economic diversification. For example, in Gabon major capital inflows from the oil sector have locked the Gabonese economy into oil production (Megevand, 2013: 108).

However, there are positive prospects for the development of the mining sector in the Basin. The rising price of minerals drives the interest in mining in the Basin. It is for that reason, the mining sector is receiving a particular attention and because of the high prices and demand (Megevand, 2013: 108).

Direct impacts from mining entail deforestation that encompasses the following: the site covered by roads, mines, excavated minerals and earth, equipment and settlements associated with mining activities. Mining operations have an indirect impact on the forest, by leading to deforestation and forest degradation (Megevand, 2013: 108).

The mining sector is expected to become a major pressure on Congo Basin forest. Conflicting land use plans carry the potential for large deforestation and forest degradation. Numerous problems have been noted between conservation priorities, mining and logging concessions, and the livelihoods of the local populations (Megevand, 2013: 112).

1.13.6. Ethical Aspect

Our planet “earth” is facing environmental crisis. A question Arises: what is this crisis and where does it come from? The crisis emanates from the deforestation, the loss of biodiversity, desertification and the climate change. Among others, humans are affected, for instance, avoiding deforestation will be a benefit for the pygmies who live in Congo Basin Forests; their lives depend on the forests (foods and medicines). Destroying the forests will be disastrous for them.

When we analyse the situation, we realised that egoism is at the heart of the crisis. In most of the case, indigenous people are neglected. When the illegal logging occurs, indigenous people are excluded. And, in this regard, the Rio Declaration on environment says:

Indigenous people and their communities and other local communities have vital role in environmental management... (Rio de Janeiro, 1992: 5).

Pope Francis during his speech to the UN claims:

Economic and social exclusion is a complete denial of human fraternity and a grave offense against human right and the environment. The poorest are those who suffer most from such offenses (Pope Francis’s speech to the UN, 2015).

In addition, the conflict in the DRC, namely the “war” is a grave offence. When, there is war, people are ignored and even excluded. According to Maathai people are not considered and there is no respect of human rights. In the DRC, the war was due to the

natural resources or the Colton war (Colton is served to manufacture cell phones, laptops and plasmas). Maathai shows that:

The war, in many ways, merely the latest, fight to utilise the forests resources stretching back to the day of Mobutu Sese Seko, who as the president of Zaire enriched himself and his coterie for three decades at the expense of his people. This conflict mirrored the exploitation of the Belgian colonial administration that preceded Mobutu, and the Belgian King Leopold II, who ran the Congo as his personal estate in the late nineteenth and early twentieth centuries (Maathai, 2009: 264).

In this regard, the principle of equity is required; we think that to protect the ecosystem it is necessary that the people who live in the Congo Basin Forests feel they have a stake in its protection. This means that the people of these forests have a long relationship with the area's flora and fauna, and they need to be include in any decision making concerning their future and to benefit from its development (Maathai, 2009: 269).

To resolve the problem, the social doctrine of the Catholic Church states that:

The environmental crisis and poverty are connected by a complex and dramatic set of causes that can be resolved by the principle of the universal destination of goods, which offers a fundamental moral and cultural orientation. The present environmental crisis affects those who are poorest in particular way, whether they live in those lands subject to erosion and desertification, are involved in armed conflicts or subject to forced immigration, or because they do not have the economic and technological means to protect themselves from other calamities (CDSC, 2004: 482).

Pope Francis says that the environment is God's gift to everyone and we have the responsibility towards the poor; the future generations and the humanity. The church has a responsibility also towards the creation, she must defend the earth and protect mankind from self-destruction (Benedict XVI, 2009: n. 48-51).

Today, mankind is under threat from what he produces himself. The exploitation of the earth demands rational and honest planning. Today, exploitation of the earth for

industrial purposes and uncontrolled development of technology bring a threat to man's natural environment and alienate him in his relations with the nature (John Paul II, 1979: n. 15). Later the same Pope John Paul II said: "man consumes the resources of the earth and his own life in an excessive and disorder way. At the root of the senseless destruction of the natural environment lies an anthropological error, which unfortunately is widespread in our day. Man, who discovers his capacity to transform and in a certain sense create the world through his own work, forgets that this is always based on God's prior and original gift of the things that are" (John Paul II, 1991: n. 37).

We can say that this is the lack of the love that is why the Catholic Church, took an option called "love of preference for the poor". It is a special exercise of Christian charity to which the tradition of the church bears witness. According to the Church, ignoring the poor's realities would mean becoming like the rich man who pretended not to know Lazarus lying at his gate (John Paul II, 1987: n. 42). We noted the presence of numerous organisations for charitable or philanthropic purposes; they are committed to find humanitarian solutions to the social and political problems today. And the different organisations engaged in meeting various human needs is due to the fact that the command of love of neighbour is inscribed by the creator in man's nature (Benedict XVI, 2005: n. 30-31)

1.14. Conclusion

This chapter focused on the geographical aspects of Congo Basin forest and attention was drawn especially in the ecological role of the forest. Key causes of the deforestation of the Congo Basin were discussed and had included the agricultural sector, construction of the roads, logging sector, mining sector and charcoal collection. It was highlighted that Indigenous people may suffer from the negative consequences due to the deforestation, climate change, and desertification. Therefore, an ethical perspective is important by adopting participative approach on forest management. Indigenous people have the right to be involved in any decision concerning their lives. The next chapter will deal with the challenges that the world is facing, particularly, the negative impacts of industrialisation and some solutions will be suggested.

CHAPTER 2

ETHICAL CHALLENGES TO THE ENVIRONMENT

This chapter presents the impacts of industrialisation as an ethical challenge. It covers mainly the potential negative effects of global warming, biodiversity and the environment, the industrialisation impacts on the environment and ecosystems. Several aspects such as Indigenous communities' role in the Congo Basin and their protection from injustice, climate change mitigation and adaptation will be discussed. Lastly, a brief summary on dominant religions' response to the climate change will be given.

2.1. Introduction

In chapter one, we examined the ecological role played by the forest in supporting human life. The researcher also, analysed the different causes of the deforestation, which lead to the greenhouse gas effect. The increase of greenhouse gas in the atmosphere through industrialisation and the massive deforestation are reported to be among the principal roots of global warming and climate change. Climate change is a global problem which needs also a global solution. And since climate change is also an ethical issue, it is important to indicate the thoughts of the most dominant religions such as Christianity, Buddhism, Hinduism, Judaism and Islam in addressing the issues related to the climate change. This chapter focuses on interfaith responses to the crisis discussed above.

2.2. The Impacts of Industrialisation on the Environment and the Ecological crisis

Industrial activities have brought not only benefits; but also challenges in the conservation of the environment: The depletion of the ozone layer and the related greenhouse effect, the destruction of the rainforests, the industrial wastes, the burning of fossil fuels and the use of herbicides, coolants and propellants, threaten creation (John Paul II, 1990: n. 6). A similar point of view is highlighted by Mangan who comments on this communication with the Pope (Mangan, 1990: 588). Mechanisation and the use of technology have brought benefits to humanity. They demonstrate the human vocation to participate in God's creative action in this world. However, these discoveries in the

field of the industry and agriculture have produced long-term effects on the environment (John Paul II, 1989: n. 6).

Those effects of ecological crisis are evident in the pollution around us as stated by the US Conference of Catholic Bishops: the chemicals are in our water and on our food; radioactive and toxic waste lacks proper disposal. This threatens the health of industrial and farm workers. Poisoned water also is crossing borders freely; acid rain pours on countries that do not create it. These issues are being explored by scientists and they need an urgent attention and action. At the US Conference of Catholic Bishops, the importance of immediate and urgent action to address this problem was emphasised (US Conference of Catholic Bishops, 1991). All these issues need to be taken seriously; our planet is in peril. Scientists highlight the threats which are occurring, but developed countries continue to harm other countries by their selfish interests. Their powerful technologies are affecting people all over the world and increase global warming.

2.2.1. Global warming

The harmful effects of global warming are also highlighted by modern scientists such as Gardiner. The environmental challenges are seen in the increase of greenhouse gases through industrialisation contributes to global warming (Gardiner, et al., 2010: 4). The atmosphere absorbs some of the radiation and sends energy back to earth. The mixture of gases in the atmosphere is being changed by the addition of massive amounts of gases released by human production and consumption. More of the earth's radiation is absorbed, and more is returned to earth. The consequence is the production of the greenhouse effect or global warming (Presbyterian Eco-Justice Task Force, 1989: 21). However, according to Gardiner, without some greenhouse effect, the earth would be much less hospitable for life. In reality, human induced greenhouse effect causes the climate problem. The concern of many scientists is that an enhanced greenhouse effect causes an extra energy in the earth's climate system, and creates an imbalance (Gardiner, et al., 2010: 4).

Deforestation has been the second source of greenhouse gas (GHG) emissions, after fossil fuel combustion (IPCC, 2007). There has been a global decline in deforestation;

Sub-Saharan Africa is the only region where it has increased. Deforestation in the Western and Central African region of the continent, including the Congo Basin forests which accounts for most of this loss of forests. The huge implication of this in terms of climate change is not just carbon emissions; more importantly, it is increasing the vulnerability of forest ecosystems (Sonwa et al., 2009: 95).

Therefore, Sonwa emphasises that there is a need to study the impact of climate change and their implications for indigenous and traditional communities in the Congo Basin Forests. It is also important to understand the adaptation and the resilience strategies as developed for decades by the people, particularly in marginal areas and ecosystem boundaries. Sonwa add further that the natural resource base affected by climate change needs to be evaluated in order to plan for the special adaptation needs of women and the elderly, and of minorities and under-represented groups who are the poorest and most vulnerable in the Congo Basin (Sonwa et al., 2009: 95).

A similar point of view is expressed by Brown, who states that today human beings are unable to stop the process they have started. Human beings have already, unknowingly produced enough extra global warming gases in the atmosphere to keep the process going for a long time. Global warming will happen. The solution is to control it and slow it down, and have time to get used to it and change our lifestyles. It is not enough to lower the rate of the emissions. A natural balance should be created (Brown, 1996: 5).

Spence notes that climate change is altering our world. Vegetation is changing, seasons are shifting and entire habitats are being transformed. The changes to our forests, grasslands, coasts, oceans, deserts, mountains are affecting animal populations all along the food chain (Spence, 2005: 59). Tropical rainforests are the most varied ecological ecosystems on the planet. However, they are subject to intensive degradation due to human activities through the loss of biodiversity. Forests produce goods and services which are important to support human life. For instance, they have medicinal plants which can be used in treating diseases. Destroying the forest is like destroying the source of our own life (Mangan, 1990: 589).

Ethical considerations are critical as Palmer and Engel note climate change impact is expected to fall disproportionately on people living in some of the poorest regions of the world. They are the most vulnerable to adverse changes in, for instance, food production and water resources (Palmer& Engel, 2009: 2). Global climate change will have diverse impacts on human being health, some positive, but most negative. Changes in the frequency and intensity of extreme heat and cold, floods and droughts, and the profile of local air pollution will directly affect population health. Other effects on population health will result from the impact of climate change on ecological and social systems (IPCC, 2001). This impact includes changes in infectious disease occurrence, local food production and nutritional problem, and other various health consequences of population displacement and economic disruption. Health impacts will occur around the world. In general, rich populations will be protected against physical damage, changes in patterns of heat and cold, or spread of infectious diseases, and any adverse changes in world food supplies (IPCC, 2001).

The main challenges that African populations will face are from the effects of extreme events such as tropical storms, floods, landslides, wind, cold waves, droughts, and abnormal sea-level rises that are expected as a result of climate change. These events will exacerbate management problems relating to pollution, sanitation, waste disposal, water supply services, public health, infrastructure, and technologies of production (IPCC, 1996).

2.3. Indigenous Communities' role in the Protection of the Congo Basin

This section will focus on the indigenous people's role in the conservation of the forests, their rights, and the virtue of equity and justice policies. In addition, principles of forest sustainability will be discussed.

2.3.1. The Role of Indigenous Communities

In Congo Basin indigenous people include Pygmies, Bantu, Nilotic and Sudanese. The Pygmies are the oldest inhabitants of Central Africa. They speak different languages such as Lingala and Swahili from the Bantu to the main ethnic group in the DRC (Hall & Patrinos, 2010: 2). These researchers comment further that their semi-nomadic

lifestyle remains unchanged for thousands of years, living from hunting, fishing and harvesting wild fruit and nuts. In the last two decades, under the influence of multiple factors, the pygmies have gone through a process of semi-sedentarisation. They have been closely attached to the rain forest; the forest was the source of their religion, their livelihood and protection (Hall & Patrinos, 2010: 2).

The greatest environmental problem the pygmies are facing today is the loss of their traditional home land, the tropical forests of Central Africa (Sheshadri, 2005). In most of the countries such as Cameroon, Gabon, Central African Republic and the Republic of Congo, this is due to the deforestation and the desire of some governments in Central Africa to evict the pygmies from their forest in order to quick profits from the sale of hardwood and the resettlement of farmers onto the cleared land (Sheshadri, 2005). If the deforestation and the eviction of Pygmies continue to take place, they will disappear from the forest.

Sobrevila focuses on tropical forest conservation and states that, conservation of biodiversity is not an isolated concept, but an integrated part of their lives. Therefore, dispossession of the land has brought not only economic impoverishment but also loss of their identity and threats to their cultural survival. Traditional knowledge provides the foundation for intricate resource management systems that have sustained indigenous for millennia (Sobrevila, 2008: 8-9). Indigenous people should be recognised as “repositories” of traditional ecological knowledge passed down over generations’ knowledge that has potential to complement and enrich existing scientific knowledge of climate change. On moral grounds, despite this knowledge, indigenous people have often been excluded from debate and discussion around the science and impacts of climate change on ecological and human system (Mearns & Norton, 2010: 18).

In addition, indigenous people know the importance of their land; they understand how relevant it is to live in harmony with nature. Actually, humanity is obliged to preserve the nature by avoiding any kind of pollution, especially water and air pollution, including deforestation (Sobrevilla, 2008: 11). Therefore, the debate regarding indigenous peoples’ knowledge and the role it plays with respect to natural resource

management in general, and biodiversity in particular have increased, achieving international recognition in the convention on biological diversity and in the United Nations Declaration on the rights of indigenous peoples (Mearns & Norton, 2012: 151-152).

2.3.2. The Rights of Indigenous Communities

Since 1948, the Universal Declaration of Human Rights states that all human beings are: equal in dignity and rights and without distinction of any kind, such as race, colour, sex, language, religion, political or other opinion, national or social origin, property, birth or other status (Universal Declaration of Human right, 1948: arts 1-2).

Despite the recognition of the Universal Declaration of Human Rights, indigenous peoples continue to face serious threats to their existence due to systematic government policies. Most of governments continue to deny indigenous peoples the right to live in and manage their traditional lands. Not only in Congo Basin regions, but also governments around the world has displayed an utter lack of respect for indigenous values, traditions and human rights (Hymowitz, 2003: 4).

Rio Declaration on Environment and Development emphasises that:

Indigenous people and their communities, and other local communities, have a vital role in environmental management and development because of their knowledge and traditional practices. States should recognize and duly support their identity, culture and interests and enable their effective participation in the achievement of sustainable development (Rio Declaration on Environment and Development, 1992: n. 22).

Raja Sheshadri (2005) claimed that pygmy's culture is threatened today by the forces of political and economic change. The pygmies have been viewed as inferior by colonial authorities and the village dwelling Bantu tribes. This has translated into vicious discrimination on both a societal and state level. One example would be when Belgium

colonial authorities captured and exported pygmy children to zoos throughout Europe (Sheshadri, 2005).

2.3.3. The virtue of equity

The word equity comes from the moral concept of equality, that people should be treated as equals. The concept of equity helps us decide how to distribute goods and services in our society (Sheshadri, 2005). The state is responsible for its influence over how goods and services are distributed in a society, and using this influence to ensure fair treatment for all citizens. Unfortunately, there is inequality in developing countries. People's access to and interaction with key institutions are shaped by power balances in the political, economic and social spheres, leading to adverse incorporation and social exclusion (Jones, 2009: VI).

The concept of equity is the application of the principle of moral equality or the application of principle of justice (fairness) to the ways in which people are treated by society (Jones, 2009: 4). The principle should cover every individual's actions in society but should be of particular importance in setting goals for and constraints on actions by governments and states. There is strong consensus that the relationship between the state and its citizens means that the state should respect moral equality (Jones, 2009: 4). A similar point of view is expressed by Allen when he notes that citizens hold the state responsible for acting fairly or meeting certain minimum standards, or ensuring certain outcomes, in return for citizens fulfilling certain duties, such as paying taxes. Equity is about understanding how moral equality can be realised at the level of a whole society (Allen, 1990: 396).

According to Beder, equality is just a minimum level of income and environmental quality below which nobody falls. It means also that everyone should have equal access to community resources and the same opportunity, and no individuals or groups of people should be asked to carry a greater environmental burden than the rest of the community as a result of government actions. Also, it is agreed that equity implies a need for fairness in the distribution of gains and losses, and the entitlement of everyone to an acceptable quality and standard of living (Beder, 2000: 228).

Equity is a focus on justice and power. Sometimes, elites that benefit from inequitable laws and practices tend to use their greater power to defend the *status quo* while poor and marginalised people are relatively powerless to ask for fairer treatment. Approaches to tackling inequity must therefore involve efforts to promote empowerment of the poor and marginalised people so that they are better equipped to make such demands (Tucher & Ludi, 2012).

2.3.4. The Principle of Sustainability

Sustainability is a useful norm for all earth-keeping. As a norm of human behaviour, sustainability requires that we relate to the realm of nature in ways that respect its integrity. In that way, the natural systems may continue to function properly. The earth's beauty may be maintained and kept sufficient for human beings and nonhuman species (Presbyterian Eco-justice Task Force, 1989: 63).

Sustainability is the: “development that meets the needs of the present without compromising the ability of the future generations to meet their needs” (Nothwehr, 2012: 171).

It is the process of production and accumulation of goods in a way of keeping in mind the responsibility of a sound environmental management for future generations needs as well. In ecological and biological perspectives, “sustainability means: “the trend of ecosystems toward equilibrium, sustained in the web of interdependencies and complementarities flourishing in ecosystems” (Nothwehr, 2012:171).

In this regard, Maathai points out that:

The principles of sustainability, accountability, and equity need to be made real and tangible. In a manner that is likely only to become more vivid as the decades pass, sustainability entails recognizing that the destruction of the Congo's forests has global implications-not simply in further destabilization of weather patterns that may mean reduced harvests in the American Midwest and increased desertification in central Asia, or the increase of carbon dioxide in the atmosphere; but also perhaps in the loss of critical medicines and

minerals that may allow for human development in the future, both in Africa and beyond (Maathai, 2009: 267-268).

In the same way, Beckerman and Pasek expressed that the principle of sustainability can be called, sustainable development, as such it is a requirement to preserve intact the environment as we find it today in all its forms. And the loss of plant and animal species can greatly limit the options of future generations; so sustainable development requires the conservation of plant and animal species. “One of the important features of all these definitions is that, in the end, they are couched in terms of maintaining wellbeing or welfare, not some other concept such as the overall stock of natural capital, which is the key variable in some definitions of sustainable development” (Beckerman & Pasek, 2001: 74-76).

The language of sustainability refers to the long-term dependence of human and non-human well-being on the natural world, it is obvious that human activities are altering, damaging, and disrupting the natural systems on which all species rely. That is why, “the preservation of opportunities to live well is the normative focus of concern for sustainability” (Boylan, 2014: 332). The concept of sustainability is concerned with human well-being much as conservation is, but the conceptualisation of sustainability has recognised that the dependence of human well-being on the natural environment is richer and even more complex than dependence on natural resources (Boylan, 2014: 332).

According to O’Brien and O’Keefe, the word “sustainability” has two articulations or two interpretations: the weak and the strong. Weak interpretation states that technology or human ingenuity can solve the problems we have created. And the second which is the strong interpretation, suggests that the environment focuses and recognises the need to live within ecological limits. In short, the strong interpretation says that the pursuit of materialism is heading in the wrong direction, and the weak interpretation, pursue economic growth without respect for ecological limits (O’Brien & O’Keefe, 2014: 14).

2.4. From Injustice to Justice

Indigenous people are human beings; they deserve the right to be protected by the law as any other human beings. They cannot be neglected, evicted and separated from their own lands. Doing so means ignoring and threatening them (Mearn & Norton, 2010: 18-19). This injustice can be addressed only through the recognition of indigenous peoples' rights and customary land and resource tenure and through their inclusion as key partners and decision makers in the design and implementation of mitigation and adaptation interventions at global, national, and local levels (Mearn & Norton, 2010: 18-19).

The human rights organisation states that as the forest has receded under logging activities, its original inhabitants have been pushed into populated areas to join the formal economy, working as casual labourers or on commercial farms and being exposed to new diseases. This shift has brought them into closer contact with neighbouring ethnic communities whose HIV levels are generally higher. This has led to the spread of HIV/AIDS into the pygmy group (Bahuchet, 2006).

If the rights of indigenous peoples are not recognised or they are excluded from the discussion about climate change, it is obviously an issue of injustice. The North (developed countries) is industrialised and produces more greenhouse gas than the South. The South (developing countries) is almost poor and produces less greenhouse gas. Southern countries are vulnerable to the effect of greenhouse gas because they do not have strategies and policies to deal with such issues.

As citizens of this earth, we live in one of the most productive industrialised societies of the history, we are comfortable, but the wastes produced from our economic system are dangerous. We dump industrial chemical and radioactive wastes into our rivers and groundwater (Art & Meyer, 1991: 50). This is a case of injustice. Justice should be implemented. Justice in the sense of the quality of being just (Hanks & McLeod, 1986: 829). This is an injustice: in terms of tackling the causes of climate change or mitigation a social justice perspective emphasizes the need for an equitable sharing among nations of the responsibility for reducing GHG emissions, based on an acknowledgment of the

highly unequal distribution of past, present, and projected future emissions among them. “Moreover, a social justice perspective emphasizes that those whose lives and livelihoods are most vulnerable to the consequences of climate change and who have contributed the least to its causes should receive preferential support” (Mearns & Norton, 2010: 8-10).

These emissions (GHG) are externals to those who produce them. They are imposing at the same time social costs on the world and future generations, but they do not face the full consequences of their actions. The worst impacts of climate change are expected to fall on people living in some of the poorest regions of the world. They are the most vulnerable to adverse the impacts of climate change, for instance in terms of food production and water resources (Palmer & Engel, 2009: 2). The scientists identified the main source of carbon dioxide emissions in the production and consumption of fossil fuels, industrial activity and agriculture, including the destruction of forests for farmland, which have reduced natural sources of carbon dioxide absorption. This process has consequently increased the concentration of carbon dioxide in the atmosphere. However, changes will happen. Variations in climate will disrupt activities such as agriculture. Significant migration will occur, warm weather diseases such as malaria will spread and kill people, People will experience deaths caused by flooding and other hazards. The impact will be worst in the most vulnerable places such as India and Sub-Saharan Africa Countries (Posner & Weisbach, 2010: 1).

What should we do to address the danger of climate change? We need an urgent solution to prevent our life and the generation to come from the danger. Eric Posner and David Weisbach suggest that:

The governments of the leading contributors, now and in the future, adopt policies that reduce greenhouse gas emissions. These policies will need to make it more costly, for people to burn fossil fuels, clear forests, and engage in other activities that contribute to global warming (Posner & Weisbach, 2010: 2).

According to Posner and Weisbach to settle the climate treaty, nations must agree on the abatement measures. In this regard, developing countries claim that rich states should bear the bulk of the cost of abatement. China, India and Brazil urge that the United States and the industrialised nations of Europe should have to undertake aggressive emissions reductions, and provide significant financial assistance for any emissions reductions in the developing world. Developed countries object, and argue that the biggest emitters including developing countries should have the strictest obligations and other advancing different principles of equity (Posner & Weisbach, 2010: 3).

Most people around the world continue to think that the matter of climate change or global warming is not true; it is a myth or a simple distraction. Climate change is not a myth; it is a reality that people are facing in the meantime. The impact of climate change is occurring everywhere. For instance, the rise of the sea and the flood are observed around the world.

2.4.1. Climate Change: Myth or Reality?

The origin of myth comes from Greek culture “mythos”, which means:

An idea or story that is believed by many people but that is not true or a story that was told in an ancient culture to explain a practice, belief, or natural occurrence (Merriam-Webster Dictionary, 2016).

There is no doubt about climate change consequences on the environment. Effects such as drought, floods, rise of sea level, heavy rain are experiencing in many places. Climate change as a global problem needs a global solution or response in addressing its issues. This had been commented on Pope Francis (2015: n. 25);

The global causes and consequences of climate change imply the need for international collective action for an efficient, effective and equitable policy response (Palmer & Engel, 2009: 2).

Climate change is not a myth, but a reality that the world is facing each and every day and burying our heads in the sand will not reverse its catastrophic consequences.

2.4.2. Climate Change Justice

Maathai' analysis shows that the temperatures are rising because of an increase of greenhouse gases in the atmosphere and much of the greenhouse gases emissions have been made by developed countries which empowered their economies with the burning of fossil fuels. Climate change will seriously affect first and foremost the poorest and most vulnerable people on the planet, including the people in developing countries and especially in Africa. It is unfair that those who bear little responsibility to the crisis should pay the highest prices. Climate change is an issue of climate injustice (Maathai, 2004: 3).

The Presbyterian Church states that an eco-justice is required to address the ecological crisis, which means, a theology for instance who will deal with ecological crisis. Eco-justice reminds us that the urgent ecological problems are linked with the traditional concern for social and economic justice. In this regard, distributive justice remains a part of what is relevant to keep in mind. Justice is to be done to nature and its manifold creatures. Human beings have linked the plight of the vulnerable nonhuman world to the plight of poor and vulnerable people. Social justice and ecology cannot be separated (Presbyterian Eco-Justice Task Force, 1989: 67).

Climate Change raises social justice issues, particularly equity considerations between generations. Decisions taken today will affect future generations. Climate change also reinforces a vision of the world that is polarised between heavy greenhouse gas emitting and resource poor countries that will suffer the worst consequences. It is convenient to consider climate change mitigation as the responsibility of rich countries and adaptation as the concern of the poor countries (Mearns & Norton, 2010: 7). In this condition, an imperative of human action is required:

Act so that the effects of your action are compatible with the permanence of your action is not destructive of the future possibility of such life (Jonas, 1984: 11).

Beckerman and Pasek highlight that the interest of the future generation needs to be taken into account, including environmental policies. In this regard, the denial of the

future generation remains a big issue. Support and protection also need to be provided to future generations. It is imperative to refer to the principle of justice, because justice is that part of morality that allowed people with conflicting ends to coexist in peace and harmony. It is also a set of principles that enable people to agree on the allocation of rights to whatever assets might be the source of conflict. Moreover, this enables people to settle this kind of dispute peacefully or in the right way (Beckerman & Pasek, 2001: 28-31).

What are the ethical obligations of the countries that threaten others (the developed countries)? However, it is true that people's moral worth transcends spatial and temporal boundaries. Wealthy countries have the obligation of assisting and helping poor countries. To anticipate changes, actions need be taken (Posner & Weisbach, 2010: 169). In this regard, Posner and Weisbach state that:

If climate change would impoverish the future, the current generation has a strong obligation to take remedial action. If climate change would simply make some wealthy people in the future less wealthy than they would have been without it, but wealthier than most people today, then the obligation to take remedial action is weaker. And if climate change would produce future winners and losers, then the current generation's obligation to take remedial action today depends on the extent to which that action will in fact help the losers and not the winners, rather than vice versa (Posner & Weisbach, 2010: 169).

The researcher notes that climate change is a challenge to ethics. The response to that challenge should be to conserve future generation from the negative impact of climate change. The implementation of policies in this matter will be relevant. It is important that both the developed and the developing countries respect these policies.

Posner and Weisbach suggest further that to address the issue of climate change, a climate change treaty is necessary. To achieve appropriate climate goals, the treaty must develop a broad, deep, and enforceable treaty. Nations should join a climate treaty; nations must be designed to make signatories better off. But, this obligation imposes a

serious ethical duty on rich and poor nations, and cooperation between nations is required. It is unethical for a nation to refuse to join a climate treaty. A nation might be better off with a climate treaty that it joins, but it would be better off if everyone else joined a treaty. Not joining a treaty in these circumstances, will be unethical (Posner & Weisbach, 2010: 170).

These researchers highlight that nations should approach the climate problem from a pragmatic perspective. People argue that the climate treaty should include principles of corrective and distributive justice. Climate negotiation appears as an occasion to solve some serious problems in the world. This approach is not acceptable, this argument runs into serious objections of principle, and it makes climate change agreement unfeasible. Any effort to solve the entire world problem will shift on the diverse interests of the various states, those who are making these arguments, are hurting poor countries. If we demand a lot from rich countries, they will drag their feet (Posner & Weisbach, 2010: 5).

Boff suggested that:

The culture of the satisfied will become in its consumeristic selfishness and cynically ignore the devastation of the poor masses of the world. There is also a danger that the new barbarians will not accept their death sentence and will set out on a desperate struggle for survival, threatening everything and destroying everything. Humankind may find itself facing violence and destruction at levels never before seen on the face of the Earth unless we collectively decide to change the course of civilization (Boff, 1997: 113-114).

2.4.3. Climate Change Mitigation and Adaptation

Mitigation means reducing emissions or removing greenhouse gas out of the atmosphere. By contrast, adaptation consists of responding to climate change impacts (Shalizi & Lecoq, 2010: 298). It is relevant to establish the legal regulatory basis for effective climate change mitigation and adaptation by strengthening and increasing indigenous and other community rights to forestlands, trees, and their carbon in forest

countries (Mearns & Norton, 2010: 29). To limit the impact of climate change on economies, countries are required to mitigate emissions or adapt to climate change consequences (Shalizi & Lecoq, 2010: 298).

The researcher notes that climate change is an environmental problem where the countries causing the greatest damage, for example air pollution, are often reluctant to implement the Kyoto protocols. Andrews states that GHG emissions are released into the atmosphere and not localised to one spot, therefore the detrimental effects of climate change are not necessarily felt by some offenders. This can impact negatively on people far away from the actual source of pollution and the original polluters (Andrews, 2009: 2). Small islands and some coastal towns and villages will be submerged if nothing is done to mitigate the effects of climate change, as was noticed in the tsunami of 2004.

In addition, the damages are not immediate but built up over time. This separation between space and time can make people feel less responsible for the damage caused by their activities. In the case of climate change, industrialised countries share the most responsibility for creating the climate change problem, yet the poor nations face its harshest effects. Furthermore, the countries facing the greatest impact of climate change have little means to reduce this threat (Andrews, 2009: 2).

To slow down the impact of climate change in developing countries, Maathai suggests that traditional knowledge is very useful for communities that depend on farms; they are the most vulnerable to the impact of climate change, because they are facing food security problem and do not have the purchasing power at the market. To improve their security, rural people will need to become more resilient to changes in water availability and to extreme weather patterns. Traditional knowledge and strategies have a key role to play in climate resilience. Droughts have been experienced before and local knowledge can inform for an effective response. Encouraging farmers to strengthen indigenous knowledge systems and build upon them creates more community ownership of solutions and reduces their vulnerability (Maathai, 2004).

When peoples affected the most by climate change are not the ones causing the problem and have no means to reduce these threats, those who are causing climate change have

an ethical obligation to mitigate or prevent these consequences, particularly if such consequences are catastrophic. Climate change places human life, health, and welfare at risk, as well as threatens plants, animals, and ecosystems. Climate change further threatens to increase instances of drought, storms, floods, and can cause social conflict as people face a scarcity of natural resources, clean water, and a rise in disease (Andrews, 2009: 3).

Societies have the duty to manage the impact of weather and climate events. Nevertheless, additional adaptation measures will be required to reduce the adverse impacts of climate change and variability, regardless of the scale of mitigation undertaken over the next two to three decades. Moreover, vulnerability to climate change can be exacerbated by other stresses. This arises from, for instance, current climate hazards, poverty and unequal access to resources, food insecurity, trends in economic globalisation, conflict and diseases such as HIV/AIDS (IPCC, 2007).

In the light of the IPCC report of the 2007, Sonwa affirmed that the effects of climate change are having the worst impact on the poor who live in developing countries in Sub-Saharan Africa most of which are women and children. They are vulnerable to climate variability, particularly because they are dependent on natural resources. Household livelihoods and food security are also likely to be vulnerable under the changing climate since both production systems and forests, which are a vitally important part of food security in the region, are intricately dependent on the climate system. “This makes it imperative for climate change and climate variability measures to be taken seriously and for adaptation to be integrated into project development planning in both the private and public sectors in Sub-Saharan Africa” (Sonwa et al., 2009: 94).

Unfortunately, the importance of forests in the Congo Basin region is under-represented in major national development planning strategies, for example those on climate change response and poverty reduction strategies. This could be due to inadequate capacity in using the available evidence that documents how forests sustain the poor (Sonwa et al., 2009: 94). These researchers state that:

The challenge for the Congo Basin Forest and Climate Change Adaptation (CoFCCA) project was to increase both public and policymaker awareness of the contribution of forests to the development of livelihood adaptation strategies and to use forests goods and services in a way that does not jeopardize the resilience of the forests to future climate impacts. This would ensure the continuous provision of these goods and services, which contribute to adaptation, improving food security and reducing poverty (Sonwa et al., 2009: 94).

An ethical imperative of this analysis emphasises the obligations of rich countries both to reduce emissions rapidly and to provide adaptation support to poor countries. Within poor countries, a social justice perspective highlights the need to give priority to the poorest and most vulnerable groups in adaptation support and to ensure that vulnerable groups benefit from measures to reduce greenhouse gas emissions, rather than be left worse off because of them (Mearns & Norton, 2010: 14).

To tackle the consequences of climate change equitably, it is important to build the adaptive capacity and resilience of vulnerable social groups and the institutions that support them. To tackle adaptation required also seeing beyond infrastructure in deciding on priorities in allocating resources for adaptation (Mearns & Norton, 2010: 29).

In their research, Mearns and Norton founded that many societies are not well adapted even to existing climatic conditions, including the challenge posed by existing levels of climate variability. Which means that there is an “adaptation deficit” that needs to be addressed even before turning to an agenda that explicitly addresses the need to adapt to future climate change. Although, sound development remains the best form of adaptation, strong and accountable institutions, effective delivery of education and health care services, integrated water resources management, pro-poor agricultural research and extension, good infrastructure and diversified economy contribute to social resilience (Mearns & Norton, 2010: 29-30). Moreover, these researchers state that:

The Congo Basin also provides major regulation services for local and regional weather and ensures the cycling of water, which is a critical resource for adaptation and is also projected to be severely affected by future climate change (Sonwa et al., 2009: 95).

Sonwa emphasises that the wildlife habitats and biodiversity preserved in these forests, more than 29 million people, mostly indigenous people of about 150 distinct ethnicities, live in the Congo Basin forest. They depend on the forests for their livelihood, which increases their vulnerability to climate change impacts. For people of the Congo Basin, the forest is an indispensable asset for supporting poverty reduction strategies and serving as a starting point for adaptation. Unfortunately, the value of forests to local livelihoods is not fully captured in national documents, such as the first national communication reports submitted to the United Nations Framework Convention on climate change (UNFCCC), very few references were found to the potential contribution of forests to climate adaptation and mitigation strategies (Sonwa et al., 2009: 95).

Deforestation has been the second source of greenhouse gas emissions, just after fossil fuel combustion (IPCC, 2007). Maathai expresses that it is a concern on ecosystems degradation due to the deforestation of sub-Saharan Africa (western, Central African region) including the Congo Basin forest ecosystems. It is a need to investigate on climate change impacts and their implications for indigenous peoples in the Congo Basin forests. This will contribute in the understanding of and of the adaptation strategies to be implemented by the people who could be the most affected. The natural resource base affected by climate change needs to be evaluated in order to plan for the special adaptation needs of women and the elderly, and the minorities who are the poorest (Maathai, 2009: 255).

Furthermore, the same researcher states that “the industrialised countries also have a responsibility to deal with climate change at home, but also to assist Africa and the rest of the developing world to address its effects... Mechanisms ought to be established quickly to raise steady and reliable funds for the prime victims of climate change crisis,

who will be poor”. Today, most government’s forest policies are not helping matters (Maathai, 2009: 255).

According to Maathai the deforestation is taking place in Africa, and it has the highest rate of deforestation in the world currently losing approximately half a percent of its forests annually. It is a moral duty for all industrialised countries to assist Africa and other poor regions to find alternative and renewable sources of energy such as biomass, hydropower, and solar in order to enable South to participate in carbon market so Africa develop industries based on renewable energy sources (Maathai, 2009: 256).

In the case of the Congo Basin the lack of data, planning climate change response becomes very difficult, but it is urgently required. Planning national climate change adaptation involves the integration of scientific knowledge and monitoring, and estimating future scenarios in order to formulate policies. The goal of the Congo Basin Forest and Climate Change Adaptation(CoFCCA) project was to provide an innovative framework that incorporates forest ecosystem goods and services from sustainably managed Congo Basin forests into climate change adaptation strategies (Sonwa et al., 2009: 94).

These strategies will contribute to poverty reduction and biodiversity conservation in order to enhance resilience to future climate impacts. For a region where livelihood and national development are highly linked to natural resources, an approach for climate change adaptation is fundamental in sustainability and poverty alleviation (Sonwa et al., 2009:94).

While rich countries can help mitigate the effects of climate change by supplying Africa with appropriate technology, Africa itself can prioritise the protection and rehabilitation of its forests (Maathai, 2009: 257).

All governments must make a concerted effort to stop unsustainable logging and find mechanisms, such as reforestation programs, whereby the poor can secure a livelihood by protecting and not degrading their environment (Maathai, 2009: 257).

As long as there has been climate, there has been climate with all its ecological changes. Also, as long as there have been systems involving living organisms, adaptation has been needed. The concerns about global warming is the worry that human beings and ecological systems will not be able to meet the adaptation of anthropological climate change, and failure to do so will have high social, economic and biological costs (Thomson & Bendik-Keymer, 2012: 64).

IPCC suggests that adaptive capacity in human systems varies between regions, countries, and socioeconomic groups. The ability to adapt to climate change impacts is a function of wealth, technology, information, skills, infrastructure, institutions, equity, empowerment, and ability to spread risk. Groups and regions with adaptive capacity that is limited along any of these dimensions are more vulnerable to climate change damages, just as they are more vulnerable to other stresses. To focus on adaptive capacity is a necessary condition for reducing vulnerability, particularly for the most vulnerable region and nations (IPCC, 2001).

In the Congo Basin, especially in the DRC, a post conflict country, adaptation strategies remain difficult because of mismanagement. The DRC is a rich country, but its population remains poor. Among the poor, indigenous people like the pygmies are neglected and vulnerable to climate change effects.

An ecological restoration is needed, the practice required a response to damage for which we are responsible and it involves morally significant relations to individuals and groups, and it engages a deliberation about who we should be in relation to involving systems. Climate change complicates our attempts to develop a defensible moral relationship with nature, because it undermines both traditional views about how nature fits into a good human life and traditional aims of restoration (Thomson & Bendik-Keymer, 2012: 47).

2.4.4. Climate Change and Migration

Nail claims that the twenty-first century is the century of the migrant. More people are migrants because of environmental, economic, and political instability. And climate

change particularly may cause international migration to double over the next forty years (Nail, 2015: 10).

Climate Change has social and economic effects. Millions of poor from rural areas are relocating to cities; fleeing from their countries and joining other environmental refugees. Coastal areas may be less habitable, forcing people living there to find a convenient migrate land (Maathai, 2009: 253).

In this regard, the researcher notes that Port Gentile in Gabon is experiencing the threat of rising sea levels. If the action is not taken on time, people will migrate from this island of the Congo Basin because of the environmental threat.

Climate Change will bring significant changes in migration patterns throughout the developing world. There is evidence that in extreme incidents, such as droughts, floods and heat waves humans must be on the alert and be prepared for (Mearns & Norton, 2010: 103).

A similar viewpoint is presented by Bardsley and Hugo who state that with climate change forced migration will definitely involve poor people; they will be the most vulnerable to climate change impacts and could impoverish by the deterioration of their local situations. Most of the resettlements will occur within poor countries, and successful resettlement is not cheap. There will need to be a significant investment of resources made to successfully establish those displaced in new locations and provide them with sustainable livelihood opportunities in these destinations (Bardsley & Hugo, 2010: 256).

2.4.5. Climate Change Action

To address the consequences of climate change that we are facing, it is important to focus on a “global consensus”. The problem cannot be resolved by unilateral actions, this consensus can lead us to achieve a sustainable development, for instance in the field of agriculture and renewable energy. And it is better to promote a good management of marine and forest resources. The technology that uses polluting fossil fuels needs to be replaced progressively by the use of renewable energy. Unfortunately, international

community did not reach an appropriate consensus about the responsibility for paying the costs of this energy transition (Francis, 2015: n. 164-165).

In terms of tackling the causes of climate change, Mearns and Norton declared that it is necessary to strengthen the benefits and reduce the potential costs of migration actions to poor people and their livelihoods. We need to develop an inclusive and social accountable approach to hydropower development biofuels and forest carbon finance initiatives. To promote a good forest management, involvement and participation of indigenous people is capital in searching for the solution. The application of social safeguard policies required the involvement of various actors in forest carbon finance initiatives in concert with international agreements and good practices (Mearns & Norton, 2010: 29).

Recently, the Paris Agreement on Climate Change, the parties reaffirmed the goal of limiting global temperature increase well below two degrees Celsius (Outcomes of the U.N. Climate Change in Paris, 2015: 1). Climate change obligations are a global justice issue. It is not a matter of self-interest; justice requires all nations to reduce their greenhouse gas emissions to the levels that are distributive just. The duty to reduce activities that harm others is not diminished if others, who are contributing to the harm, are unwilling to reduce their harmful behaviour. This is so because no one has the right to continue destructive behaviour on the basis that others who are contributing to the damage have not ceased their destructive behaviour (Brown, 2013: 214).

In Brown's point of view, if some nations are not willing to reduce their emission according to what justice requires of them, no nation, including the United States, can refuse to reduce its emissions levels on the basis that others will not act. The imperative that nations should reduce their greenhouse gas emissions is terminated when they are below levels required by fair global allocations. As an ethical issue, all nations have a duty to keep greenhouse gas emissions below their fair share, independent of what other nations are doing. This is not a policy option, but an ethical duty (Brown, 2013: 215).

For instance, if a nation claims that another, such as the United States, should not adopt climate change policies because economic competitors, such as China did not adopt

climate change policies, this nation is claiming that no nation has a duty to reduce its greenhouse gas emissions to reduce their emissions. It means that China would not reduce their emissions to their fair share of safe global emissions until the United States will reduce its emissions. This position will undermine other nations to reduce their greenhouse gas emissions (Brown, 2013: 215).

The researcher thinks that it is an imperative for all countries that are emitting the greenhouse gases to reduce their emissions. Developing countries suffer from the effects of climate change produced by the developed countries such as the United States of America and others. The conservation of the Congo Basin's forests will be necessary for future generation in terms of climate regulation.

2.5. Dominant Religions' Response to Climate Change

This section will highlight the role which dominant religions play in addressing climate change issues. The focus will be on their main doctrine and strategies in dealing with the climate change challenges.

2.5.1. Christianity and Climate Change

Ecological crisis is a moral issue said John Paul II (1990: 5). He states that even people without religious conviction, but with a sense of responsibilities for the common good, recognise their obligation to contribute to the restoration of environment. Christians believe that their responsibility within creation and their duty towards nature and God are part of their faith. Therefore, they are conscious of a vast field of ecumenical and interreligious cooperation (John Paul II, 1990: n. 15).

Today, the ecological crisis is the responsibility of everyone. Its aspects demonstrate the need for concerted efforts aimed at establishing the duties and obligations that belong to individuals, peoples, States and the international community (John Paul II, 1989: n.15).

When the ecological crisis is set within the broader context of the search for peace within society, we can understand better the importance of giving attention to what the earth and its atmosphere mean to all of us, that there is an order in the nature which must be

respected, and that the human person, endowed with the capability of choosing freely, has a responsibility to preserve this order for the well-being of the generation to come (John Paul II, 1989: n. 15).

Pope Francis said that:

We need to realize that the solutions will not emerge from just one way of interpreting and transforming reality.... If we are truly concerned to develop an ecology capable of remedying the damage we have done, no branch of the sciences and no form of wisdom can be left out, and that includes religion and the language particular to it (Francis, 2015: n. 63).

The big issue on ecology is the problem of consumerism; humans consume the resources of the planet in an excessive manner. As human beings, we shift towards an “anthropological error” by our discoveries and the capacity to transform this world through the work of our hands; we forget that the world belongs to God (Jean Paul II, 1991: n. 37).

Instead of carrying out his role as a co-operator with God in the work of creation, man sets himself up in place of God and thus ends up provoking a rebellion on the part of nature, which is more tyrannized than governed by him (Jean Paul II, 1991: n. 37).

Among the irrational destruction of our planet, there is the human environmental destruction. Human beings should preserve not only their own life, but also the natural habitats of the different animal species threatened with extinction. Each of these species makes a particular contribution to the balance in the nature. Until today, human beings’ effort is not enough to safeguard the moral conditions of the human ecology (Jean Paul II, 1991: n. 38).

Mankind realises that we are under threat and pressure because of the result of the work of our own intellect and our hands. It becomes “alienation”, in the sense that we are unable to be in control of what we made and it turns against human beings. As the main

consequence, man live in fear, the fear of what he created himself (John Paul II, 1979: n. 15). In this regard, Pope John Paul II said that man:

Is afraid that it can become the means and instrument for an unimaginable self-destruction, compared with which all the catastrophes of history known to us seem to fade away (John Paul II, 1979: n. 15).

The exploitation of our planet requires a rational and honest management, because it is obvious that the uncontrolled developments of technology out of the framework of humanistic plan bring a threat to the man's natural environment and even alienate him in his relations with nature. God's will allows man to communicate with the nature as a guardian or a master and not as an exploiter or a destroyer of the nature (John Paul II, 1979: 15).

According to the Catholic Bishops of the United States of America, the challenge of climate change must be rooted in the virtue of prudence. Most experts agree that something significant is happening to the atmosphere. Human behaviour and activity are, according to the most recent findings of the international scientific bodies charged with assessing climate change, contributing to a warming of the earth's climate. It is crucial not only to continue to investigate about this matter, but to act now to mitigate possible negative effects in the future (United States Conference of Catholic Bishops, 1991).

His Holiness Pope Benedict XVI said that all of us are responsible for the care and protection of the environment. With regard to the principle of subsidiarity each of us is called to overcome the prevalence of particular interests. Different groups such as civil society, non-governmental organisations and the media should work together for the spread of ecological responsibility with respect for human ecology. There is no need to keep quiet to what is happening among us, even for the destruction of any one part of the planet affects us all. The relationship between all of us and environment should be marked by charity and respect (Benedict XVI, 2010: n. 11).

In addition, Benedict XVI states that:

A particular manifestation of charity and a guiding criterion for fraternal cooperation between believers and non-believers is undoubtedly the principle of subsidiarity, an expression of inalienable human freedom. Subsidiarity is first and foremost a form of assistance to the human person via the autonomy of intermediate bodies (Benedict XVI, 2010: n. 11).

According to Benedict XVI, the principle of subsidiarity is relevant in the sense that it respects personal dignity by recognising in the human being a subject who is capable of giving something to others; by considering reciprocity as the root of what is important between human being (Benedict XVI, 2009: n. 57). In the same way, pastoral constitution on the church in the modern world states that:

Attention must be always being paid to this universal destination of earthly goods. In using them, therefore, man should regard the external things that he legitimately possesses not only as his own but also as common in the sense that they should be able to benefit not only him but also others. On the other hand, the right of having a share of earthly goods sufficient for oneself and one's family belongs to everyone (Gaudium et spes, 1965: n. 69).

The modern world is a time of great progress; it is in the same moment a time of any kind of threat for human. The Church has a duty to speak of this threat to all people of good will and must carry on a dialogue with them about this problem. The modern world seems to be far from the moral order, and from the justice's requirements (John Paul II, 1979: n. 16).

The human person is living in danger today; moreover, the urgent need for human ecology, the peril is serious, because the root of the problem is not superficial but a big issue. It is not merely a question of economics but of ethics and anthropology. The Church has always stressed on it and many people are agreeing with the church, unfortunately they are unable to change their wrong behaviour since what dominates are

the dynamics of an economy and finance that are lacking in ethics. It is no longer man who commands, but money, cash commands (Francis, 2013: 2).

An appropriate solution remains a global agreement on the consequences of climate change. We need an ethical imperative to act (Francis, 2014: 1). According to Pope Benedict XVI, the human development is linked to the obligations which come from man's relationship with the natural environment (Benedict XVI, 2010: 1). We need to act as soon as possible, because it is the poor and the powerless that most directly bear the burden of current environmental carelessness (Veldman et al., 2014: 177).

Another danger which threatens the world is war. Today, modern science has the capacity to transform the environment for hostile purposes (John Paul II, 1990: n. 12). Alterations of this kind over the long term could create more consequences. Despite the international agreements which prohibit chemical, bacteriological and biological warfare, the fact is that people continues to develop new offensive weapons capable of altering the balance of nature. Today, any form of war on a global scale would lead to incalculable ecological damage. But even local or regional wars, not only destroy human life and social structures, but also damage the land, by ruining crops and vegetation as well as poisoning the soil and water. The survivors of war are forced to migrate and start a new life in difficult environmental conditions, which in turn create situations of extreme social poverty, with negative consequences for the environment (John Paul II, 1990: n. 12).

Pope John Paul II has explicitly employed an ecological understanding in discussing the moral issue. In *Centesimus Annus* he writes:

In addition to the irrational destruction of the natural environment, we must also mention the more serious destruction of the human environment.... Although people are rightly worried.... About preserving the natural habitats of the various animal species.... Too little effort is made to safeguard the moral conditions for an authentic 'human ecology' (Hertzke, 1998: 631).

The ecological crisis and the destruction of biodiversity are threatening the existence of the human species. The consequences of the mismanagement of the global economy, guided by ambition for wealth and power, must serve as summons to a forthright reflection on man:

Man is not only a freedom which he creates for himself. Man does not create himself. He is spirit and will, but also nature (Benedict XVI, Address to the Bundestag, 22 September 2011, cited in *Laudato Si'*, 6).

According to Pope Francis creation is compromised:

Where we ourselves have the final word... The misuse of creation begins when we no longer recognize any instance above ourselves, when we see nothing else but ourselves (The Speech of the Pope Francis to the UN, 2015).

The Catholic Church is encouraging and supporting the “ecological conversion” which in recent decades has made humanity more sensitive to the catastrophe to which it has been heading. According to the Roman Catholic Church man is no longer the Creator's “steward”, but an autonomous despot, who is starting to understand that he must stop abusing nature (*Evangelium vitae*, n. 27).

Another welcome sign is the growing attention being paid to the quality of life and to ecology, especially in developed countries, where people's expectations are no longer concentrated so much on problems of survival as on the search for an overall improvement of living conditions (*Evangelium vitae*, n. 27).

2.5.2. Buddhism and Climate Change

The Tibetan Buddhist leader, Dalai Lama claims that climate change is created by human beings, and he is inviting all humanity to take action. Lama appealed to younger generation to take a more active role in protecting this planet. “This is not a question of

one or two nations. This is a question of humanity. Our world is our home.... There's no other planet where we may move or shift" (Dalai Lama, 2015).

Some Buddhist countries such as Bhutan wish to be in harmony with nature and to pass on this rich heritage to their future generations. Research demonstrates that the Bhutan is a net carbon sink and the causes of climate change are coming from outside of Bhutan's border, the government should facilitate people's ability to adapt to a changing climate. And climate change is expected to impact on cultural preservation, as people's livelihoods will have to adapt to new systems and less agriculture could increase urban migration (Veldman, 2014: 47-58).

Buddhists believe that their concern is founded on the Buddha's realisation of dependence on which all things are interconnected in the universe. Understanding this interconnected causality and the consequences of our actions are critical steps in reducing our environmental impact. Cultivating the insight of compassion, we will be able to act out of love, to protect our planet. Buddhist leaders have been speaking about this for centuries. However, everyday life can easily lead us to forget that our lives are interconnected with the natural world through every breath we take, the water we drink, and the food we eat. Through our lack of insight, we are destroying the systems that support our life; we and all other living beings depend on for survival (Global Buddhist Climate Change Collective, 2015).

Buddhists claim that "The Time to Act is Now: A Buddhist Declaration on Climate Change," which is endorsed by a diverse and global representation of Buddhist leaders and Buddhist documents. They welcome and support each and every climate change declarations of other religious traditions. They are united by their concern to kick out fossil fuels, to reduce the consumption patterns, and the ethical imperative to act against both the causes and the impacts of climate change, especially on the poor countries (Global Buddhist climate Change Collective, 2015).

According to Buddhism:

The health of the whole is inseparably linked to the health of the parts, and the health of the parts is inseparably linked to the health of the whole.

This means that caring for the environment begins with caring for oneself. Buddha taught people to live simply and appreciate the natural cycle of life. The solution to the environment crisis begins with individual. A good life is in harmony with nature (Buddhism and Climate Change, 2015).

The global Buddhist community recognises the dependence on one another as well as on the natural world. The humanity has the imperative to act on the root causes of these environmental crises, which is driven by our use of fossil fuels and the lack of concern about the consequences of our actions (Global Buddhist Climate Change Collective, 2015).

Buddhists point out that the earth is our mother as well as our home. When the earth becomes sick, we become sick also, we are part of her. Buddhists suggest that they need to move towards an economy that provides a satisfactory standard of living for everyone which can provide a development of our potential in harmony with the biosphere that sustains all beings. If politicians are unable to recognise the urgency of our global crisis, we may need to challenge them with sustained campaigns of citizen action (The Time to Act is now, 2015).

At the same time, the Dharma (Buddha's teaching), suggests ways to minimise climate change crisis and its consequences. The first solution, we must acknowledge the truth of our suffering, and without reductions in fossil fuel use and efforts to increase carbon sequestration, global warming will rise to or beyond 2 degrees Celsius. It will lead to death of millions of people worldwide and the extinction of many of species on earth. Therefore, poor nations and people subjected to oppression and discrimination, who contributed little to climate change will be harmed the most (The Earth as Witness, 2014)

The Dharma also emphasises that craving; aversion and delusion within the human mind are the root causes of human suffering. Like these mental factors throughout history led to the oppression, abuse, and exploitation of indigenous peoples, aversion, craving, and delusion are also the root causes of climate change. However, by acknowledging and addressing these internal mental drivers, we can resolve the external causes of climate change (The Earth as Witness, 2014).

The Dharma presents three pathways to minimise the impacts of climate change; the first principle is the “wisdom”. We must acknowledge not only the external causes of climate change, but the internal mental drivers as well, and their consequences. We must do whatever is necessary to reduce climate crisis to manageable levels. The second principle is an “ethical conduct”. We need to make a firm moral commitment to adopt ways of living that protect the climate and restore the earth’s ecosystems. In our lives, we should keep the value of contentment and sufficiency and we should also realise that, after a certain modest level, additional consumption, material wealth and power will not bring happiness (The Earth as Witness, 2014).

To fulfil our moral responsibility, we should make sure that our economy, social, and political institutions be altered so they protect in a just and equitable manner. The third principal is the “mindfulness”. It increases awareness of our inherent interdependency with other people and the natural environment and of values that enhance human dignity rather than subordinate people, animals, and nature to the craving for more material wealth and power (The Earth as Witness, 2014).

2.5.3. Hinduism and Climate Change

Hindu tradition states that man cannot be separated from nature. Human beings are linked by spiritual, psychological, and physical bonds with the nature. We cannot continue to destroy nature without destroying ourselves. We must do what is humanly possible to protect the earth and her resources for the present as well as future generations (Hindu Declaration on Climate Change, 2015).

Hindus are linked by spiritual, psychological and physical bonds with the elements of the nature. Knowing that the Divine is present everywhere and in all things, Hindus strive to do no harm the nature. Hindus hold a deep reverence for life and an awareness that the great forces of nature, the earth, the water, the fire, the air and space, as well as all the various orders of life, including plants and trees, forests and animals, are bound to each other within life cosmic web (Hindu Declaration on Climate Change, 2015).

Hindus are sure that they live in very crucial moment; this time is a time of crisis and a time of change. Multiple crises are among them, crisis of ecology, economics, and evolution. Crisis needs a combination of technology and spirituality to kick in to save the entire humanity. This crisis needs an integral and unified response. If they overcome the challenge, they may transform the world. Otherwise, the planet will be destroyed (Paranjape, 2016).

The entire world has yet to agree on a relevant plan to ameliorate man's condition to the complex change. This is due to powerful forces in some countries who challenging the concept that unnatural climate change is occurring. Mahatma Gandhi urged, "You must be the change you wish to see in the world". This sentence of Gandhi inspires us to change our lifestyle, to restrain our desires, and even to adopt a good behaviour towards the nature (Hindu Declaration on Climate Change, 2015).

The global Hindu Community again urge strong, meaningful action be taken at both the international and national level, to slow and prevent climate change. Such action must be scientifically credible and historically fair, based on deep reductions in greenhouse gas emissions through a transition away from polluting technologies, especially away from fossil fuels. A transition towards using 100-percent clean energy is desperately needed, as rapidly as is possible in every nation. Doing so provides the only basis for sustainable, continued human development. It is the best hope for the billions of people without electricity or clean cooking facilities to live better lives and reduce poverty (Balaji, 2015).

2.5.4. Judaism and Climate Change

The Jewish moral principle on climate change focuses on Deuteronomy. “Therefore choose life that you and your descendants may live” (Dt 30: 20). It is the responsibility towards future generations. As human beings, we have an obligation to protect the future generations. Minimising climate change means to learn how to live within the ecological limits of the earth, so that we shall not compromise the ecological or economic security of those who come after us (Climate Change Resolution, 2005).

Jewish tradition cares and respects the earth because “The earth is the Lord’s and the fullness thereof” (Ps 24). For Judaism any act that damages our earth is an offense against God’s property. Among the threats that the earth is facing, climate change remains a huge challenge to resource development. To address the issue of climate change, we need to learn how to live within the ecological limits of the earth in order to prevent the ecological of the future generations (Jewish Views on the Environmental, 2016). The Jewish tradition cares about the planet for many reasons and one of the most important natural resources of this planet is water, water indeed has a special place in Jewish tradition, playing a role in major stories in the bible. Jewish tradition has long advocated that local and national governments take appropriate measures to remove or ameliorate the growing threats of environmental pollution, in order to afford protection to the environment (Jewish Views on the Environment, 2016).

The procedures to address climate change must protect those who are vulnerable to climate change around the world, poor people, those living in coastal areas, those who rely on subsistence agriculture. The Earth cannot sustain the levels of resource exploitation currently maintained by the developed world (Climate Change Resolution, 2005). To achieve the global economic development, the developed world should promote the use of renewable energy sources and new technologies, so that developing nations do not face the same environmental challenges that we face today because of industrialisation. Strong action to reduce greenhouse gas emissions is required including the improvement of air quality, development of non-polluting alternative energy sources, energy efficiency and energy conservation. Together, the people of the world

can, and must, use our God-given gifts to develop innovative strategies to meet the needs of all who currently dwell on this planet, without compromising the ability of future generations to meet their own needs (Climate Change Resolution, 2005).

The Torah claims that: “justice and only justice you shall pursue, so that you may live and occupy the land that the Lord your God is giving you” (Dt 16: 20). The criteria of justice and equity should be implemented. The countries most responsible should be those most responsible for finding a solution to the problem. Judaism underscores the moral imperative of protecting the poor and vulnerable. Poor countries are bearing the brunt of negative impacts of climate change (Jewish Views on the Environment, 2016).

In Leviticus 26, the Torah says that if we refuse to let the earth rest, it will rest anyway, despite us and upon us through drought and famine and exile that turn people into refugees. We must act right now, because we are facing floods, droughts, sea-level rises, and the expansion of disease bearing insects from tropical zones into what used to be temperate regions (Waskow, 2015).

2.5.5. Islam and Climate Change

Islamic teachings encourage behaviour that is directed at the goal of reducing fossil fuel use. In an Islamic perspective, the problem of climate change needs a personal response that integrates the spiritual and the rational, a response at the community and economic levels. On a personal level, spiritual practice and reflection on the natural world would assist in nurturing the orientation of an individual such that their outward actions begin to embody more unifying value (Hussain, 2007: 15 & 31). Similarly, Baig states that in the Qur’an, God made us inheritors of this earth. We are caretakers of this earth today; tomorrow it will be the turn of our children. The critic questions whether we are fulfilling our duty to take care of this earth. He continues to examine the condition we are that we are going to leave this earth, for next generations (Baig, 2014: 4).

According to Muslim tradition:

The environment is the creation of Allah. The creation of this earth and all its natural resources is a sign of His wisdom, mercy, power and His

other attributes and therefore serves to develop human awareness and understanding of Allah. In Islam, humans are expected to protect the environment since no other creature is able to perform this task (Islam and Climate Change, 2011).

Muslims are making an effort to protect the creation of Allah. They recognise that human beings are responsible for their actions in this earth and all the community cannot deny it. The earth is not for one generation, it belongs to every generation, past, present and the future including humans as well as other creatures on the earth (Islam and Climate Change, 2011).

On a personal level, carbon emissions could be reduced more quickly when spirituality is complemented with rational intelligent. Spirituality might help a person to be comfortable with some choices uncovered through a rational understanding of the facts. Rational response however, could include development of knowledge, for instance, of low carbon energy sources, energy efficiency, local, national and international politics, social movement (Hussain, 2007: 31-32).

2.5.6. African Traditional Religion and Climate Change

In Africa, our ancestors in order to get the equilibrium between the nature and the human beings were living the forest in “fallow land” mechanism (Period of time when nothing is done to allow the forest to grow again). Indigenous knowledge was in the forefront to guide people, because people depend on the forest, the forest represented everything for them; food and medicine were the fruit of the forest. Obviously the forest was part of their culture and they could not survive without the forest. For example, in the Congo Basin, the forest was the source of Pygmy religion as said Sheshadri (2005). Indigenous people deserve the responsibility to conserve and restore nature. However, they continue to be excluded in some decisions regarding their living conditions. Today, climate change challenges are global issues and the response to the problem should be also be a global one.

The third chapter will present the theology of creation. God is the Creator of heaven and earth, and He earth mandated human beings to be the steward of the creation; to protect and to care for it.

2.6. Conclusion

This Chapter has highlighted the environmental issue of climate change. Humans and non- humans' destruction has been described and analysed. It emphasised the key role played by Indigenous communities in the Congo Basin protection. In order to address the injustice and to implement the norm of social justice, recommendations were made on the practice and the implementation of the equity principle, and the notion of sustainability was developed. In view of climate change challenges, it was emphasised that societies need to develop common strategies based on ethical values. In addition, a review of dominant religious doctrines highlighted the necessity of saving the planet against the negative impacts of climate change, which is in accordance with the will of the Creator.

CHAPTER 3

ETHICAL THEOLOGY OF CREATION

The third chapter will explore the ethical theology of creation. Special attention will be given to the following aspects: Creator and creation; the care of creation; the protection of creation; the Bible as the root of creation stewardship; steward responsibility; theology of nature; human beings and nature; nature's safeguarding; management of nature; the natural environment and peace; the natural law; social doctrines of the Catholic Church and human dignity.

3.1. Introduction

Chapter two was an analysis of the industrialisation impacts. The researcher highlighted the role played by the dominant religions stressing that we should take action and protect God creation. In the researcher's understanding, God is the Creator of heaven and earth as state in Genesis chapter one. We rely on this affirmation, when we realise that human being is unable to perform what God have done. Thus, God remains transcendent and immanent in the world. Created in the image and likeness of God (Gen 1, 27), human being have dominion over the entire creation and care for the creation of God, he should be the steward of God creation.

Theology of creation will focus on the relationship between human beings and nature and an ecological ethics should guide people on how to protect life in all its form. That is why; the Roman Catholic Church throughout its teaching is no longer discussing more only the "anthropocentrism". The Church is focusing now on "ecocentrism", and the new vision of the Roman Catholic Church is taking care of all creation. The researcher notes that the Catholic Church no longer focuses on mankind but focuses on the conservation, as a point of departure.

Moreover, human beings should protect creation, because life depends on nature. Mankind should not destroy it and wipe out non-human nature. Therefore, to conserve nature and the future generation, man should implement a cleaner technology, which can help to use forests. This must be done on a sustainable way in order to avoid the

negative impacts of climate change and global warming. Thereafter, man will live in peace and harmony with nature and retain his dignity.

3.2. Creator and creation

The first chapter of Genesis states: “God is the creator of heaven and earth” (Gen, 1). Therefore, Waldron claimed that:

As we begin to think, we begin to marvel, because commonly when we think of heaven and earth, we move from sight to vision. We move from what we see in the everyday to a sort of cumulative vision of all creation. We think of sky and clouds and stars, glory of sun and sheen of moon, mountains and snow, rivers and shining water, green field and forests and flowers. The vision is of beauty and we look upon the earth as God must have looked on it in the first white days of the world. And we see that it is good (Waldron, 1990: 336).

As human beings, we are unable to perform the same work as God. However, it is possible to continue God’s creation. All that God has done is wonderful. Our actions as God’s creatures are imperfect, but God’s deeds are perfect. God’s perfection depends on His nature; He is the Master of our lives and of everything that exists in this world.

Thus, Waldron continues to explain that the difference between God and all other beings is clear. He emphasises the relationship between the creator and creation. This relationship remains a close, happy bond. All God had made, was good (Gen 1: 31). All those beings, light and people, water and animals, air and plants participate in what God is. They are creatures, and one should not diminish their status by stressing their dependence. Their relationship with the Creator from whom they have received their being is noted (Waldron, 1990: 336-338). Harrelson has a similar viewpoint; he qualifies this affirmation as an affirmation of faith which cannot be scientifically verified. For instance, it is difficult to think of the eternity of time and to think of the beginning of time. Both appear to involve logical contradictions. Creation, therefore, is a term forever clothed in mystery. There is no conflict between “science” (based on hypothesis and experience) and “religion” (belief and faith) on the matter of creation, since creation is

an affirmation of faith not subject to proof or disproof by any discipline of human thought or investigation (Harrelson, 1956: 46). Therefore, creation as a matter of faith is clearly contained in the Bible.

The first article of the creed (Catholic Church Prayer) says: "I believe in God the Creator of heaven and earth". This confession of faith proves to be highly mysterious. The researcher agreed with O'Donnell that the Christological confessions and the doctrine of the hypostatic union push our intellects to the limits of human reasoning as they ponder how Jesus can be both divine and human. The doctrine of creation allows us to understand how the transcendent God can go out of himself and create something other than himself which is simultaneously, not greater than God. When one acknowledges God as Creator it also implies the question of God's difference from, and unity with the world. In other words, the divine transcendence and immanence is a mystery (O'Donnell, 1997: 309).

The researcher acknowledges that the creation of God was a dynamic process. When God started to create, we were not present, but at the end we came into being. At the beginning of creation, we were absent and finally we are with God when we came into existence and we participate in His being. God is at the same time among us, and He is standing beyond our knowledge, as human beings. We are not able to exercise God's power unless He infuses His power on us.

In addition, Waldron notes that the Creator provides "intelligibility" and "meaning" to creatures. The critic adds that human beings who participate most fully in God have a unique meaning on earth. Waldron notes further: "We alone know that we know We are both distinct from nature and at one with nature in that we too are part of the whole created order" (Waldron, 1990: 340). The human being is made in the image of God, a being to appreciate, to collaborate; a human being has the freedom of choice. The rest of earth's creation will obey perfectly the will of the Creator (Waldron, 1990: 340).

According to Harrelson, there are two versions of creation in the Bible, each complementing the other. Both of them are presented as records of what happened. We may refer to them as myth as designed to account for realities which lie beyond the

realm of history. The Biblical writers presented this history as primeval history, as the history of the beginning of mankind and his world. It is not possible to do more than sketch the two stories. Genesis 1: 1-2: 4a is a carefully structured account by Israel's priests of the precise process by which the heaven and earth were called into being by the divine world (Harrelson, 1956: 47). Therefore, Harrelson states that:

Behind the story is the desire to distinguish the Israelite view from the notions of creation current in the surrounding cultures. The primeval waters, unformed and inchoate, are illuminated by the creation of light. This reminder that heavenly bodies are not gods at all; they are not necessary to God when he begins his work; they are not even on hand. The waters are divided into the heavenly, earthly and subterranean seas, held in place by firmament of heaven and by earth itself. No word is given about the heavenly arrangements, since for the Israelite this realm is God's alone (Harrelson, 1956: 47).

Human beings think that God is sometimes beyond our understanding. When our powers are limited, God starts to act by showing us His power and nature.

Animals and mankind are created and commanded to be fruitful and multiply. Man alone is created in the image and likeness of God (Gen 1, 27). In this regard, Harrelson states that the most important difference between man and the rest of creation, is man's capacity for "self-transcendence"; his capacity to be both subject and object in the created order. He is not God, but he is creature of God. As creature, however, he is commanded to have dominion over the entire creation. This is his mandate to possess the earth, to enjoy its fruit, to bring it into subjugation for the sake of the purpose of God in creation. When God's work is done, he pronounces it to be "very good". Then, He rests on the seventh day. In the same way, man too is to work faithfully and well, and then to rest from his labours (Harrelson, 1956: 47).

Among visible creatures only man is able to know and love his creator. He is the only creature on earth that God has willed for its own sake, and he alone is called to share, by

knowledge and love, in God's own life. It was for this end that he was created, and this is the fundamental reason for his dignity (Catechism of the Catholic Church, 1993: 356).

The Christian faith has been challenged by responses to the question of origins. Ancient religions and cultures produced many myths concerning origins. Some philosophers have said that everything is God, that the world is God, or that the development of the world is the development of God (Pantheism) (Catechism of the Catholic Church, 1993: n. 285). Others have said that the world is a necessary emanation arising from God and returning to him. Still others have affirmed the existence of two eternal principles, Good and Evil, Light and Darkness, in permanent conflict (Dualism, Manichaeism). According to some of these conceptions, the world (at least the physical world) is evil, the product of a fall, and is thus to be rejected or left behind (Gnosticism). Some admit that the world was made by God, but as by a watch-maker who, once he has made a watch, abandons it to itself (Deism). Others reject any transcendent origin for the world, but see it as merely the interplay of matter that has always existed (Materialism) (Catechism of the Catholic Church, 1993: n. 285). Christians trust in God Creator of heaven and earth, master of the universe visible and invisible.

3.2.1. The Care of Creation

The Catholic Church in 1215, promulgated temporal creation *ex nihilo* as official church doctrine at the fourth Lateran council, declaring God to be creator of all things, visible and invisible, who by His almighty power, from the beginning of the time has created both orders in the same way out of nothing (Craig, 1998: 178). Thus, Craig emphasises that this declaration not only affirms that God created everything without any material cause, but even that time itself had a beginning. The doctrine of creation is thus inherently bound up with temporal considerations and entails that God brought the universe into being at the same point in the past without any antecedent or contemporaneous material cause. Christian scriptures claim that God is engaged in a sort of on-going creation, sustaining the universe in being. Christ "reflects the glory of God and bears the very stamp of His nature, upholding the universe by His word of power" (Heb 1.3; Craig, 1998: 178).

Adam was instructed to take care of the garden in which he lived, and the animals were created to provide companionship for him (Gen 2:18). Drane suggests that the story assumes a relationship of interdependence between Adam and nature. Not quite one of equality, as he also named the creatures, which suggests control over or responsibility for them. As expressed in Genesis 1, this control is encapsulated quite precisely in the statement that God's intention for humankind was to be "in our image, according to our likeness; and let them have dominion over the fish of the sea, and over the birds of the air, and over the cattle, and over all the wild animals of the earth, and over every creeping thing that creeps upon the earth" (Gen 1: 26, 28; Drane, 1993: 8). The word "dominion", in this sense means, the care and protection of the earth. This conclusion is underlined by the affirmation that humankind is "in the image of God". The idea that human behaviour should be modelled on the known characteristics of God is central to Old Testament morality. Drane expresses that if Genesis 1 gives people considerable status in the order of creation, then Genesis 2 expresses a difference, but no less significant, idea about the natural balance of things. Humankind is created from the dust of earth, emphasising that people are directly related to the environment, and in spite of their perceived status, are themselves an intrinsic part of nature (Drane, 1993: 8). Other texts say the same thing. For example, Psalm 8 makes peoples only "a little lower than god" (Ps 8: 5), then Psalm 144 describes them as "a breath; their days are like a passing shadow" (Ps 144: 4). And if we have a look at the Psalm 104 there is a discussion of how God created and sustains every part of the environment and every living creature. However, the whole psalm expresses a view of the interdependence of different parts of the natural world on one another (Drane, 1993: 8).

The researcher observes that the dominion of creation by mankind means that mankind has an obligation to care for, or, to be the master of the creation. However, it does not mean the destruction of nature. Moreover, mankind has an obligation to continue God's creation. For instance, he has the responsibility to innovate or to introduce a new idea in any kind of field of research. As mankind's life depends on nature, he cannot disturb nature; doing so will lead to many negative consequences that the world is facing today such as floods, desertification, and climate change.

However, according to Hart, Catholic environmental teachings have undergone a major transformation. The tradition that was dominated by anthropocentrism is developing a new vision for church teachings that integrate human responsibility to care for all creation with human responsibility to be solicitous of the needs of all members of the human family. As this teaching continues to develop, it will impact the church, Christian community, and everybody in general. People will assess more objectively their patterns of pollution and consumption, and their responsibilities to humanity, to Earth and to God. Such an assessment, when accompanied by an enhanced spiritual sense of the presence of God-immanent, and when incorporated into concrete historical projects of social and ecological transformation, will lead to a renewed Earth (Hart, 2004: 129-130).

3.2.2. The Protection of the creation

The misuse of the Bible sometimes leads to the abuse of nature. According to Berry people who are destroying creatures without respect, will want to believe that they are ensouled creatures or humans. By denying spirit and truth to the nonhuman creation, human beings are performing a form of blasphemy without which the nature and culture destroying machinery of the industrial economy could not have been built that is they have legitimised bad work. Good human work honours God's work. Good work uses nothing without respect, both for what it does not respect and that it does not love. It honours nature as a great mystery and power, as an indispensable teacher of all work of human hands (Berry, 1993: 156).

In this regard, human beings should protect nature, for the nature represents the source or the soul of all kind of life in this world, without nature human beings cannot survive, what is relevant is to keep our nature safe, in order to get a better life today and in the future. Moreover, we should keep the creation. The judgment of Revelation 11: 18 is that those who destroy the earth themselves will be destroyed. Genesis 2: 15 sees our duty as serving and keeping the Garden; imaging God, we should satisfy the earth by the fruit of our work as God does (Ps 104); exercising dominion in the manner of Christ (Phil. 2: 5-8), we should care for the land, keeping our eyes continually upon it (Deut. 11:11-12) (DeWitt, 1993: 14). The Lord Himself is advising us through the Bible not to destroy

the earth, but to provide protection. The examples mentioned above represent the guide that we should follow.

Thus, Cooper and Carling note that dominion over nature is not a license to exploit nature in order to satisfy every human need. Rather, human beings are authorised to be God's stewards to care for creation, enabling it to fulfil its purpose. The Bible regards it as man's duty to use nature, not to abstain from using it; but that he must use it as son of God and in obedience to God's will; and that his use or abuse of nature has far-reaching results in the whole structure of the world (Cooper & Carling, 1996: 71). These researchers emphasised that an understanding of humans as created "co-creators" is rooted in the Christian theological traditions of "creation continua" and hope in the new creation. In exercising our dominion over the creation, we must ask ourselves: "If God's purposes are for the well-being in relation of the whole of the creation", what is the place of human well-being in relation to the whole creation? Dominion is exercised, then, in accordance with the creator's intentions for creation rather than satisfying human wants and desires. Stewardship practiced from a "theocentric" perspective will act in way that sustain or enhance the overall well-being of creation (Cooper & Carling, 1996: 71-72).

The Bible teaches man simultaneously that the non-human creation has worth; apart from its usefulness to humanity, and also that humans are created in God's image and called to be stewards of God's garden. God did not create the non-human world only for the benefit of humans; non-humans are relevant for God and for us (Berry, 2000: 47). For instance, God feeds the birds and clothes the lilies (Matt.6: 26-30; Berry, 2000: 47). In the story of the flood, God makes a covenant, not just with Noah and his family, but also with the non-human creation:

I am establishing my covenant with you and your descendants after you,
and with every living creature that is with you, the birds, the domestic
animals and every animal on earth (Gen.9: 9-10; Berry, 2000: 47).

Moreover, according to Berry, our dominion should be the gentle care of a loving gardener; we should not wipe out species or the non-human creation. Only a careful, stewardly use of plants and animals by human beings is legitimate. The creator who

made us, both body and soul, wants us to enjoy the gorgeous bounty of the material world. Also, we are created in such a way that human wholeness and fulfilment comes not only from material things, but also from right relationships with nature and God. Both the call to care for our nature and the summons to sabbatical worship of God place limits on human acquisition and consumption. Material things are very good, but less important than spending time and enjoying right relationships with nature and God (Berry, 2000: 48).

The Presbyterian Eco-Justice Task Force reminds us that we cannot ignore our role, only the human creature is in charge of the creature with the Creator in keeping the creation:

Keeping means tilling with care. It means maintaining the capacity of the creation provides the sustenance for which the tilling is done. But God's "garden" was not planted exclusively for human tilling. It has its own beauty and integrity apart from that. Keeping it means respecting and cherishing the whole of it- ensuring that the cycles and seasons may continue as the Creator intends, and that the wind and the rain, the bees and the bacteria, may continue to do their work as components of the natural systems whereby all life may flourish (The Presbyterian Eco-Justice Task Force, 1989: 4).

The researcher agrees with these critics, as in the Congo Basin deforestation is taking place every day. It proves that human beings are destroying nature, instead of caring for it. The researcher recommends that man not destroy creation, but maintain and care for it as God did. Thus, nature will continue to function as usual in harmony and in peace. It is the reason why God wants us to be good stewards.

3.3. Root of creation stewardship in the Bible

The Christian stewardship ethic starts with the Bible especially the Genesis commandment (1:26-28) which gives humans dominion over the earth. Kearns thought that they reinterpret it as a divine charge to be good stewards and to take care of and protect the creator's creation. They point out that stewardship is one of the first commandments given to humans by God. The ecological problem is not first a problem

concerning the way we think. We are treating our planet in an anti-human, manner (Kearns, 1996: 58-59).

In this sense, abuse of creation, and of the Creator's provisions make a mockery of creation's goodness and God's providing care; it reduces the praise of God by creation; and violates the teachings of the scriptures. Our main responsibility is to care for the food, water and comfort of animals under our domination and not deny them their blessing (DeWitt, 1993: 14).

3.4. Steward Responsibility

According to Leopold, the word "stewardship" has shifted through several meanings. In feudal periods, a steward was one who managed the realm while the king was away; there is an idea of "taking care" involved. It later came to mean tending to the needs of persons in a boat or airplane; again a "taking care" inference. In recent years it has taken on a new meaning: the custodianship of natural resources. In present day usage, stewardship means a protective restraint, a taking care of resources through nurturing and thrifty management of their use (Leopold, 2012: 237). With regard to the Congo Basin, the researcher has a different point of view. The deforestation that is occurring in the Congo Basin is an abuse of the forest and shows no respect for nature. Therefore, the forest is not protected. It shows man's irresponsibility towards creation.

Engagement with the world, allows us look with new eyes at the entire cosmos, which contains traces of that word through whom all things were made (Jn1: 2). A commentator on this passage of John, Morciano, thought that human who believe in Gospel, have a responsibility toward creation. Revelation makes known God's plan for the cosmos, yet it also leads us to denounce that mistaken attitude which refuses to view all created realities as a reflection of their creator, but instead as mere raw material, to be exploited without scruple. In this way man lacks humility which would enable him to see creation as a gift from God, and to use it in accordance with his plan. Instead, the arrogance of human beings leads them to exploit nature, failing to see it as the work of God (Morciano, 2014: 61-62). In his statement, Berry suggests that:

Stewardship may mean the use of creation: perhaps our appreciation for a flower will lead us to put it in a vase to decorate our table. Stewardship, however, will bring us well beyond appropriate use to restoration of what has been abused in the past. The widespread lack of awareness and ignorance of creation and creation's integrity mean that we and many others have abused and degraded the environment unknowingly, and stewardship means that we will work to set things right again, to reconcile and redeem (Berry, 2000: 72-73).

To know God's requirements for stewardship is not enough; they must be practised. Sometimes people do not put the message of God into practice in the mouths people express devotion, but their hearts are greedy for unjust gain (Berry, 2000: 67). Indeed, to them you are nothing more than one who sings love songs with a beautiful voice and plays an instrument well, for they hear your words but do not put them into practice (Ezek. 33:30-32; see also Lk 6: 46-49). Believing in God's Son (Jn 3: 16), we must do the truth, making God's love for the world evident in our deeds, energetically engaging in work and action that are in accord, harmony with God will, and God's love (Jn 3: 21; Berry, 2000: 67).

The researcher agrees with Berry's statement. Two things need to be taken into account. Knowledge and actions are complementary, and should be linked together; otherwise, no change will take place. These principles are applicable to the Congo Basin. To implement policies for the forest is not sufficient; we need also to practise them.

3.5. Theology of the creation

The Book of Genesis, in its first pages, points to the design of the cosmos: it comes forth from God's mind and finds its culmination in man and woman, made in the image and likeness of the Creator to fill the "earth" and to "have dominion over" it as "stewards" of God himself (cf. Gen 1: 28; Morciano, 2014: 42-43). The harmony between the creator and the rest of created world was disrupted by the sin of Adam and Eve, who wanted to take the place of God. As result, the work of "exercising dominion" over the earth, was also disrupted, and conflict arose between mankind and the rest of creation

(Gen 3: 17-19). Human begins let themselves be mastered by selfishness; they misunderstood the meaning of God's command and exploited creation out of a desire to exercise absolute domination over it (Morciano, 2014: 42-43).

Biblical revelation shows us that nature is a gift of Creator, who gave it for free to man and enable man to draw from it the principles needed to "till it and keep it" (Gen 2: 15). Morciano stressed that everything that exists belongs to God, who has entrusted it to man, not for his arbitrary use. Once man, instead of acting as God's co-worker, sets himself up in place of God, he ends up provoking a rebellion on the part of nature, "which is more tyrannized than governed by him". Man thus has a duty to exercise responsible stewardship over creation, to care for it and to cultivate it (Morciano, 2014: 43). Between human beings and nature, there is a connection which enables human beings to survive:

Human beings and society always establish a relationship with the environment. Human beings are the result of a long biological process. Without the elements of nature of which they are part and parcel, without the viruses, bacteria, microorganisms, the genetic codes, and the basic chemical elements, they would not exist. Societies always organize their relationships with the environment to assure the production and reproduction of life (Boff, 1997: 6).

There is a connection between human beings and nature and nonhuman, both are playing a key role in the nature. In addition, according to Boff, the state of the world is connected to our own state of mind. If the world is sick, it means that our psyche is also sick. Aggression against nature and the will to dominate exist because visions, archetypes, and emotions that lead to exclusion and violence are at work within the human psyche (Boff, 1997: 6).

People are alienated from creation and its testimony. This alienation comes from their increasing separation from the natural world; for example, fewer people are needed in agriculture, so they move to expanding cities whose growing inner cores often displace and destroy nature (Berry, 2000: 63).

The researcher takes cognisance of the fact that Boff and Berry's points of view are similar. The former, gives precedence to the connection between human beings, non-human and nature. The later state that the separation of human beings from nature is the source of alienation. The researcher adds that the problem we are facing today is the result of this separation or exclusion. Problems arise from the disturbance of the ecosystem.

Benedict XVI states that today, the development of the world implies our relationship to the natural environment. The environment is God's gift to everyone, and in our use of it we have a responsibility towards the poor, towards humanity and future generations. Today the danger is to reduce nature to a collection of contingent data; it can cause violence to the environment and even encourage activity that fails to respect human nature itself. Our nature, is constituted not only by matter but also by spirit, and as such, endowed with transcendental meaning and aspirations (Benedict XVI, 2009: n. 48). It is obvious that Boff, Morciano and Benedict XVI are expressing their concern about the respect of nature; the dominion over nature should be exercise with care, for human beings are linked to nature. Nature remains the unique expression of human beings' livelihood.

Human beings interpret the natural environment through their culture, which in turn is given direction by the responsible use of freedom, in accordance with the moral law. Consequently, projects for integral human development cannot ignore the future generations, but need to be marked by solidarity and "inter-generational justice", while taking into account a variety of contexts: ecological, juridical, economic, political and also cultural (Benedict XVI, 2009: n. 48).

Van Dyke observed that the environmental problems that our planet earth is facing today are result of disruptions and imbalances in transformations of matter within natural systems. To begin, we must describe the way our environment normally processes matter and energy when it is not polluted or stressed. Think for a moment about the relation of such basic components as plants, animals, air, water and sunshine. Under normal conditions, the proportion of oxygen (20 percent) and carbon dioxide (0.03 percent) is

regulated so that a dynamic balance is maintained. Green plants form carbohydrates and release oxygen in the presence of sunlight when water and carbon dioxide are available (Van Dyke, 1996: 20).

As said previously by Boff, Curry points out that the ecological ethic values nonhuman as well as human nature. It recognises that we are only a part of life on Earth; that we need the rest of it vastly more than it needs us; and that there is an ethical dimension to all our relationships with it. In other words, an ecological ethic must be ecocentric (perceiving and protecting value in all nature), not anthropocentric (restricting value to humanity alone). It therefore encourages ways of living and acting which, as much as possible, allow both human and nonhuman nature to develop at the same moment (Curry, 2011: 11).

Therefore, another researcher highlight that it is important to know that when rational, autonomous agents subscribe to the principles of moral consideration and intrinsic value and so conceive of wild living things as having that kind of worth, such agents are adopting a certain ultimate moral attitude toward the natural world. This can be called “respect for nature.” It parallels the attitude of respect for persons in human ethics. When we adopt the attitude of respect for persons as the proper attitude to take toward all persons, then we consider the fulfilment of the basic interests of each individual to have intrinsic value (O’Neill et al., 2001: 353).

In the same way, some aspects of nature possess intrinsic value which is considered by some as an axiom of conservation. Others consider nature’s value superfluous. When something possesses intrinsic value it deserves to be treated with respect, with concern for its welfare (Vucetich, 2015: 321). From this basis, Vucetich highlighted that one can only conclude that nature’s intrinsic value is not “misanthropic” because concern for nature’s welfare does not in any way preclude also being concerned for human welfare. The practical import of acknowledging nature’s intrinsic value rises from recognising all the objects of conservation concern for instance we have to consider all, endangered species that offer little benefit to human welfare. Sociological and cultural evidence indicates the belief that at least some elements of nature possess intrinsic value is

widespread in society. Our reasoning suggests the appropriateness of rejecting the assertion that nature's intrinsic value is anathema or superfluous to conservation and accepting its role as an axiom (Vucetich, 2015: 321). If nature deserves to be valued intrinsically, this dissertation will examine the relationship between nature and human beings.

3.5.1. Human beings and Nature

Human beings share with other species a common relationship to the earth. By acknowledging the biocentric outlook we take the fact of our being an animal species to be a fundamental feature of our existence (O'Neill et al., 2001: 358). Researchers consider it as an essential aspect of the human condition. They cannot deny the differences between humans and others species, but they keep in their mind the fact that in relation to their planet's natural ecosystems they are but one species among many others. Then they recognise their origin in the very same evolutionary process that gave rise to all other species and they acknowledge themselves to be confronted with similar environmental challenges to those that confront them (O'Neill et al., 2001: 358).

Therefore, according to O'Neill the laws of genetics, of natural selection, and of adaptation apply equally to all of us as biological creatures. This means that we consider ourselves as one with them, not set apart from them. We, as well as they, must face certain basic conditions of existence that impose requirements on us for our survival. Each animal and plant is like us in having a good of its own. Although our human good is not like the good of a nonhuman animal or plant, it can no more be realised than their good can without the biological necessities for survival and physical health (O'Neill et al., 2001: 358).

Man is the master of the physical universe or the master of the part that he inhabits. He alone has the duty to control the natural forces with his intelligence, to put them to the work to his purposes and to build a future world in his own image (Platt, 1965: 14-15). Platt emphasised that this is what may be done if man has the power to control his irrational behaviours, to suppress his weaker diversionary tendencies, and to develop his strongest and best characteristics. This is what indicates that the opportunities for future

development are unbounded for a rational society operating without war. Man's intelligence, and the sense of responsibility, is the qualities that will carry us forward. But for all these dreams to come true, man must enjoy his role as master of the universe. He must understand that this is his function; he must have enough responsibility to carry it out without leading himself toward death and self-destruction (Platt, 1965: 14-15).

In this regard, Curry points out that it is obvious that an ecological ethic is one which values nonhuman as well as human nature. It recognises that we are only a part of life on Earth; that we need the rest of it vastly more than it needs us; and that there is an ethical dimension to all our relationships with it. In other words, there is no doubt that a fully ecological ethic is "ecocentric" (perceiving and protecting value in all of nature), not "anthropocentric" (restricting value to humanity alone). It therefore encourages ways of living and acting which, as much as possible, allow both human and non-human to flourish (Curry, 2011: 11).

3.5.2. Safeguarding Creation

There is disagreement regarding human relationship toward the rest of the natural world, most conservationists agree that biological diversity is valuable and that the extinction of species should be avoided where possible (Paterson, 2006: 144). These principles vary, from arguments that emphasise the instrumental value of other species for humans to ethical theories that point that wild species have intrinsic value. With the increasing human population and the pressures on non-human species and their habitats, conservation efforts have to reconcile the conservation of nature with the needs of people. Especially in developing countries, people's livelihoods depend on the extraction of natural resources (Paterson, 2006: 144).

Conservationists point of view on wildlife stress the instrumental value that certain species have for people, a value that can be translated into economic terms. Such reasoning does not necessarily support the reckless exploitation of the environment. However, these arguments support the idea that species should be carefully managed as natural resources for human being wealth (Paterson, 2006: 144).

Endangered species conservation is central to the missions of environmental organisations such as Wild World Fund (WWF), icons of conservation are often at the species level: pandas, tigers, whales; and the threat of a sixth species-level mass extinction is widely associated with the current biodiversity crisis. Reasons that species valued include their aesthetic qualities (especially large, colourful, and intelligent species) and moral obligation to preserve the existence of different life forms. Arguments for conservation are also commonly associated with ecosystems, particularly the natural beauty of wilderness. (Pearson, 2016: 367).

According to Pearson, species conservation and the beauty of nature are reasons for conservation associated with intrinsic and non-use values. For instance, it can be regarded as morally right to maintain the existence of tigers in the wild, and to conserve the beauty of Yosemite Valley, regardless of human use. But accepting this should not preclude accepting arguments for conservation that are based on utilitarian value, particularly when we consider different levels of biological organisation. For instance, populations of species provide vital ecosystem services such as pollination, such that loss of a population can cause loss of an ecosystem service that has utilitarian value (Pearson, 2016: 368). In the same way, Adams suggests that:

Ecology served not only to objectify nature for conservationists; it also provided an account of how nature ‘worked’. Ideas about ecosystem succession yielded an explanation of the capacity of nature to change in undesirable ways. Nature not only had to be reserved but also to be managed within those reserves. Awareness grew of the capacity of nature itself to cause change that could bring the loss of valued features of a reserve (for example, a rare species), particularly through ecosystem succession. Nature conservation had to establish rules for reserve management and for this it drew on ecological science (Adams, 1997: 282).

The researcher agrees with Adams that the conservation of nature should go hand in hand with the management process. The Kyoto protocols which link conservation and government management are a testament of this.

3.5.3. Management of Nature

To manage nature today the field of cleaner technology represent the new direction for environmental management. Defining cleaner technology or pollution prevention is difficult because the context for use is very different (Overcash et al., 1997: 1299). However, a typical definition is all efforts closely related to or influencing manufacturing that also reduces chemical loss or waste generation. Economics remain a major driving force for the development and use of pollution prevention alternatives in industries providing goods and services (Overcash et al., 1997: 1299).

To evaluate how future climate changes may impact habitats has become increasingly important in the study of maintenance of global biodiversity. The potential for rapid climatic changes and the effects on sensitive ecosystems due to greenhouse-gas emissions raise many questions concerning the vulnerability of nature reserves to future environmental change: Changes in global temperatures, local precipitation patterns, and disturbance regimes could exacerbate “ecophysiological” stresses on protected natural areas (Halpin, 1997: 828-829). Stresses, coupled with ongoing habitat losses, could affect unprecedented changes in geographic distributions of species and communities. To be realistic, however, the research must move toward more rigorous and practical debate-future assessment of global-change effects and ecosystem protection must be grounded in explicit ecological processes and focused on realistic management actions (Halpin, 1997: 828-829).

To implement our obligations to the generation to come requires that we take positive actions to develop and use forests on a sustainable basis; avoid contamination of the forests by pollution; provide emergency assistance to protect forests as needed; provide compensation for the loss of forests; and ensure that there is equitable access to the benefits and use of forests. Exploitation of renewable resources on a sustainable basis remains the “cornerstone of intergenerational equity”. Attention need to be paid to

sustainable, otherwise, the present generation benefits at the expense to future generations (Weiss, 1988: 226).

However, attitudes towards the management of the natural environment have been described as building on individuals' images of nature and the human-nature relationship. Hence, it could be argued that such concepts are useful to understand attitudes towards the ways in which management measures deal with nature. Many management approaches focus strongly on intervention in nature, for instance reforestations and the control of plant and animal populations (Fischer, 2010: 123).

The management actions should respond creatively and seek out new techniques or cleaner technology as discussed previously by Overcash that new techniques will protect natural ecosystems and nature reserves from the impacts of rapid climate change (Overcash (1997). Preparing for possible changes in climatic features and subsequent movement of species within and beyond the confines of existing nature reserve boundaries requires that environmental policy makers and the scientific community forge a pragmatic partnership. Dynamic management approaches will be required to meet the needs of continual changing future generation conditions (Halpin, 1997:829).

In addition, according to Halpin, one of the controversial and most effective management options is to maintain healthy habitat conditions in existing reserve areas by reducing stress on protected areas. Therefore, through proper stewardship, protected habitats can be maintained at the highest level of natural resilience to change. Successfully implementing this option requires defining the thresholds to change for different ecosystems and the effects exogenous stresses have on altering these thresholds (Halpin, 1997: 841). Managerial approaches and achievement of a good environment requires the climate of peace. The implementation of peace allows nature to be in harmony.

3.5.4. Natural Environment and Peace

Kyrou points out that to continue to ruin the environment worldwide will be the cause of conflict in the future generation. Those who accepted the emerging field of

environmental security reached a variety of backgrounds. However, they adopted the traditional security perspective that guides the work of researchers, and which currently informs the various agencies and research centres that predict the next environmental crisis and the potential effects on regional stability and security. Thus, the environmental security approach was and still remains, predictably policy-oriented with a realist view of security. This predominantly realist views of the connection between the environment and security was challenged with the introduction of environmental peacemaking (Kyrou, 2007: 75).

Kyrou suggests a transformation of the concept of environmental security from the traditional competitive approach to a more relational approach of collaborative environmental problem-solving. Although the concept of security was now understood differently, the approach remained incremental. What was missing from most of the publication and the environmental peacemaking discourse in general was the integration of theoretical and conceptual elements from peace studies into environmental peacemaking (Kyrou, 2007: 75-76).

This researcher emphasised that environmental degradation due to violent conflict leaves societies crippled, dealing with the effects of war. The impacts of war on the environment do not end with a cease fire; they persist for decades due to demolished infrastructure, movement of refugees and internally displaced people, the remaining risks from hazards such as mines and depleted uranium, and the political shortcomings of reconstruction. Structural violence takes place when laws, formal institutions and cultural or societal structures and processes discriminate against particular groups of people based on traits such as gender, skin colour, or ethnic background. The apartheid regime in South Africa is an accurate example in this specific case. Forms of structural violence encountered in environmental studies most frequently include laws, institutions and practices discriminating against indigenous peoples, minorities, the powerless, and by extension biodiversity and the environment (Kyrou, 2007: 80).

The researcher view is that the Congo Basin is quite different. The environmental degradation in DRC, for example is not only due to war conflict. It is probably the result

of mismanagement and of social injustice. In South Africa, during the apartheid era the discrimination against black people impacted negatively on the use and conservation of the land.

Foreign models of peace keeping and development of the environment may not always work in Africa. To this effect Ramirez contends that real solutions cannot be imposed from abroad, but must be based on African culture and values. It is better to have a retrospective look at the traditional African values, because they may help us to uncover excellent tricks for promoting peace and development in Africa (Ramirez, 2005:70).

In this regard, the African Union (AU) has a mandate for the maintenance of peace in Africa. It is blighted by the conflict, and human beings are at the mercy of civil wars and repressions. Besides the conflicts, there is climate change as an environmental issue; it has political, societal and economic ramifications, which cannot be neglected. In 2011, the United Nations Security Council expressed concern that the adverse effects of climate change could intensify threats to international peace and security. Some states will lose their territory. The Constitutive Act of the African Union, adopted in July 2000, stipulates the Union right of intervention in a member state in case of grave circumstances, for example crimes against humanity (war crimes) (Spier & Magnus, 2014: 203-204).

In the Congo Basin, the DRC adopted a new constitution on 18 February 2006. During the 45 years preceding its 2006 constitution, the DRC introduced eight previous constitutions. The 2006 constitution introduced environmental rights and obligations as follows (Spier & Magnus, 2014: 203-204):

Right to clean drinking water (Art 48); right to a healthy environment and the duty to protect the environment (Art 53); obligation of the state to protect the environment and to ensure health of populations (Art 54); obligatory control of domestic and international toxic waste resulting from economic activities (Art 55) (Spier & Magnus, 2014: 203-204).

The DRC alone has a major Africa's rainforests (one-fifth) that play a key role in the earth's carbon cycle. It is important to preserve these forests in the fight against climate change. Besides other International Environmental Agreements, The DRC is a party to the UNFCCC (since 1995); the Kyoto Protocol (since 2005). Also, a national climate change adaptation plan was adopted in 2006, in order to develop a priority action programme to guide the DRC's adaptation to climate change (Spier & Magnus, 2014: 204).

Spier and Magnus have recognised some regulations in the new constitution of the DRC. But, these regulations are not in practice; they are in papers only. The DRC as a post conflict country faces many challenges that Congolese people are facing, such as little respect for the rule of law. The political climate affects everyone. If there is peace, the law will be respected, and even the natural law will also be respected.

3.5.5. Natural Law

The expression "natural law" means that human beings are a certain kind of being, and the features of that being should guide our understanding of how human beings should live. This approach implies the existence of some sort of objective moral law knowable through reason. It is implicit in what are the most basic intuitions giving rise to natural law, and there must be some general standard in light of which it is possible to judge human laws or conventions (Wolfe, 2003: 38).

It is important to emphasise that the conceptions of natural law apply to all mankind, all times, and where the basis of social order have raised. Since social order occupies a significant position among universal human values it is therefore the object of interest for all disciplines in the field of humanities. The problem of natural law as the basis of social order is among the most developed paradigms in the world (Tokarczyk, 1993: 70).

The natural law's conception offers indications to the content of the conceptions of social order. Antiquity introduced the principle of the harmony of the component parts of social order. The middle Ages suggested the idea of hierarchy. Modernity pointed the cult of freedom. Today the categories of equality and justice are being stressed

(Tokarczyk, 1993: 78). Tokarczyk adds further that all conceptions of social order which declare their conformability with natural law remain in the domain of the conceived liberalism. This liberalism adopts natural law as one of its fundamental assumptions. For the mean time, there is a clear awareness of the universally accepted contents of the supranational social order. It would have to be a liberal, rather than totalitarian order, it would have to allow freedom of movement for individuals and the protection of local differences, and it would have to protect national values without renouncing the advantages of international ties (Tokarczyk, 1993: 78).

This becomes important for natural law because the specifics of the law, the precepts for daily life applicable to concrete situations, are based on the human good. Thus, differences of opinion about the human good, even where they are small, can lead to exponentially larger and larger differences about the natural law (Anderson, 2006: 619). Anderson in his analysis gives following sequence:

(a) natural law is based on the human good; (b) the human good is based on human nature; (c) human nature is based on what is eternal; (d) differences in belief about what is eternal will lead necessarily to differences in belief about human nature, the human good, and natural law; (e) natural law presupposes that the eternal is knowable; (f) holding a person responsible for knowing and doing the natural law requires first holding them accountable for knowing what is eternal (Anderson, 2006: 619).

One's view of the natural law is based on one's view of human nature. Human nature is what all humans have in common at all times. The natural law must be universal because human nature is universal. If there is a natural law, it applies to all humans just because they are humans (Anderson, 2006: 619).

The central value in natural law theory remains the notion of universality. Natural law theory highlights that the law is based on human nature, and there is only one human nature. And, there is also only one natural law. The emphasis in natural law theorising must be on obtaining a correct view of human nature on which a natural law can be based. Because one's view of human nature depends on one's view of the origin of

human nature, a correct view of human nature will first require having a correct view of the eternal (Anderson, 2006: 630).

According to Nemeth the natural law is an eternal law, which is imprinted on a person, infused into his nature, written in his heart, like said Nemeth, who took Saint Thomas's work as his inspiration. In this sense, human being participates in eternal law of God. And in general, rational creature is subject to divine providence; therefore, the participation of the eternal law in the rational creature is called the natural law. We can say that the natural law came from God Himself (Nemeth, 2001: 33).

To respond to the natural law or to let it become actual as law, to show by one's actions what can be done, and to make others see what should be done is to be a certain kind of person: not one who simply conforms to things set down, but one who lets the good appear, to himself and to others (Sokolowski, 1981: 641).

Moreover, in our life, good is to be done. This principle is the supreme commandment of the natural moral law. Good corresponds to the essential nature. The essential nature is the measure, and what corresponds to it is good, what is contrary to it is bad. In other hands, "Good is to be done", means that "Realize your essential nature" (Laing & Wilcox, 2014: 218).

3.6. Social Doctrine of the Catholic Church

Sollicitudo Rei Socialis spoke about the respect for the natural world and awareness of the needs of all creatures, rather than human grasping out of economic necessity. Secondly, the non-renewable nature of resources forces the need to take in account the effects on future generations. Thirdly, consideration mentioned in *Sollicitudo* is the public health risks associated with industrialisation. Pope begins to speak of the environmental crisis as an important moral issue, which he develops further in his 1990 World Day of Peace Message, 'Peace with God the Creator; Peace with All Creation'. The Papal statement raises a number of specific environmental issues: The indiscriminate application of advances of science and technology which has resulted in global pollution of common resources. And, the self-destruction from an indiscriminate

genetic manipulation, which, leads to the rejection of respect for life and respect for the integrity of creation (Deane-Drummond, 1997: 318).

Pope identifies greed and selfishness at the root of the crisis, both at an individual and corporate level, calling for an “internationally coordinated approach to the management of the earth’s goods”. He argues that the most vulnerable in each society need protection; every citizen has a right to a safe environment (Deane-Drummond, 1997: 318-319). The structural causes of poverty have to be addressed at the same time, along with alleviation of the menace of war. He believes that modern society needs to examine its current attachment to consumerism and instant gratification. He suggested that ‘education in ecological responsibility is urgent, responsibility for oneself, for others, for the earth’. He believes that we need to recognize the aesthetic value of creation which has “deep restorative power”; any urban planning has to be sensitive to the natural world (Deane-Drummond, 1997: 318-319).

3.6.1. Roman Catholic Church and Climate Change

In his statement, Pope Francis said that, Bartholomew has drawn attention to the ethical and spiritual roots of environmental problems, which require that we look for solutions not only in technology but in a change of humanity; otherwise we would be dealing with symptoms. He suggests that we should replace “consumption” with “sacrifice”, “greed” with “generosity”, “wastefulness with a spirit of sharing”. All Christians have the duty “to accept the world as a sacrament of communion, as a way of sharing with God and our neighbours on a global scale. It is our humble conviction that the divine and the human meet in the slightest detail in the seamless garment of God’s creation, in the last speck of dust of our planet” (Francis, 2015: n. 9).

Just after the Encyclical letter *Pacem in Terris*, Blessed Pope Paul VI referred to the ecological concern as “a tragic consequence” of unchecked human activity in the sense that human beings are destroying the nature and are becoming the victim of their own degradation. He spoke also to the Food and Agriculture Organisation of the United Nations about the “ecological catastrophe under the effective explosion of industrial

civilisation”, the Pope suggests “the urgent need for a radical change in the conduct of humanity” (Francis, 2015: n. 4).

Pope John Paul II in his first Encyclical claims that human beings use the natural environment for their immediate use and consumption only, Subsequently, a call for a global ecological conversion still relevant. According to the Pope an effort had been made to “safeguard the moral conditions for an authentic human ecology”. The destruction of the human environment is extremely serious, not only because God has entrusted the world to us men and women, but because human life is itself a gift which must be defended from various forms of degradation. Every effort to protect and improve our world entails profound changes in “lifestyles, models of production and consumption, and the established structures of power which today govern societies” (Francis, 2015: n. 5).

By quoting his predecessor Benedict XVI, Francis observed that the world cannot be analysed by isolating only one of its aspects, since “the book of nature is one and indivisible”, and includes the environment, all the life aspects. The natural environment has been damaged by our irresponsible activity. And due to the fact that today there are no indisputable truths to guide our lives, and human freedom have no limit. We should know that man is not only a freedom which he creates for himself. He is also spirit, will, and nature (Francis, 2015: n. 6).

Climate change is affecting every sector in our society; the implications of this change are occurring in environmental, social, economic, political sectors. It is one of the big challenges facing humanity in our day. Its negative impacts will affect the developing countries in coming decades. Many of the poor live in areas affected by the warming phenomena, and their means of subsistence are largely dependent on natural reserves such as agriculture, fishing and forestry (Francis, 2015: n. 25).

People who are living in developing countries have no resources to adapt to climate change or to face natural disasters, and their access to social services and protection is very limited. As a consequence, they have to migrate or to leave their homes, with great uncertainty for their future and that of their children. Therefore, there is a tragic rise in the number of migrants seeking to flee from the poverty caused by environmental

degradation. Sadly, there is now a certain indifference to such suffering which is taking place throughout our world (Francis, 2015: n. 25).

3.6.2. Human Dignity

According to Shaoping and Lin the dignity of human being cannot be infringed upon for any reason and is a core tenet of modern global civilisation. It has a spiritual foundation, upon which human beings can coexist peacefully and resist interpersonal persecution and any kind of abuse, and even the threat of human self-destruction that is facing the world nowadays. This idea is a great achievement of human beings through a history of struggle for liberty, justice and humanism (Shaoping & Lin, 2009: 372).

Other researchers like Mattson and Clark stressed that the notion of the subjective experience of dignity is everywhere in writings about human rights. Dignity is something to be realised through the individual human experience of autonomous choice in the different domains, “for instance, in the domain of the political; of happiness, well-being, self-esteem, and psychological integrity in the domain of the psychological; of belonging to a group or culture, adhering to a set of norms, with access to approval, respect, and recognition in the domain of the social; and of access to security, food, shelter, and physical integrity in the domain of the material”. In this way, dignity is not a principle, but rather a subjective integration of an individual’s experience of the many facets of human life, and it is a judgment made by each person for him or herself, informed by culture, social interactions, and physical experiences (Mattson & Clark, 2011: 309).

In addition, Habermas points out that the experience of violation of human dignity has performed, and can still perform, an inventive should be possible in many cases:

be it in view of the unbearable social conditions and the marginalization of impoverished social classes; or in view of the unequal treatment of women and men in the workplace, and of discrimination against foreigners and against cultural, linguistic, religious, and racial minorities; or in view of the ordeal of young women from immigrant families who have to liberate themselves from the violence of a traditional code of

honour; or finally, in view of the brutal expulsion of illegal immigrants and asylum seekers (Habermas, 2010: 467).

According to the Catechism of the Catholic Church the respect for the human person entails respect for the rights that come from his dignity as a creature. These rights are prior to society and are the basis of the moral legitimacy of every authority. It belongs to the Church to remind men of good will of these rights and to distinguish them from unwarranted or false claims. Respect for the human person proceeds by way of respect for the principle that every person should look upon his neighbour as “another self,” above all bearing in mind his life and the means necessary for living it with dignity (Catechism of the Catholic Church, 1993: n. 1930-1931).

The Compendium of the Catholic Church states also that a just society can become a reality only when it is based on the respect of the transcendent dignity of the human person. The person is the ultimate end of society, by which it is ordered to the person:

Hence, the social order and its development must invariably work to the benefit of the human person, since the order of things is to be subordinate to the order of persons, and not the other way around (CSDC, 2004: n. 132).

The Compendium of the Catholic Church further adds that respect for human dignity can in no way be separated from obedience to this principle. It is important to consider every neighbour without exception as another self, taking into account first of all his life and the means necessary for living it with dignity. Every political, economic, social, scientific and cultural programme must be inspired by the awareness of the primacy of each human being over society (CSDC, 2004: n. 132).

3.7. Conclusion

Based on biblical perspectives, this chapter has focused on its ethical theology of creation. God, as the creator of heaven and earth, has given the world to human beings in order to protect and to use the creation according to sound management principles. Such principles have been developed and thought by the Roman Church through various

official themes within the social doctrine. God mandated man to be the steward of His creation, instead of caring and protecting the creation, human activities have negative impacts on the creation. Man should not destroy nature. He has the duty to protect it, because nature represents the source of human's life, without it human cannot survive. Dominion over nature does not mean that human beings should exploit nature in order to satisfy his need only, rather, he is authorised to be God's stewards to care for creation. It was highlighted also that theology of the nature still relevant by showing that human being and the nature are in a constant relationship; human being cannot exist without the nature. In this sense, an ecological ethic should protect value in all nature (ecocentric) and it cannot restrict value to humanity only (anthropocentric). Thus, human and nonhuman should be developed simultaneously.

There is a necessity to protect our lives and the future generations against the impact of climate change and global warming. The use of renewable resources on a sustainable basis and cleaner technology are recommended as solution to the problems that affect the world. The social doctrine of the Catholic Church played a key role when it discussed the respect for the natural world. Respect for life and respect for the integrity of creation will enable man to achieve peace and dignity.

In the final chapter, chapter four, we will focus on some recommendations for ethical norms. Those recommendations will provide suggestions in order to protect the future generations.

CHAPTER 4

CONCLUSION AND RECOMMENDATIONS FOR ETHICAL NORMS

The purpose of the fourth chapter is to conclude the theological and ethical considerations of the Congo Basin environment. Chapter four goes to provide recommendations and ethical norms. It will highlight the importance of environment's protection, and suggests recommendations regarding climate change impact. It will focus also on environmental ethics and the future generation; ethical norms on environment.

4.1. Introduction

The third chapter expressed the ethical theology of creation in the light of the Bible. Instead of caring and protecting the creation, human beings started to disturb the creation by their own negative actions. As the planet face the danger of global warming produced by human actions, it will be relevant to suggest solutions on how to avoid negative impacts today and in the future. The environment protection remains the *sine qua non* condition against the threats that the Congo Basin is facing. Protection should be extended also to indigenous people who are experiencing discrimination. They deserve the right over their traditional land and their rights need to be recognised.

Therefore, the researcher notes that climate change represents a big threat on a global scale; negative impacts are occurring locally and internationally. To end these impacts, the reduction of greenhouse gases will be recommended. Thus, to reduce the impact of climate change, reforestation and cessation of deforestation will be suggested as part of the solutions. In order to improve the quality of our environment, it will be important to recycle, reduce and re-use materials that are recyclables, in this way; our environment will be clean and unpolluted. There is a little evidence presently that any conservation strategies are being implemented in the Congo Basin. In addition, the use of renewable energy will bring more advantages, for example the technology that will come from organic wastes, forestry and agriculture residues.

Human beings need special ethical education that will help them to consider the nature as part of their life or part of natural system and set an obligation of protecting the future generation. Climate change, threatens human rights, for instance the right for health and food (as stated by UDHR, art. 25). That is why; human beings have an obligation to care for future generation. A critical aspect will end this chapter. It will discuss the way how, human beings are harmed in their environment by focusing on one of the disadvantages of a capitalist economy, namely egoism or self-interest.

4.2. Protection of the Environment

Today, informal logging is taking place along roads in the Congo Basin's forest, with most of the timber used for local fuel and exported from the north-eastern DRC to nearby Uganda, where population increases are driving up demand for wood. Kinshasa alone (with a population of 8 million) consumes about 4.5 million cubic meters of wood equivalent per year for charcoal. Industrial logging is now the main threat to the forest in some major provinces, not only because of the direct impact of logging on wildlife and ecosystems but also because it acts as a catalyst for further destruction of the forests, increased levels of hunting, and agriculture (Koenig, 2008: 1440).

Biodiversity data in the Congo Basin is both scarce and incomplete. With the information available, it is more difficult to identify biodiversity trends, because baseline data was not collected. Based on what little data exists for a few of the areas analysed, large mammal populations continue to be on the decline. For instance, two thirds of the total elephant population in Minkébé National Park in Gabon was lost to poaching between 2004 and 2013 (Protected Areas in the Congo Basin, 2014: 4). Similarly, in Kahuzi Biega National Park (DRC), gorilla and elephant populations have declined drastically in the past decade, despite greater funding being provided to support security patrols and management planning, including for anti-poaching, community conservation, and ecotourism (Protected Areas in the Congo Basin, 2014: 4).

Environment and development should go together; we have to build safeguards from the outset so that environmental concerns are embedded completely in the framework of economic growth as stated by Ramesh (2010). However, the real issue, from a

governance point of view, is what does one do when there is a real conflict? Politicians are generally reluctant to make the choice because they may be perceived to be anti-growth or anti-development, but the time has come for those in positions of authority to stand up and change their behaviour. Moreover, the ideology of ecological security as fundamental to the sustenance of high economic growth is an idea whose time has come, particularly in the context of the global concern on climate (Ramesh, 2010: 3).

Wild life areas in the Congo Basin are not protected at all, especially in the DRC. As a post-conflict country; it is not possible to control or to access different national parks, because of current political turmoil. Illegal poaching continues to be a problem, together with the challenges of corruption and mismanagement. To deal with the matter, DRC and the entire Congo Basin countries need political stability that will bring peace to these countries. The researcher notes that the ongoing conflict in DRC remains a problem to access the interior of the National Park. Peace and political stability will combat illegal poaching. This will ensure good management of the Basin.

4.3. Contributions of Indigenous Communities

The majority of protected areas in the Congo Basin were established without taking into account customary rights to the land or socio-economic realities which have shaped these areas and ecosystems over millennia of habitation and use by indigenous forest peoples. Reports indicate that the creation of 26 out of the 34 protected areas analysed, resulted in partial or complete relocation or displacement of local indigenous and farming communities living in the area prior to park establishment. These populations, whose livelihoods depend entirely on natural resources, are facing significant challenges in coping with change and adapting to new spaces, territories, and restricted livelihoods (Protected Areas in the Congo Basin, 2014: 5).

The same report emphasised that whatever economic gains have resulted from protected areas, they have not reached local communities, and certainly not reached any levels near fair compensation for the loss of livelihoods incurred. Only in eight of the 34 protected areas analysed are there reports of some revenues for local people related to park activities, mainly in the form of employment as park rangers or tourist guides.

However, this is often accompanied by discrimination, towards indigenous peoples. Rather, the situation is one of the communities having been pushed off their ancestral lands into marginal strips, often along roadsides and bordering national parks and forestry and mining concessions. However, local communities have expressed deep resentment and opposition to imposed protected areas and accompanying strict conservation regulations (Protected Areas in the Congo Basin, 2014: 5).

The researcher observes that indigenous people deserve the right over their land and natural resources, because they depend directly on it. To evict them by force is unfair and unethical. For instance, the pygmies are the people of the forest. To remove them from their land will be a catastrophe. They may lose their lives, and this may affect the biodiversity.

4.4. Rights of Indigenous Communities

Indigenous communities are discriminated and marginalised. They have no rights over the lands they depend on and have no means of political representation. Their lives depend on the forest resources for centuries. The discrimination they suffer in all other areas of life is also reflected in the relations that conservation agencies have with them, for example, when Bantu neighbours are given preference for employment opportunities and when they negotiate on behalf of the indigenous population (Protected Areas in the Congo Basin, 2014: 7).

The rights of indigenous peoples are linked to their ancestral lands and territories. Enforcing these rights is likely to require a substantial rethink of the way protected areas are established and managed. In this regard, the Durban Accord pointed out that:

Participatory mechanisms for the restitution of indigenous peoples' traditional lands and territories that were incorporated in protected areas without their free and informed consent are established and implemented (Protected Areas in the Congo Basin, 2014: 7).

In the Congo Basin, there are absolutely no examples of this taking place (Protected Areas in the Congo Basin, 2014: 7).

One of the crucial issues was the adoption of a universal declaration (1 June 2006) on the rights of indigenous peoples. The adoption of a universal declaration on the rights of indigenous peoples is seen by many indigenous peoples as a necessary step under international law to affirm their right to a specific identity and to ensure their survival (Gilbert, 2007: 207-208). One of the key roles of the UN has been to support partnership between States and indigenous peoples. This aspect of the Declaration is crucial and reflects the role that UN human rights machinery has been playing over the last decades, which after centuries of oppression and cultural assimilation has supported the establishment of a dialogue between States and indigenous peoples (Gilbert, 2007: 207-208). The relationship between indigenous peoples and their lands and territories is one of the key characteristic of indigenous claims. It was expected that a universal declaration on the rights of indigenous peoples would reflect the importance of land rights for indigenous peoples (Gilbert, 2007: 223).

Protected areas are the principle defence against forest loss and species extinctions. Four regions: Amazon, Congo, South American Atlantic Coast, and West Africa constitute about half the world's tropical moist forest. In the Amazon and Congo, protected areas are generally large and retain high levels of forest cover, as do their surroundings. These areas are protected by being inaccessible and remain protected if they continue to be so. In contrast, protected areas in the Atlantic Coast forest and West Africa show sharp boundaries in forest cover at their edges. This effective protection of forest cover is partially offset by their very small size: little area is deep inside protected area boundaries. Lands outside protected areas in the Atlantic Coast forest are unusually fragmented (Joppa et al., 2008: 6673).

Allen analysed the nature and extent of the social injustices visited upon indigenous peoples by settler societies must be taken seriously. He states further that the international community has recognised its moral responsibility to address the indigenous problem. Human rights approaches to problems of discrimination have focused on affirmative action as a means of promoting substantive equality. In addition, Allen states that indigenous peoples are distinguishable from other groups that currently experience discrimination as they constitute distinctive societies in the absence of

prejudice. Arguably, therefore, their entitlements should not be constrained by a temporal dimension. Positive law can create rights and play an important supporting role in persuading unsympathetic states to recognise indigenous rights (Allen, 2008: 123).

Moreover, Quane states that if they are successful in claiming this right, it could be used to exert greater control over development projects on ancestral lands such as the construction of dams, the extraction of mineral resources, and the use of traditional plants and indigenous knowledge for pharmaceutical products. In this context, the right to participate in public affairs could be significant in enabling indigenous peoples to participate effectively in the formulation of development projects that affect them (Quane, 2005: 656-657).

The researcher notes that the recognition of the indigenous communities' rights is highlighted by the international community. However, in practice nothing is observed. One of the examples is the case of the DRC in the Congo Basin, where the indigenous people (pygmies in the Ituri area) are neglected and are not involved in any decisions concerning their situation. In this context, the law runs the risk of presenting utopian ideas. To deal with this situation, the researcher recommends that the government should consider the pygmies in the manner, as other tribes, such as the Bantu.

It is not obvious that all people that are claiming indigenous status are seeking a privileged position. Rather, the majority are seeking equal rights based on an acceptance of the legitimacy of the economic and social basis of their ways of life. Historical injustices against indigenous peoples should be addressed through compensation, reparations and restitution. These rights are necessary because of the modernist bias towards individualism underpinning much property and rights law. This bias discriminates against the ways that many communities express their social and environmental relations (Kenrick & Lewis, 2004: 9).

The marginalised indigenous communities deserve the right to be recognised, for they are human beings as other human beings. They are excluded from activities regarding their life. They should participate in decisions concerning the forest management; their life is rooted in the forest. As stated previously, the adoption of the universal declaration

on the rights of indigenous people was the recognition of their right and identity. But, this declaration is still neglected.

The recent powerful speech of Cardinal Laurent Monsengwo (Archbishop of the Roman Catholic of Kinshasa in DRC), remains the proof of illegal deforestation in the rainforest of DRC. In His speech entitled: “A vin nouveau, outre neuve”, Monsengwo, pointed out that: “.... Il est inacceptable que dans notre pays, on arrive à une exploitation sauvage de ressources minières et forestières”. Which means that, it is not allowed in our country to assist in a savage exploitation of our mining and forestry resources (Monsengwo, 2016).

Despite, the recognition of the indigenous people’s rights by international community, the illegal deforestation continues its trends due to the sin of corruption, egoism, and self-interest of some governments in the Congo Basin countries. This kind of social injustice against indigenous people, especially the most vulnerable (Pygmies) in the Congo Basin should be addressed. However, to prevent and protect the marginalised people against these threats, an immediate and urgent action is required in local and international levels.

4.5. Climate Change Impact and Recommendations

Climate change is affecting the global insurance industry. These changes are often seen as being negative, although opportunities also exist. These trends in past climate data have translated into trends in insurance claims. Sea levels have risen, leading to greater storms, causing more problems (e.g., Katrina). Forest fires last longer and are more frequent, leading to property damage and more insurance claims (Maynard, 2008: 140-141).

Evidence shows that the negative impact of climate change is clearly evident in Central Africa: Lake Chad is disappearing and the drought is experienced everywhere; in Port Gentile (Gabon, island in the Atlantic Ocean). Some areas are submerging, due to the sea rise; in DRC, we assist to the heavy rain and flood. In Austral Africa; there is drought in Zimbabwe and Malawi; floods in Mozambique; flood and drought in South Africa. If

action is not taken on time, the worse consequences of climate change will affect environment in general and agriculture in particular.

The Intergovernmental Panel on Climate Change (IPCC) assessment of major risks for African agriculture and food security caused by climate change during coming decades is confirmed by a review of more recent climate change impact assessments. Agriculture in Africa runs some risk to be negatively affected by climate change; existing cropping systems and infrastructure will have to change to meet future demand. With respect to growing population and the threat of negative climate change impacts, scientific analysis has to show if agricultural production in Africa can be significantly improved (Muller, 2011: 4313).

Therefore, Robinson and Bradley pointed out that climate change is characterised by a number of ironies. It is argued that more scientific analysis is required before significant decisions should be taken. Evidence shows that measures that would reduce both emissions and vulnerabilities to future climate impacts are available at low cost and, even negative costs; the international policy community seems to be in perpetual state of gridlock on climate change policy. Today, part of the difficulty in developing climate change policy lies in the way it has been framed as a scientific problem and that developing a dialogue between climate change and sustainable development might represent a fruitful way to make a more effective connection to policy (Robinson & Bradley, 2006: 2).

Climate change will create conflicts that will affect the conditions of many people. The deterioration of the human environment and the resulting violent conflict may induce large numbers of people to migrate as stated previously in chapter 2 of this work, thus also creating conflicts in areas less negatively affected by climate change. Climate change increases the global risk of violent conflict by adding another element of contention to the competition among major powers (Brzoska, 2009: 138).

The acceptance of the security consequences of climate change as an “intractable” problem could well reduce efforts to find peaceful solutions to the conflicts that will inevitably come with climate change. Climate change will have major consequences, particularly in countries where living conditions are already precarious (IPCC, 2007).

The consequences of climate change are visible on some basic foundations of life, such as fresh water supplies, arable land and agricultural productivity in various parts of the world can already be roughly estimated for various global-warming scenarios. There are also more or less well founded predictions of the consequences of reduced availability of natural resources such as arable land and water on hunger and disease, even though such consequences are highly dependent on counter-measures and adaptation efforts in affected regions. There is no inevitability about these consequences (IPCC, 2007; Brzoska, 2009: 138).

The researcher recommends the following changes in the Congo Basin: The Congo River is the source of hydroelectric power. This can be done in the country with a company like Eskom from South Africa which can provide electrification for the DRC. Deforestation will decrease and people will get electricity, and the standard of living is improved. The ethical consideration comes in the fact that we are conserving, nature and at the same time we are uplifting people's living conditions. Thus, with the electricity we have the possibility of better communication, internet access, and education. The mineral resources are available and can serve to improve the lives of the people.

4.6. Reduction of Global Warming

The Kyoto Protocol on climate change, has highlighted the importance in a global climate change regime of "flexibility mechanisms," which allow shifting of emission abatement effort among nations with accompanying flows of finance and technology. Because negotiated emission targets are producing divergent national marginal abatement costs, total cost can be reduced by shifting abatement effort from where it is costlier to where it is cheaper (Parson et al., 1999: 207).

Labson suggested that the greenhouse effect is well understood process whereby the earth's atmosphere is warmed through the "entrapment" of energy by gases, including water vapour, carbon dioxide. Greenhouse gases have been increasing since the beginning of the industrial revolution. What are not well understood are the extent to which the concentration of such gases is expected to increase in the future and the effect this will have on the earth's climate, an understanding of the enhanced greenhouse effect

is required and a significant leap in our understanding of the dynamics of climatic systems (Labson, 1996: 178).

In Martinez' point of view, the distinction between natural Greenhouse gases (GHGs) and Greenhouse gases that are released from industrial plants and through vehicle emissions still relevant. Natural GHGs, such as water vapour, carbon dioxide, and other gases, exist in the atmosphere and act to catch some of the energy that is radiated back into space from the heat of the Earth's surface. This kind of natural greenhouse effect is beneficial because it maintains the Earth's average temperature around sixty degrees Fahrenheit, making the planet a hospitable environment (Martinez, 2005: 403-404). But, excessive amounts of gases emitted from industrial sources and automobiles have increased the planet's ability to "trap" this energy, causing an increase in the average global temperature. On the other hand, if atmospheric carbon dioxide concentrations and global temperatures continue to rise, there is a threat of several catastrophes, including a continued rise in sea level, flooding and droughts, and the spread of diseases. It is important that every country implement the regulations on GHG emissions that are economically feasible (Martinez, 2005: 403-404).

However, this researcher showed that advances in technology during the Industrial Revolution and the burning of fossil fuels have caused an excessive amount of GHGs to be released into the atmosphere. By enhancing the natural greenhouse effect, the planet is getting warmer and the damaging effects of human activity could be seen within the next twenty-five years. The major effects of a warmer planet will be higher sea levels, increased flooding and droughts, and an increase in infectious diseases. Many countries will be severely affected by these consequences, but countries with low income will suffer the greatest detriment (Martinez, 2005: 420).

It is accepted that increases in anthropogenic greenhouse gas concentrations are the cause of increasing global average air and ocean temperatures, widespread melting of snow and ice and rising global average sea level (IPCC, 2007). Such changes will have a strong impact on natural resource dependent communities through a multitude of primary and secondary effects in both natural and societal systems. People who are already poor and marginalised will experience the impacts of climate change acutely,

particularly in south. For example, African populations are widely expected to be more vulnerable to climate change (Pach Brown, 2011: 164). To avoid the negative impact of climate change, it is required to keep the forest, for it represents the carbon sink. If the forest does not exist or is lost, reforestation should be suggested as a solution.

4.7. Reforestation

Weiss observed that forests play a key role for people's livelihood. They provide substance, shelter, as well as resources for the development of other sectors. They comprise the most biologically diverse, readily convertible, and potentially self-regenerating natural store of biological wealth on the planet. Forests provide economic benefits through timber production and minor forest products, such as oil, medicines fibres, fruits, wild nuts. They are important sources of foods and fuel wood for people in rural areas of developing countries. They provide essential environmental services in conserving watersheds, as by preventing soil erosion, maintaining soil productivity, facilitating water recharge. They are important in the hydrological cycle, regional and global climate system (Weiss, 1989: 219).

The problem is occurring in developing countries suffering from high rate of deforestation and the population oppressed by the effects of poverty. This apparent cause and effect relationship between the destruction of the forest and the fight for the survival of the populations in dire poverty very often becomes a vicious circle. This is particularly in Africa where the rate of deforestation and degradation of forests is high (Ze Meka, 2006: 54).

The Kyoto Protocol encourages the "promotion of sustainable forest management practices, afforestation and reforestation" (Kyoto Protocol, 1997: art. 2).

According to Struck and Scholz, the rising concentrations of atmospheric carbon dioxide (CO₂) are driving changes in climate patterns. Industrialisation and economic development have resulted in a sharp rise in emissions of CO₂ and other greenhouse gases (GHGs). But human-induced emissions are not limited to industrial processes. Photosynthesis binds CO₂ and stores it as carbon in plants. Forests act thus as carbon storehouses and play an important role in influencing our climate. When forests are

cleared, they release carbon and act as a source of GHG emissions. When they are restored, they sequester carbon and become a sink of carbon. The use of forests is also adding the greenhouse gases in the atmosphere and it is one of the causes of climate change, but it can also be a tool in formulating ways of mitigating it (Struck & Scholz, 2006: 861).

Researchers argue that both mitigation and adaptation should be implemented, especially for the tropical rainforests which, according to current estimates, are disappearing at a rate of 6 million ha per year. Many forest types resulting from this former human occupation are still to be found in the lowland Congo basin. In some areas, often considered “virgin,” the forests may still be undergoing a process of secondary succession (Willis & Gillson, 2004: 402).

The negative ecological and environmental impact of deforestation is a matter of real concern to many countries, particularly:

the need to preserve genetic resources, to slow down the rate of agricultural encroachment into tropical rain forests, to protect the habitat of forest dwelling people, to preserve wildlife resources, and in upland areas, to protect those catchment area forests which play a major role in regulating downstream water flow (Spears, 1983: 211).

While the overall situation, especially in relation to preservation of genetic resources, may be less alarming than suggested by some observers, the fact is that with increasing population pressure in the developing countries, the remaining tropical rain forests are under threat and substantial areas could disappear in the longer term if remedial action is not taken (Spears, 1983: 211).

Deforestation is progressing at a higher rate than ever before. It's releasing about 1 to 3 billion tons of carbon annually into the atmosphere. In the meantime, the net annual accumulation of carbon dioxide in the atmosphere amounts to about 3 billion tons (Woodwell, 1988: 1493). That is the amount that must be removed from current releases to bring the atmosphere toward stability in the short term. A cessation of deforestation would obviously make a major contribution in that direction (Woodwell, 1988: 1493).

Moreover, the reestablishment of forests is more than simply planting trees. Forests contain a diversity of species and, in the normal circumstance, build organic matter into soils over time. The total amount of carbon in a forest exceeds substantially the total amount in trees, and the total per unit land area in primary forests and in most secondary forests on fertile soils exceeds the total in plantations. Therefore, program of planting trees in such places would ameliorate the local climate and reduce demands for fossil fuel. But there is a substantial difference between planting trees and re-establishment of forests as a tool in management of the global crisis of climate (Woodwell, 1988: 1493).

According to Weiss, to conserve forests for the benefit of present and future generations, several steps should be initiated:

First, it is essential to monitor forest growth and decline on a worldwide basis. Second, international guidelines for national forestry legislation integrating forestry policy with watershed management and soil conservation should be drafted. Third, countries should consider negotiation of bilateral and regional agreements to provide for mutual assistance in case of emergencies that threaten the forests (Weiss, 1989: 231-232).

This particularly important for conserving forests for present and future generations (Weiss, 1989: 231-232). Also, to get a clean environment, the implementation of some techniques is required, for example the recycling, reducing, reusing and cleaner technology.

4.8. Recycle, Reduce and Re-use

Palliser suggests that recycling consists of three basic steps: collection and processing, manufacturing, and purchasing recycled products. After collection, recyclables are sent to a materials recovery facility where they are cleaned and sorted. After cleaning and sorting, recyclables move on to the manufacturing stage where they are converted into a product that is either completely or partially made of recycled materials. Newspapers, paper towels, aluminium, plastic, glass soda bottles, steel cans, and plastic laundry detergent bottles are items that often contain recycled material. Recycled materials are

also being used in roadway asphalt, carpeting, park benches, and pedestrian bridges (Palliser, 2011: 14). The same researcher emphasised that “reduce, reuse, and recycle” is the goal. If your area does not recycle, encourage management to recycle office paper, card board, food packaging, and cans, and to purchase office paper that has been recycled. It is recommended to purchase items made from recycled materials for instance toilet paper, printer paper. Most grocery stores now carry recycled products. To reduce, re-use, and recycle in your everyday actions will reduce waste, prevent pollution, use less resources, save money, and work toward a cleaner, healthier Earth for the future generation (Palliser, 2011: 17).

Cleaner technology continues to represents the new direction for environmental management. Defining cleaner technology or pollution prevention is difficult because the context for use is very diverse. However, a typical definition is “All efforts closely related to or influencing manufacturing that also reduce chemical loss or waste generation.” That is why, pollution control is needed to convert these waste chemicals into less or non-impacting materials (Overcash, 1997: 1299-1300).

However, pollution prevention or cleaner technology represents change in the means by which industry has demonstrated a significant progress. In addition, pollution prevention has enlisted a new dimension of expertise and individuals, those with responsibility for processes, chemicals, materials, products and the losses to the environment. The rapid growth of successful implementation in this field, now emerging into a significant area of research, has demonstrated significant creativity and a sustainable development in this field (Overcash, 1997: 1306-1307).

To this effect, the researcher emphasises the use of cleaner technology as being vital. It will reduce the risk of disease; people will live in a good environment. The Congo Basin countries have to bring in that practice as a part of sustainable development. It will be possible with the Congo Basin government’s help.

DeBoer states that microbiologic agents remain a problem for water re-use. Studies on the effects of combinations of chemicals, such as those that may be found in wastewater, to determine the potential for additive effects are needed to determine the full effect of low-level contaminants in drinking water. Research needs to be done on the effective

“fail-safe” removal of those contaminants from reclaimed water. Nowadays, the capital expense for any re-use plan is the redundancy in treatment needed to ensure removal of known and unknown contaminants. The development of treatment technologies to provide reliable removal, without backup systems, could provide more cost-effective treatment and therefore more practical reuse facilities. In addition, treatment technology for removing unknown contaminants is required (DeBoer, 1983: 356).

4.9. Use of Renewable Energy

To conserve reserves of fossil-based energy sources and to halt Climate Change effect. It is relevant to switch to renewable energies step by step over next decades (Biogas, 2013: 4). Whether in the form of heating, electricity or fuel, energy is needed everywhere, every day and makes our lives pleasant. The higher a country’s standard of living, the more energy it consumes. If water, wind and wood supplied the energy for industrialisation to take place in the 18th century, these renewable energy sources were replaced in the 19th century by coal, oil and gas (Bioenergy, 2009: 4-5). Today, approximately 90% of energy used worldwide is produced from fossil resources. There is no threat of such consequences where biomass use is concerned. When wood, residues or energy crops are converted into energy, they only produce about as much CO₂ as they had previously fixed during their growth. There is therefore a closed carbon cycle (Bioenergy, 2009: 4-5).

Burley and Haslam highlighted that with the new technique; trees, plants and other organic material such as food scraps are turn into energy for heat and electricity use. Waste products like wood off cuts and wood chips are used; high demand for biomass would lead to farming of energy crops on industrial scale monoculture plantations. In power stations biomass are replacing a proportion of the coal or gas. It could be a carbon neutral energy source since the plants it comes from absorb carbon dioxide as they grow. But because of the huge quantities of energy and fertiliser that it takes to cultivate process and transport biomass crops, emissions can compare badly with fossil fuels (Burley & Haslam, 2008: 162). In the field of biofuels, cars, buses, trucks and motorcycles can use liquid fuels made from organic material such as plants, animal waste and sewage. Vegetable oils notably from soy, palm and oilseed rape can be turned

into biodiesel; starchy, sugary vegetables like corn can be used as ethanol (petrol substitute); and animal and vegetable fats can be recovered from the food industry and converted to biofuel. Today, biofuels should be promoted as a solution to climate change because the plants absorb carbon dioxide when they grow and release it when they are burnt (Burley & Haslam, 2008: 187-188).

Hydropower also plays a key role, with a unique capacity to respond to electricity demands. It has large development possibilities in different parts of the world, but there are some environmental obstacles and constraints to its development. Most of the hydropower development potential is to be found in developing countries. Wind power will play a role in future electricity supply (Destouni & Frank, 2010: 20). However, in the long term, 2050 and beyond, this balancing must be provided by non-fossil or CO₂-emission-free energy sources. Hydropower is the relevant renewable alternative for this purpose. Bioenergy will increase in importance, and the major future biomass energy option is expected to be residues from forestry and agriculture, with organic wastes. Solar energy technologies are developing rapidly and, can become important energy providers. In general, for the global energy system, international coordination and investment in energy research and development are crucial to enable future reliance on renewable energy sources with minimal fossil fuel use (Destouni & Frank, 2010: 20-21).

Traditional methods of using wood and charcoal are not efficient; renewable resources also include the chemical energy stored in food and non-fuel plant products, and even the energy in air used to dry materials or to cool, heat and ventilate the interiors of buildings. Therefore, renewable energy utilisation reduces the demand for conventional energy forms. And, in performing economic and financial analyses, there is no significant distinction between renewable energy technologies and measures designed to improve the efficiency of conventional energy utilisation (Jhirad, 1987: 106-107).

Foley stated that the problem within the fuel sector is a lack of effective replenishment measures. Securing future wood supplies is a political, economic, and social problem. It is the questions of land ownership, customary laws, and social organisation. In most of the case demand reduction measures fail to reach the root of the problem, since they

create no incentives for increased supply. The question of wood fuel replenishment is thus paramount. Apart from this, the openings for the use of renewable energy technologies in the subsistence sector are limited, though many optimistic efforts have been made. The example of the solar cooker is worth examining since it belongs to that rare class of technologies which might be called “self-extinguishing” (Foley, 1981: 203).

We should also make great strides in efficiency and energy savings of the products that many of us are using each and every day in our homes and on the road (Browener, 1997: 277). Today, the greatest challenge of our future is to provide the energy that will lift the world’s population out of poverty without imposing a cost on the planet than neither humans nor the rest of its inhabitants can bear. Analysing the problem, we find out that the answer to the challenge is political and technological, but we realise that the possible technologies are not ready. Now and in the future, we need a massive research program to get them ready, we need to be investing in research into solar energy as well as carbon capture (Kunzig & Broecker, 2008: 266).

4.10. Environmental Ethics and the Future Generations

A relevant analysis of Weiss declared that the intergenerational equity is shaped by two kinds of relationships in the context of our natural environment: firstly, our relationship to other generations of our own species; secondly, our relationship to the natural system of which we are a part. Which means that the human species is often linked with other parts of the natural system; we both affect and are affected by what happens in the system. On the other hand, the natural system makes life possible for us (Weiss, 1990: 199-200). It allows us to survive and to improve human welfare. Our actions affect the natural system. Among all living creatures, human beings have the duty to shape significantly their relationship to the environment. And they can use it on a sustainable basis or they can degrade environmental quality and the natural resource base. As part of the natural system, human beings have no right to destroy its integrity; nor is it in their interest to do so. Rather, as the most living creatures, human beings have a special responsibility to care for the planet (Weiss, 1990: 199-200).

Also, Gundling observed that the fairness to future Generations relies on a norm of equality among generations of the human species in relation to the care and use of the natural system. As part of the natural system, human beings should respect this system. Human beings have a right to use and enjoy the system but no right to destroy its robustness and integrity for those who come after us and the present generation has an obligation to care for the planet and to ensure that all peoples will be able to enjoy its services (Gundling, 1990: 207).

In this case, the background to the ethical approaches has been the fact that humanity has accumulated a monstrous potential to destroy life on earth, and that it is using natural resources and the environment in a way that threatens the survival of future generations. There is good reason to deal with our responsibility to future generations not only as a moral postulate, but also as a legal principle (Gundling, 1990: 207-208).

We should recognise that our primary responsibility is to ensure that future generations belong to a community with ourselves, that they are able, for example, of appreciating works of science and art, the goods of the nonhuman environment, and the worth of the embodiments of human skills, and are also able of contributing to these goods. This is an obligation not only to future generations, but also to those of the past, so that their achievements continue to be both appreciated and extended (O'Neill, 1993: 42).

We have an obligation to promote the good of future generation. We would be both ethically and practically well-advised to set our sights on more immediate generations and, upon our immediate posterity. Even if we do have obligations to future generations, our obligations to immediate posterity are much clearer (Golding, 1972: 98).

4.11. Climate Change and Prosperity

Actions that heighten the possibility of climate catastrophe will be perceived as the big risk. In breaking with the past we need to liberate some energy. Overturning things on this scale is difficult work because this is our heritage. Changing it radically will mean re-organising our lives: where we live, what we eat, what we throw away. This strategy required an aspect of courage that ties it explicitly to overcoming what we might

characterise as a cowardly stance to the past: one that allows us to take the path of economic, social and political business as usual (Williston, 2012: 181).

GHG emissions are the major causal of climate change as state previously, including melting glaciers; rising sea level and coastal inundation; increased storm frequency and intensity; droughts and floods, and biodiversity loss (Knight, 2010: 1038). The importance and distributional equity of these impacts are important value judgments that are informed but not determined by science. Treatment includes diminution of the causal agent through mitigation of GHGs as well as alleviation of symptoms by adaptation to negative impacts of climate change. The Conference of the Parties under the UNFCCC, IPCC deliberations, and scientific meetings are the “grand rounds” and “consultations” of climate change. Treatments must be global in scope; adaptations range from local to national to regional in dimension (Knight, 2010: 1038).

4.12. Climate Change and the Rights of Future Generations

Scientific evidence indicates that climate change is associated with collective violence (Levy & Sidel, 2014: 32). Pathways that underline this association are not fully understood; however, increased temperatures and extremes of rainfall, with their adverse impacts on the environment, appear to play key roles. Collective violence due to climate change poses serious threats to health and human rights, including by causing mortality directly and indirectly by damage to the health-supporting infrastructure of society, forcing people to migrate from their homes, damaging the environment (Levy & Sidel, 2014: 32).

Collective violence due to climate change threatens basic human rights, as embodied in the Universal Declaration of Human Rights (UDHR) and other international human rights instruments. For example, it threatens the rights enumerated in Article 25 of the UDHR, including the right to a standard of living adequate for health and wellbeing, including rights to food, clothing, housing, medical care, and social services, as well as the right to security (Levy & Sidel, 2014: 33).

Levy and Sidel observed that sea level rise will have its greatest impact on people living in coastal areas. This impact will be most profound on people living in island nations.

Some of these island nations may disappear and some coastal regions may become uninhabitable, forcing many people to become “climate refugees,” migrating within their own countries or to neighbouring countries. Similarly, climate change causes and contributes to damage to the environment, not only by collective violence, but also by sea level rise, droughts, flooding, and extreme weather events. Sea level rise, droughts, and flooding often cause damage to croplands, leading to decreased agricultural yields, with resultant threats to human rights (the right to food and the right to health) and to health (leading to malnutrition and increased associated risks of morbidity and mortality due to infectious diseases) (Levy & Sidel, 2014: 36-37). In this regard the case of Central Africa and Austral Africa remain an example and proof, because the impact of climate change is affecting us already: flood, drought, and heavy rain as stated previously in the climate change and recommendation section.

The duty of these researchers is to launch an urgent call to the decision makers, because of their legal and moral obligations to protect human rights, and also States should work to prevent collective violence and to protect human rights that are threatened by collective violence due to climate change. States have legal and moral obligations to mitigate climate change and reduce the risk of its adverse consequences to health and human rights. (Levy & Sidel, 2014: 36-38).

The first principle of international environmental policy on environmental protection and sustainable development was enunciated in the World Commission on Environment and Development’s (WCED) report, *Our Common Future*: “All human beings have the fundamental right to an environment adequate for their health and well-being”. This statement highlights the fact that a healthy environment is a “fundamental right” of all human beings; it does not explicitly state, however, that the right extends to future generations of human beings (WCED, 1987: 348).

According to Narum, if we are to grant rights to future generations, it is appropriate to ask “Who are they?” Many of the objections to the idea of granting rights to future generations are that they are non-entities. But it might help to look at the question another way, with the help of two correlated syllogisms: Firstly, living human beings have rights, I am a living human being, therefore I have rights; and secondly, I will be

alive tomorrow, I will be a human being tomorrow (and human beings have rights), tomorrow is the future, therefore I will have rights in the future (Narum, 1993: 26). Although I cannot assert the right that I possess tomorrow today I cannot travel in time. I can perceive the basis for that right for example, the need for a healthy environment and assert the right today to a healthy future. This is slightly different from granting rights to non-existent people who will live 200 years from now, but not much. If it is politically unacceptable or unfeasible to expect rights to be granted to unborn people, it seems reasonable to argue that based on some level of life expectancy, we could extend the rights of living people into the future. While we cannot say from one person to the next who will be alive at some future date, there is a strong likelihood that many people alive today will also be alive in the future (Narum, 1993: 26).

International cooperation on global warming cannot only be a response to knowledge of the potential impacts on future generations, but can also be a reflection and an obligation to preserve the environment for future generations. The impacts of the activities of the industrial era centuries ago are still affecting us today, as our activities will affect future generations centuries from now. We have a common past and a common future, but policies are made in the present. To preserve the environment for future generations, the international community must combine its knowledge of the long-term impacts of human activity with the political will, based on commonly shared expectations toward sustainable development (Narum, 1993: 37-38).

4.13. The Care for Future Generations

The failure to mobilise effort to fight climate change reflects a combination of political and economic forces, on the national and the global level. Aldy thinks that, unborn generations would enjoy the benefits of policies to reduce carbon emissions whereas the current generation would have to bear the costs (Aldy, 2016: 157).

Today children, as the future generation, lack a voice in climate policy debates. But we can design policy approaches that attempt to drive action consistent with their interests. The key challenge lies in crafting policies that mesh the interests of the current generation with those of future generations (Aldy, 2016: 174).

Gundling states that there is good reason to deal with our responsibility to future generations not only as a moral postulate, but also as a legal principle. As to international law, one can state that the debate no longer is merely an academic one, but rather has found its way into international politics, which may mean that it has crossed the threshold of the law-creating process. The international community should make efforts at the international level to reach a consensus on paths toward sustainable development. In this context, sustainable development is the development that takes into account not only the needs and interests of the present generation, but also those of generations to come (Gundling, 1990: 208).

According to Boff, being ethical means that other beings have relative autonomy and therefore, they deserve the right to continue to exist and to coexist with us and other beings, since they existed for years before us and without us (Boff, 1997: 7).

It is reasonable to claim that we have a duty towards future generations, and we are required to promote those conditions which are important to generation to come. Failure to promote their interests involves us in an injustice for our contemporaries have a claim on us in this regard. Therefore, whatever other duties we may have with regard to future generations, we have a duty of justice to preserve the environment and to conserve natural resources for the benefit of future generations provided that doing so does not involve us in an injustice to members of our own generation (Hubin, 1976: 83).

4.14. Ethical Norms for Environmental Ethics

Climate change as we know, not only threatens each person's fundamental and inalienable "right to life, liberty, and personal security" as guaranteed by the Universal Declaration of Human Rights (United Nations 1948, Article 3), it is already responsible for considerable death and enormous hardship. The factors that cause climate change and the efforts to both mitigate and adapt to it, raise ethical issues that require ethical responses. In this regard, O'Hara and Abelson identified some principles to a discussion of an ethical response to climate change as followed (O'Hara & Abelson, 2011: 28-35):

The principle of *non-maleficence: nocere Primum non* (firstly, do no harm). This principle states that each person has a fundamental and primary obligation to avoid doing harm to others was recalled in the 1992 Rio Declaration on Environment and Development. This declaration stated that while states may develop their own resources for their own benefit, they also had “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” (United Nations 1992a, Principle 2). In that same year, the nations who ratified the United Nations Framework Convention on Climate Change (UNFCCC) agreed to the “stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system” (United Nations 1992b, Article 2). The signatories to these agreements not only reaffirmed the universal moral norm that we are obliged to act in ways that are not harmful to other people, but they also agreed to act in ways that were not harmful to the Earth’s ecosystems, and this duty of non-maleficence was recognised as owing to both current and future generations (United Nations 1992a, Principle 3; 1992b, Article 3).

The Principles of Equity and distributive Justice: The principle of equity and the principle of distributive justice are closely related. Both deal with the fair and just distribution of benefits and burdens within a society, and both can be the subject of many complex and subtle distinctions. For our purposes, they will be considered together. For example, if two people have a different need for food, it would generally be assumed that it would be fair to give the person with the greater need the greater share of the food, especially if this could be done without harming the other person (O’Hara & Abelson, 2011: 28-35). Furthermore, these researchers suggested that, if it is accepted that all people are equal, then it can generally be said that all people have an equal claim on that which is held in common; none should enjoy a disproportionate share especially if this inequitable distribution would either deny others their fair share or place a burden on them. A sense of fair play also dictates that those who create a problem should be held responsible for rectifying the problem while the innocent should not suffer so that others may prosper at their expense (O’Hara & Abelson, 2011: 28-35).

Moreover, these researchers suggest that the principle of distributive justice demands that this disproportionate and prolonged over-utilisation of per capita entitlements must be considered when calculating an equitable distribution of the costs and benefits associated with climate change since this excessive appropriation of per capita GHG entitlements has both contributed more to the adverse effects of climate change while also permitting the developed nations to accumulate their wealth and higher standard of living. If the limited GHG absorption capacity of the atmospheric commons has been disproportionately consumed by the developed world, and if little reserve capacity remains, then it can be argued that not only does a much greater portion of the remaining capacity belong to the developing world, but the developed countries also owe an ecological debt to the developing nations (O'Hara & Abelson, 2011: 28-35). And, the developed countries are obliged to transfer wealth to the developing countries or pay for the latter's costs of climate change adaptation in proportion to their excess utilisation of the atmospheric commons. Thus, some developing countries, which have not remotely utilised their fair share of the GHG emission entitlements, would need to significantly increase their GHG emissions just to meet their basic needs for shelter, food and security, let alone achieve the level of prosperity enjoyed by the developed countries (O'Hara & Abelson, 2011: 28-35).

4.15. Climate Change and Moral Obligation

As the debate about the impact of climate change and what can be done continues, the link between ethical considerations and climate change needs to be at the forefront of solutions to climate change mitigation. If we are to consider global impact, we need to consider the morality of our decisions for everyone (D'Olimpio & O'Leary, 2013: 15-16). It is also relevant to point out that some discussion of values and the ethical responsibility towards our environment that supports positive action involve religious efforts. For instance, the Christian notion of stewardship of God creation is important. Religious and non-religious beliefs can both agree on the importance of community and society to human flourishing. Environmental disasters today effect population migration and numbers of refugees. They are global issues morally if we care about other human beings (D'Olimpio & O'Leary, 2013: 15-16).

According to Jamieson Concerns about the health effects of climate change are divided into two parts: direct and indirect. Direct effects are the results of exposures to extreme weather events such as heat waves, floods, and storms. An example of a direct health effect is the excess deaths that would result from the doubling in the number of very hot days in temperate regions expected to result from a two to three degree centigrade global warming. And, indirect health effects of climate change are those that are mediated by physical systems. An example of an indirect effect is the deaths that would occur as a result of increases in the geographical ranges and incidences of vector-borne diseases, such as malaria and dengue fever, caused by climate change-induced disturbance of ecological systems (Jamieson, 1997: 108-109).

Similar computations could be performed for other infectious diseases such as *trypanosomiasis* (sleeping sickness), *onchocerciasis* (river blindness), dengue, and yellow fever. When these impacts are joined with other indirect health impacts relating to food and social organisation, and direct impacts involving extreme weather events, it is clear that there is a case for taking the health effects of global warming very seriously (Jamieson, 1997: 111).

This researcher emphasised that the main practical consequence of these reflections follows more or less directly from adopting a version of the second paradigm of moral responsibility. Those who are in a position to prevent global change-induced health problems have a strong moral obligation to act in ways to prevent them. This means that they should seek to stabilise climate, and they should also do what they can to help those who are most vulnerable to the change that may already be occurring (Jamieson, 1997: 118-119). The people who suffer and die as a result of global change-induced health problems will largely be those who now have inadequate nutrition, lack access to clean water, and fail to benefit from the most basic advances in public health. This is because infectious diseases take their heaviest toll on those whose health is already compromised, and because poor people do not have the resources to adapt to global change. The moral responsibility requires that we should act as soon as possible to benefit those who live in misery. Such action would help to mitigate the negative health consequences of global change (Jamieson, 1997: 118-119).

4.16. Lessons and Education for a Sustainable Future

In Weiss's point of view, the greatest need is for a new "ethos", planetary in scope and encompassing all generations. The need to develop a sense of belonging to a community of past, present and future generations represents a priority. A planetary "ethos" is required because communities are becoming interdependent on a global scale in their economies, politics, environmental health and communications (Weiss, 1989: 145-146). Therefore, every community must be able to mobilise all members of the present generation to conserve the planet for future generations. This orientation requires that we develop process for raising public consciousness and for educating the younger members of our generation. Some countries have taken steps nationally to introduce environmental education into school curricula and to improve public information about the environment, but action is also needed at the international level. Education of the global community regarding the need for a planetary "ethos" for future generations deserves priority (Weiss, 1989: 145-146).

Education for Sustainable Development has two pedagogical objectives that were originally diametrically opposed: environmental education and education to cooperate with the Third World. The environment has been a topic in geography instruction; the preservation of nature did not really develop until the 1970s in response to public discussions of issues such as those triggered by the Limits of Growth and other influential works about environmental concerns (Boehn & Böhn, 2007: 141). The Third World was already an established topic in geography instruction in the 1950s; however, the positive assessment of economic growth did not arise until around 1960. Today, global aspects of development are frequently covered by the term global learning. The focus of environmental education was primarily on the preservation of nature, and unspoiled nature was glorified (Boehn & Böhn, 2007: 141).

According to Moellendorf, the Earth's climate and capacity for CO₂ absorption are global resources. Sustainable development in the context of climate change depends upon total greenhouse gas emissions, and not, for the time being at least, upon the emissions of any one state. A state may emit more than the average, but this is sustainable so long as the total global emissions are consistent with what is owed to

future generations, however that is construed. Sustainability with respect to greenhouse gas emissions is a constraint on total emissions, not on the emissions of a particular state taken in isolation (Moellendorf, 2011: 436-437). This is consequential for the account of the limitation that sustainability places on the license of a state to develop. The limitation that sustainability imposes is on total global emissions. International policy does not contravene the limitation of sustainability simply because it allows some states to emit more than would be sustainable if all states emitted the same total or per capita amount. The limitation that sustainability puts on the right to development is violated only if global emissions are unsustainable. And because the right to sustainable development is also the right to development of a certain kind, policy must allow emissions sufficient for development. The right to sustainable development is the right to develop in the context of a sustainable global energy (Moellendorf, 2011: 436-437).

4.17. Critical Aspects

Evidence of environmental changes worldwide indicates that humankind cannot continue its development path at the expense of nature. The world may be moving towards an environmental crisis that will seriously affect development prospects. What is needed is an increased solidarity among nations and a new pattern of development that implies the political will of both industrialised and developing countries and the global sustainability of life on Earth (Pilari, 1992: 3). To promote sustainable development in all countries, policies and strategies to halt and reverse the effects of environmental degradation in the “atmosphere”, “biosphere”, and “geosphere” should be elaborated at national, regional and international levels. The crucial role of science and technology in achieving development objectives in developing countries while protecting local and global environments will only be realised through effective international cooperation (Pilari, 1992: 3).

The world is in peril, many threats are occurring today: Global warming, biodiversity’s reduction, arctic ice disappearance, toxic environment and the loss of the forests without any doubt, what is happening is attributed to human beings’ actions; it is the consequence of the capitalist political economy. These harms are representing the criminal offences. But, in many cases they are not, sometimes they seem to be normal

way of doing things; finally, they will lead to catastrophe (White, 2009: 1). Thus, science has provided evidence that state and corporate actors have brought environmental collapse and have committed crimes against all life on the planet (White, 2012: 72).

In this regard, we are aware of the danger that is facing us due to our own activities and our use of powerful technologies which threaten our immediate environment. Modern man's goal is to achieve a wealthy life, by using technology. Consequently, our lives are in peril. It is the ambivalence of science. The desire for domination leads to the destruction of nature and life. In this sense, human beings become slaves to destruction.

Therefore, Boff states:

The will to dominate everything is bringing us under domination and holding us in subjection to the imperatives of degraded Earth. The utopia of improving the human condition has worsened the quality of life. The dream of unlimited growth has brought about underdevelopment of two-thirds of humankind, and our delight in optimally using the Earth's resources has led to the exhaustion of vital systems and to the breakdown of environmental balance (Boff, 1997: 8).

Indigenous people depend directly to their land, with the ongoing climate change; indigenous people are struggling to sustain their livelihood in changing ecological economic coupled with the political context. The analysis of their vulnerability to face the impact of climate change and their contextual factors shows that there have been few studies on the adequacy of laws and policies to address indigenous peoples' vulnerability to climate change (Abate, & Kronk, 2013: 535). For instance, in Congo Basin, especially in DRC the right of indigenous people called 'Batwa' (pygmy) is not well recognise, pygmies are always marginalized by 'Bantu' and other neighbours. Indigenous people cannot be neglected, for their cultural knowledge is very relevant.

In the Congo Basin, there is a lack of documentation on the issue of climate change; however, there is some documentation which is not enough to address the problem of climate change in Africa. In this regard, we encourage researchers to publish more documents in this field of research that will enable African populations to be aware of

the danger of climate change. This will protect their future. By contrast, the researcher notes that the Amazon basin in South America has important documentation on climate change and traditional ecological knowledge.

However, the interest in traditional ecological knowledge in recent years is motivated by the need for ecological insights from indigenous practices of resource use, and the need to create a new ecological ethic based on indigenous wisdom (Berkes, 1999: 179). In this circumstance, virtue ethics should provide a frame work for condemning all kind of human deeds which degrade, refuse to recognise indigenous knowledge and destroy the natural environment (Elliot, 1995: 4).

According to Jonas, “all traditional ethics is anthropocentric” (Jonas, 1984: 4). An ethics of the state of crisis, an ethics of responsibility, of conservation, and of preservation is required. “Traditional ethics” can no longer inform us on the norms of “good” and “evil” to which we must submit. In this ethics, nature is no more an object of human responsibility. It takes care of itself as well as of man. Now that our power is undermining the natural balances, our responsibility spreads beyond interhuman relations to the biosphere and should incorporate long-term effects in any forecast (Jonas, 1984: 4-5; see also Ziaka). As humankind’s very future is threatened, the ethics of responsibility represents an imperative to human existence and that imperative will lead human life as a worthy life. The future of nature is understood as an essential condition for this obligation: man’s interest coincides with that of the rest of life, which is his Earth home in the most sublime sense of the word. The preservation of nature is the condition of our own survival (see Ziaka).

In the same way, the need for an ethics that can rise to the challenge of the times, one that can reach our actions and guide us in protecting the future from the consequences of our actions today is imperative if the planet is to continue to thrive and if the human being want to live in peace and ethically in harmony with the earth (The Philosophical Genesis of the Ecological Crisis, 2013: 20).

4.18. Conclusion

This chapter has expressed recommendations and ethical norms. Environmental protection was pointed out as a goal to achieve a solution to the question of climate change. The environmental protection was required for everyone in the planet, especially for indigenous people who are discriminated and do not have any resources to face the negative impacts of climate change.

Moreover, in the global scale, climate change represents a big challenge (threat) created by human deeds. It required also a global response (solution), reduction of greenhouse gas, coupled with other solutions; reforestation, cessation of deforestation was recommended. To protect our environment against pollution, we need to recycle, reduce and reuse materials.

One of the research objectives in this project was to investigate how the local population can be protected against the impact of deforestation. Therefore, the researcher recommends good management of the Congo Basin forest which is possible with political stability that will bring peace to these countries.

Furthermore, ethical education should be emphasised. This will focus on nature as part of man's life in order to protect it for future generations.

This dissertation has highlighted the values of equity, distributive justice, respect and protection of the forest through conservation. In order to promote these values, the government should implement policies on how to protect indigenous people.

Good forest management by government and the Congo Basin inhabitants is mandatory to stop illegal deforestation. As the greater part of the Congo Basin is not electrified, the researcher suggests that solar energy (solar panel) should replace the use of charcoal and wood. However, the use of solar panel is limited because of the poor socio-economic conditions of the majority of the inhabitants in this Basin.

To achieve sustainable development, the implementation of cleaner technology and the use of renewable energy are suggested. And, an ethical education plays a key role, for it represents human being's responsibility towards future generations. Man has an

obligation to protect the future generations against any kind of threats. Man should avoid self-interest and should therefore focus on global interests.

As the world is in peril: Global warming, deforestation, biodiversity loss, sea rise, desertification, flood and drought.... Jonas (1984: 4) has observed that “all traditional ethics is anthropocentric”. He qualified this ethics, as an ethics of the state of crisis, thus for Jonas an ethics of responsibility, of the conservation and of the preservation will be necessary to deal with the danger that we are facing today.

If the preservation of the nature remains an obligation of our own survival like said Ziaka in his statement, however, how can we conserve the planet, if other persons are excluded? The preservation and the conservation of the planet can be effective, if we take into account the so called marginalise people, for instance the pygmies in the Congo Basin (Central Africa) and the Amerindians in the Amazonia Basin (Latin America), for they have traditional knowledge that can contribute to the prevention of the negative impact of climate change.

Analysing the Congo Basin situation, we found out that there is a lack of documentations and the lack of policies to address the climate change impact. The Congo Basin countries should encourage research in the field of forest management and the implementation of proper policies to avoid illegal deforestation and poaching in order to achieve a sustainable development in the Basin.

An environmental education should be in forefront throughout the social media and at school-universities showing people that our action should not only be anthropocentric, but also ecocentric. And we cannot continue to destroy the nature; we need global action, national, regional and international levels to address the crisis that is facing us.

4.19. GENERAL CONCLUSIONS: AN EPILOGUE

This dissertation was entitled “Environmental Ethics Challenges in the case of Congo Basin: A Theological perspective”. It was divided in four chapters.

The first was a general introduction and the key causes of the deforestation of the Congo Basin. Congo Basin contains the great biodiversity in African Continent. Destroying the forest represents the crime against humanity, because people’s life is linked to the forest. Thus, if the forest is well managed it could sustain the livelihood of poor people that live on it. However, the forest played an ecological role, for it provided fuel wood; regulation of climate in local and global scale; livelihood of the local population. Out of the biodiversity and the ecological role played by the forest, this chapter has focused especially on the causes of Congo Basin deforestation. Many causes of the Congo Basin deforestation have been identified such as: Agriculture; construction of the road; charcoal collection; logging and the mining. An ethical solution was suggested in order to address the crisis faced by the Congo Basin forest.

The second chapter analysed the impact of climate change and the human beings’ disturbance. The mitigation and adaptation and the relevant role played by indigenous people has been suggested as part of the solution to the threat in the Congo Basin forest conservation. Also, the implementation of justice, equity and sustainability was pointed out. Ethical values and religious responses to the climate change challenges were suggested in order to save the planet against the negative impacts of climate change.

The third focus on to the ethical theology of nature. God as the master of the universe has given the creation to human beings to protect and to care for it. But, instead of being the steward or the caretaker of creation, human beings turn against the creation by using powerful technologies that is destroying the planet. It was highlighted that human being had a relationship with the nature. Human being cannot survive without the nature. Thus, to destroy nature, means to destroy his own life. In order to avoid the negative impacts of climate change, it was important to look for a way out by shifting toward renewable resources and a cleaner technology. In addition, the Roman Catholic Church played a

role in this regards, when it was talking about the respect for the life and the integrity of the creation.

Recommendations and ethical norms are presented in the fourth chapter. Environmental protection was suggested and some other solutions claimed previously, for instance the renewable resources. The preservation of the nature was stressed and it could be effective if we took in consideration global effort. The problem is global and the solution should also be global or a general engagement.

The Congo Basin analysis showed that there is a real lack of policies and documentation to the problem related to the deforestation. That is why; policymakers should encourage and implement research in the field of forest management. It was mentioned also that an environmental education at schools, universities and throughout the media will be important. The crisis should be addressed at national, regional and international levels.

BIBLIOGRAPHY

BOOKS

- Abate, R.S & Kronk, E.A. Eds. 2013. *Climate change and indigenous peoples: The search for legal remedies*. Cheltenham, UK- Northampton, MA: Edward Elgar.
- Amelung, T & Diehl, M. 1992. *Deforestation of Rain Tropical Forests: Economic causes and impact on development*. Tübingen: J.C.B. (Paul Siebeck) Tübingen.
- Art & Meyer, J. 1991. *Earth-Keepers: Environmental perspectives on hunger and injustice*. Pennsylvania-Ontario: Herald Press.
- Beckerman, W & Pasek, J. 2001. *Justice, Posterity, and the Environment*. New York: Oxford University Press.
- Benedict XVI. 2014. *The Garden of God: Toward a human ecology*. Washington: The Catholic University of America Press.
- Benedict XVI, Encyclical Letter *Deus Caritas Est*. (25 December 2005).
- Benedict XVI, Encyclical Letter *Caritas in Veritate* (29 June 2009).
- Berkes, F. 1999. *Sacred ecology: Traditional ecological knowledge and resource management*. Philadelphia- London: Taylor & Francis.
- Berry, R.J. Ed. 2000. *The Care of Creation: Focusing Concern and action*. Leicester: Intersity Press.
- Bioenergy*. 2009. Gülzow: Fachagentur Nachwachsender Rohstoffe e.v. (FNR).
- Biogas: An Introduction*.2013. Gülzow: Fachagentur Nachwachsende Rohstoffe e.v. (FNR).
- Boff, L. 1997. *Cry of the Earth, Cry of the Poor*. New York: Orbis Books.
- Boylan, M. Ed. 2014. *Environmental Ethics*. Oxford: Willey Blackwell.
- Brennan, A. Ed. 1995. *The Ethics of the Environment*. Aldershot-Brookfield-Singapore-Sydney: Dartmouth.
- Brown, D.A. 2013. *Climate Change Ethics: Navigating the Perfect Moral Storm*. London-New York: Routledge.
- Brown, P. 1996. *Global warming: Can civilisation survive?* London: Blandford.
- Catechism of the Catholic Church*. 1993. Citta Del Vaticano: Libreria Editrice Vaticana.

- CDSC (*Compendium of the Social Doctrine of the Church*) 2004.
- Cooper, N.S & Carling, R.C.J. Eds. 1996. *Ecologists and Ethical judgements*. London-Weinheim-New York-Tokyo-Melbourne-Madras: Chapman & Hall.
- Curry, P. 2011. *Ecological Ethics: An Introduction*. Cambridge: Polity Press.
- Debroux, L et al. 2007. *Forests in Post-Conflict Democratic Republic of Congo*. CIFOR: The World Bank & CIRAD.
- Desjardins, J.R. 1993. *Environmental Ethics: An Introduction to Environmental Philosophy*. California: Wadsworth Publishing Company.
- Eckholm, E et al. 1984. *Fuelwood: The energy crisis that won't go away*. London-Washington: Earthscan.
- Elliot, R. Ed. 1995. *Environmental Ethics*. Oxford- New York: Oxford University Press.
- Francis, Encyclical Letter *Laudato si'* (24 May 2015).
- Gardiner, S.M et al. Eds. 2010. *Climate Ethics: Essential Readings*. New York: Oxford University Press.
- Gardiner, S.M et al. Eds. 2011. *Climate Ethics: Essential Readings*. New York: Oxford University Press.
- German, A et al. 2010. *Governing Africa's forests in a Globalized world*. London: CPI Antony Rowe- Chippenham-Wiltshire.
- Hart, J. 2004. *What are they saying about Environmental Theology?* New York: Paulist Press.
- Horrel, D.G.2010. *The Bible and the Environmental Towards a Critical Ecological Biblical Theology*. London: Equinox.
- Hymowitz, S et al. 2003. *Study Guide: The Rights of Indigenous Peoples*. Minnesota: Human Right Library.
- Hoare, A.L.2007. *Clouds on the horizon: The Congo Basin's forest and Climate Change*. The Rain forest foundation.
- IPCC (Intergovernmental Panel on Climate Change) 2007. *Climate Change: The physical science basis*. Cambridge, UK: Cambridge University Press.
- John Paul II, Encyclical Letter *Centesimus Annus* (1 May 1991).
- John Paul II, Encyclical Letter *Sollicitudo Rei Socialis* (30 December 1987).
- John Paul II, Encyclical Letter *Redemptor Hominis* (1979)

- Jonas, H. 1984. *The Imperative of Responsibility: In Search of an Ethics for the Technological Age*. Chicago-London: The University of Chicago Press.
- Jones, H. 2009. *Equity in Development: Why it is important and how to achieve it*. London: Overseas Development Institute.
- Laing, J & Wilcox, R. Eds. 2014. *The Natural Law Reader*. Malden-Oxford: Willey Blackwell.
- Maathai, W. 2009. *The Challenge for Africa: A New Vision*. London: William Heinemann.
- Mearns, R & Norton, A. Eds. 2010. *Social dimensions of Climate Change: Equity and Vulnerability in a warming world*. Washington, D.C: The World Bank.
- Megevand, C et al. 2013. *Deforestation Trends in the Congo Basin: Reconciling Economic Growth and the Forest Protection*. Washington, D.C: The World Bank.
- Montagnini, F & Jordan, C.F. 2005. *Tropical Forest Ecology: The Basis for Conservation and Management*. Heidelberg-New York: Springer.
- Morciano, M.M. Ed. 2014. *Benedict XVI: The garden of God Toward a human Ecology*. Washington, D.C: The Catholic University of America Press.
- Nail, T. 2015. *The figure of the migrant*. Stanford: Stanford University Press.
- Nemeth, C. P. 2001. *Aquinas in the courtroom: Lawyers, Judges, and Judicial Conduct*. London: Praeger.
- Nothwehr, D.M. 2012. *Ecological Foot Prints: An Essential Franciscan Guide for Faith and Sustainable Living*. Minesota: Liturgical Press.
- O'Brien, K.J. 2010. *An Ethics of Biodiversity: Christianity, Ecology, and the Variety of Life*. Washington: Georgetown University Press.
- O'Brien, G & O'Keefe, P. 2014. *Managing adaptation to Climate Risk: Beyond fragmented responses*. London-New York: Routledge.
- O'Neill, J et al. Eds. 2001. *Environmental Ethics and Philosophy*. Cheltenham-Northampton: Edward Elgard Publishing Limited.
- Palmer, C & Engel, S. 2009. *Avoided Deforestation: Prospects for mitigation climate change*. London-New York: Routledge.
- Pastoral Constitution on the Church in the modern world *Gaudium et Spes* (7 December 1965).

- Platt, J.R. Ed.1965. *New Views of the Nature of Man*. Chicago-London: The University of Chicago Press.
- Posner, E.A & Weisbach, D. 2010. *Climate Change*. Princeton-Oxford: Princeton University Press.
- Presbyterian Eco-Justice Task Force. 1989. *Keeping and healing the creation*. Louisville, KY: Committee on social witness policy.
- Schaefer, J & Winright, T. Eds. 2013. *Environmental Justice and Climate Change: Assessing Pope Benedict XVI's Ecological vision for the Catholic Church in the United States*.
- Schmidt, R et al. Eds. 1999. *Forest to fight poverty: Creating national strategies*. New Haven-London: Yale University Press.
- Schmitz-Moormann, k & Salmon, J.F. 1997. *Theology of creation in an Evolutionary world*. Cleveland: The Pilgrim Press.
- Spence, C. 2005. *Global Warming: Personal solutions for a healing planet*. New York: Palgrave.
- Spier, J & Magnus, U. Eds. 2014. *Climate Change remedies: Injunctive relief and criminal law responses*. Den Haag: Eleven international publishing.
- The Holy Bible: Apocryphal/ Deuterocanonical Books*. 1989. Glasgow-London-Newyork-Toronto-Sydney-Auckland: Collins publisher.
- Thompson, A & Bendik-Keymer, J. Eds.2012. *Ethical Adaptation to Climate Change: Human virtues of the future*. Cambridge-London: The MIT Press.
- Toly, N.J & Block, D.L. Eds.2010. *Keeping God's Earth: The Global Environment in Biblical perspective*. Illinois: IVP Academic.
- US Conference of Catholic Bishop* 1991
- Universal Declaration of Human Rights* (10 December 1948).
- Van Dyke, F et al. 1996. *Redeeming creation: The Biblical basis for environmental stewardship*. Illinois: Intervarsity Press.
- Veldman, R.G et al. Eds. 2014. *How the world's religions are responding to climate change: Social scientific investigations*. London-New York: Routledge.

Weiss, E.B. 1989. *In Fairness to future generations: International law, common patrimony, and international equity*. Tokyo-New York: The United Nations University- Transnational Publishers, Inc.

White, R. Ed. 2012. *Climate change from a criminological perspective*. New York- Heidelberg- Dordrecht- London: Springer.

White, R. Ed. 2009. *Environmental Crime: A Reader*. Cullompton: William Publishing.

Articles

Adams, W.M.1997. *Rationalization and conservation: Ecology and management of nature in the United Kingdom*. The Royal geographical society (with the institute of British geographers): Transactions of the Institute of British geographers, vol.22, N.3 (1997), PP. 277-291. Online: <http://www.jstor.org/stable/623218>, accessed: 03/09/2016.

A *Hindu Declaration on climate change 2015*. Online: <http://www.hinduclimatedeclaration2015.org/>, accessed: 06/06/2016.

Allen's, S. 2008. *International law and the evolution of indigenous rights*. Brill: International journal on minority and group rights, vol.15, N.1 (2008), PP.117-131. Online: <http://www.jstor.org/stable/2467493>, accessed: 05/09/2016.

Anderson, O. 2006. *Metaphysical foundation for natural law*. Wiley: New Blackfriars, vol.87, N.1012 (November 2006), PP.617-630. Online: <http://www.jstor.org/stable/43251086>, accessed: 05/09/2016.

Andrew, P. 2009. *Sharing an ethical responsibility to reduce GHG emissions*. Online: <http://www.climaticoanalysis.org>, accessed: 11/02/2016.

Aldy, J.E. 2016. *Mobilizing political action on behalf of future generations*. Princeton University: The future of children, vol.26, N.1, children and climate change (Spring 2016), PP.157-178. Online: <http://www.jstor.org/stable/43755238>, accessed: 14/09/2016.

Bahuchet, S. 2006. *Congo pygmies*.

Online: <http://www1.american.edu/ted/ice/pygmy.htm>, accessed: 04/03/2016.

Baig, N. 2014. *Climate change: A Muslim perspective*. Online: <http://www.icna.org/climate-change-a-muslim-perspective/>, accessed: 06/06/2016.

- Balaji, M. 2015. *A Hindu call to action in fighting climate change*. Online: http://huffingtonpost.com/murali-balaji/a-hindu-call-to-action-in_b_8631290.html, accessed: 22/06/2016.
- Bardsley, D.K & Hugo, G.J. 2010. *Migration and climate change: Examining thresholds of change to guide effective adaptation decision-making*. Springer: Population and environment, vol.32, N.2/3, human migration and environment (December 2010), PP.238-262. Online: <http://www.jstor/stable/40984178?seq=1&cid=pdf-reference>, accessed: 09/07/2016.
- Beder, S. 2000. *Costing the earth: Equity, sustainability development and environmental economics*. New Zealand journal of environmental environmental law, vol.4 (2000), PP. 227-243. Online: <https://www.uow.edu.au/>, accessed: 30/04/2016.
- Berry, W. 1993. *Christianity and the survival of creation*. Wiley: Crosscurrent, vol.34, N.2, renewing the covenant (Summer 1993), PP. 149-169. Online: <http://www.jstor.org/stable/24460004>, accessed: 22/07/2016.
- Boehn, D.L & Böhn, D. 2007. *Education for sustainable development: An International perspective*. Berghahn books: Internationale schulbuchforschung, vol. 29, N.2, Bildung für nachhaltige Entwicklung/ Education for sustainable development (2007), PP.139-145. Online: <http://www.jstor.org/stable/43056775>, accessed: 15/09/2016.
- Browner, C.M. 1997. *Global climate change: Threats and solutions*. Florida State University College of law: Journal of land use & environmental law, vol.13, N.1 (Fall 1997), PP.273-278. Online: <http://www.jstor.org/stable/42842704>, accessed: 13/09/2016.
- Brzoska, M. 2009. *The securization of climate change and the power of conceptions of security*. Nomos verlagsgesellschaft mbH: Sicherheit und frieden(S+F)/security and peace, vol. 27, N. 3, (2009). PP.137-145. Online: <http://www.jstor.org/stable/24232823>, accessed: 08/09/2016.
- Buddhism and climate change 2015*. Online: <http://www.clubs.psu.edu/up/ip1/Buddhism.Pdf>, accessed: 06/06/2016.
- CBFF (*Congo basin forest fund*) 2009.
- CBFP (*Congo basin forest partnership*) 2006.

- Celine, E et al. 2012. *National forest covers change in Congo Basin: Deforestation, reforestation, degradation and regeneration for the years 1990, 2000 and 2005.*
- Chibuko, P.C. 2010. *Forestation, deforestation: Implications for ecology and liturgy in dialogue.* African ecclesia review, vol. 52, N. 2&3, (2010).
- Climate change resolution 2005: From the central conference of American rabbis.*
Online: <http://www.Coejl.org/resources/climatechangeresolution/>, accessed: 08/06/2016.
- Craig, W.L. 1998. *Creation and conservation once more.* Cambridge university press: Religious studies, vol.34, N.2 (May 1998), PP. 177-188. Online: <http://www.jstor.org/stable/20008155>, accessed: 22/07/2016.
- Deane-Drumond, C. 1997. *A New Dawn? The Roman Catholic Church and environmental Issues.* Wiley: New Blackfriars, vol. 78, N. 917/918(July/August 1997), PP. 316-326. Online: <http://www.jstor.org/stable/43250363>, accessed: 05/09/2016.
- DeBoer, J.G.1983. *Wastewater reuse: A resource or a nuisance?* American works association: Journal (American water association), vol.75, N.7, conserving water (July 1983), PP.348-356). Online: <http://www.jstor.org/stable/41271727>, accessed: 10/09/2016.
- Deforestation in the Democratic Republic of Congo 2015.*
- Destouni, G & Frank, H. 2010. *Renewable energy.* Springer on behalf of royal Swedish academy of sciences: Ambio, vol. 39, supplement 1. Special report: Energy 2050(2010), PP. 18-21. Online: <http://www.jstor.org/stable/40801586>, accessed: 12/09/2016.
- D'Olimpio, L & O'Leary, M.2013. *The Ethical considerations of climate change: What does it mean and who cares?* Australian institute of policy and science: AQ: Australian quartly, vol.84, N.1 (January-March 2013), PP.10-16. Online: <http://www.jstor.org/stable/24363586>, accessed: 15/09/2016.
- DeWitt, C. 1993. *A Scientist's theological reflection on creation.* Sage publication, Ltd: Transformation, vol. 10, N.2, Biblical faith and the environment (April 1993), PP. 12-16. Online: <http://www.jstor.org/stable/43052392>, accessed: 22/07/2016/.

- Drane, J. 1993. *Defining a biblical theology of creation*. Sage publications, Ltd: Transformation, vol.10, N.2, Biblical faith and the environment (April 1993), PP.7-11. Online: <http://www.jstor.org/stable/43052391>, accessed: 12/09/2016.
- Foley, G. 1981. *The future of the renewable energy in developing countries*. Springer on behalf of royal Swedish academy of sciences: Ambio, vol. 10, N.5, Energy: The alternative (1981), PP. 200-205. Online: <http://www.jstor.org/stable/4312683>, accessed: 12/09/2016.
- Francis, *General audience* (5 June 2013).
- Francis speech to the UN* (2015).
- Fischer, A. 2010. *On the role of ideas of human nature in shaping attitudes towards environmental governance*. Springer: Human ecology, vol. 38, N. 1 (February 2010), PP. 123-135. Online: <http://www.jstor.org/stable/25652767>, accessed: 03/09/2016.
- Gardiner, S.M. 2004. *Ethics and global climate change*. The university of Chicago press: Ethics, vol. 114, N.3 (April 2004), PP.555-600. Online: <http://www.jstor.org/stable/10.1086/382247>, accessed: 15/09/2016.
- Gilbert, J. 2007. *Indigenous rights in the making: The United Nations Declaration on the right of indigenous peoples*. Brill: International journal on minority and group rights, vol.14, N.2/3, Special protection of minorities and indigenous people? (2007), PP. 207-230. Online: <http://www.jstor.org/stable/24675409>, accessed: 05/09/2016.
- Global Buddhist climate change collective: Buddhist climate change statement to world leaders (29 October 2015)*. Online: <http://www.plumvillage.org/news/buddhist-climate-change-statement-to-world-leaders-2015/>, accessed: 06/06/2016.
- Golding, M.P. 1972. *Obligations to future generations*. Oxford university press: The Monist, vol. 56, N.1, Philosophy and public policy (January 1972), PP. 85-99. Online: <http://www.jstor.org/stable/27902251>, accessed: 14/09/2016.
- Gundling, L. 1990. *Our responsibility to future generations*. American society of international law: The American journal of international law, vol.84, N.1 (January 1990), PP. 207-212. Online: <http://www.jstor.org/stable/2203021>, accessed: 13/09/2016.

- Habermas, J. 2010. *The concept of human dignity and the realistic utopia of human rights*. Wiley: *Metaphilosophy*, vol.41, N.4 (July 2010), PP.464-480. Online: <http://www.jstor.org/stable/24439631>, accessed: 05/09/2016.
- Hall, G & Patrinos, H. Eds. 2010. *Indigenous peoples, poverty and development*. World Bank. Online: http://www.sisteresources.worldbank.org/EXTIDPEOPLE/Resources/407801-1271860301656/full_repot.Pdf, accessed: 05/03/2016.
- Halpin, P.N. 1997. *Global climate change and natural-area protection: Management responses and research directions*. Wiley: *Ecological applications*, vol.7, N.3 (August 1997), PP. 828-843. Online: <http://www.jstor.org/stable/2269436>, accessed: 08/09/2016.
- Harrelson, W. 1956. *Creation*. Penn state university press: *The Christian scholar*, vol. 39, N.1 (March 1956), PP.45-49. Online: <http://www.jstor.org/stable/41176928>, accessed: 22/07/2016.
- Hertzke, A.D. 1998. *The theory of moral ecology*. Cambridge university press: *The review of politics*, vol.60, N.4 (Autumn 1998), PP. 629-659. Online: <http://www.jstor.org/stable/1408255>, accessed: 29/09/2016.
- Hubin, D.C. 1976. *Justice and future generations*. Wiley: *Philosophy & Public affairs*, vol. 6, N.1 (Autumn 1976), PP. 70-83. Online: <http://www.jstor.org/stable/2265063>, accessed: 14/09/2016.
- Hussain, M. 2007. *Islam and climate change: Perspective and engagement*. Online: http://www.wisdominnature.org.uk/Resources_documents/cc_Islam_P_and_E.Pdf, accessed: 06/06/2016.
- Hindu declaration on climate change: Presented for consideration to the convocation of Hindu spiritual leaders parliament of the world's religion*. Melbourne, Australia (8 December 2009). Online: <http://www.hindutoday.com/Pdf-downloads/hindu-climate-change-declaration-leaders-2015/>, accessed: 06/06/2016.
- Islamic and climate change: On the occasion of the 17th United Nations framework convention on climate change (COP 17)*. Durban from 28 November- 9 December 2011. Online: <http://www.ciibrocasting.com/2011/11/28/islam-and-climate-change/>, accessed: 06/06/2016.

- Islamic Declaration on Global Climate Change: In the name of Allah, Most Merciful, Most Compassionate*. 2015. International Islamic climate change symposium-Islamic relief worldwide. Online: <http://www.islamicclimatedeclaration.org/islamic-declaration-on-global-climate-change/>, accessed: 06/06/2016.
- Jamieson, D. 1997. *Global responsibilities: Ethics, public health, and global environmental change*. Indiana University Press: Indiana journal of global legal studies, vol.5, N.1, Symposium: The public's health in the global era: Challenges, responses and responsibilities (Fall 1997), PP.99-119. Online: <http://www.jstor.org/stable/20644673>, accessed: 15/09/2016.
- Jews views on the environment 2006*. Online: <http://www.reformjudaism.org/jewish-views-environment>, accessed: 06/06/2016.
- Jhirad, D. 1987. *Renewable energy in developing countries: Priorities and prospects*. International association for energy economics: The energy journal, vol.8, Special LDC Issue (1987), PP. 105-123. Online: <http://www.jstor.org/stable/23296868>, accessed: 12/09/2016.
- John Paul II, 1991. *Pope John Paul II on contemporary development*. In population and development review, vol. 17, N.3 (September 1991), PP. 553-561. Online: <http://www.jstor.org/stable/1971968>, accessed: 29/09/2015.
- John Paul II, 1989. *The Ecological crisis: A common responsibility*. (8 December 1989).
- John Paul II, 2011. *General audience*. (17 January 2011).
- Jonas, H. 1984. *The Imperative of Responsibility: In Search of an Ethics for the Technological Age*. Translated by Hans Jonas with the Collaboration of David Herr. London- Chicago: The University of Chicago Press.
- Joppa, L.N et al. 2008. *On the protection "Protected Areas"*. National academy of sciences: Proceedings of the national academy of sciences of the United States of America, vol.105, N. 18(6 May 2008), PP.6673-6678. Online: <http://www.jstor.org/stable/254611852>, accessed: 05/09/2016.
- Kearns, L. 1996. *Saving the creation: Christian environmentalism in the United States*. Oxford University Press: Sociology of religion, vol. 57, N.1, Special Issue: Sociology of culture and sociology of religion (Spring 1996), PP.55-70.

- Kenrick, J & Lewis, J. 2004. *Indigenous people's rights and the politics of the term "Indigenous"*. Royal anthropological institute of Great Britain and Ireland: Anthropology today, vol. 20, N. 2(April 2004), PP.4-9. Online: <http://www.jstor.org/stable/3695107>, accessed: 05/09/2016.
- Knight, C.G. 2010. *Climate change: The Health of a planet in peril*. Taylor & Francis, Ltd. On behalf of the association of American geographers: Annals of the association of American geographers, vol. 100, N. 4, Climate change (October 2010), PP. 1036-1045. Online: <http://www.jstor.org/stable/40863622>, accessed: 13/09/2016.
- Koenig, R. 2008. *Critical time for African Rainforests*. American Association for the advancement of science: Science, new series, vol. 320, N. 5882(13 June 2008), PP.1439-1441. Online: <http://www.jstor.org/stable/20054254>, accessed: 05/09/2016.
- Kyoto Protocols to the United Nations Framework*. The 11th December 1997. Online: <http://www.energy.gov.za>, accessed: 30/05/2017.
- Kyrou, C.N. 2007. *Peace ecology: An emerging paradigm in peace studies*. International peace research association (IPRA): International journal of peace studies, vol. 12, N.1 (Spring/Summer 2007), PP. 73-92. Online: <http://www.jstor.org/stable/41852955>, accessed: 03/09/2016.
- Labson, B.S. 1996. *International response to greenhouse gas abatement*. ANU Press: Agenda: A journal of policy analysis and reform, vol. 3, N.2 (1996), PP. 177-184. Online: <http://www.jstor.org/stable/43198808>, accessed: 08/09/2016.
- Lama, D. 2015. *Dalai Lama says strong action on climate change is a human responsibility*. The guardian: Associated press (20 October 2015). Online: <http://www.theguardian.com/environment/2015/oct/dalai-lama-says-strong-action-on-climate-change-is-a-human-responsibility>, accessed: 06/02/2016.
- Levy, B.S & Sidel, V.W. 2014. *Collective violence caused by climate change and how it threatens health and human right*. The president and the fellows of Harvard college on behalf of Harvard school of public health/Francois-Xavier Bagnoud Center for health and human rights, vol. 16, N.1, Climate justice and the right to health(June 2014),PP. 32-40. Online: <http://www.jstor.org/stable/healhumarigh.16.1.32>, accessed: 13/09/2016.

- Maathai, W. 2004. *Responding to climate change from the grassroots: The Green belt movement approach*. Online: <http://www.greenbeltmovement.org>, accessed: 24/05/2016.
- Manganda, E. 2004. *The Deforestation of rural areas in the lower Congo province: Environmental monitoring and assessment* 99: 245-250.
- Margolin, W. 2007. *Jewish response to climate change*. Chicago: Juf News. Online: <http://www.juf.org/news/world.aspx?id=14744>, accessed: 08/06/2016.
- Martinez, L.H. 2005. *Post industrial revolution human activity and climate change: Why the United States must implement mandatory limits on industrial greenhouse gas emissions*. Florida State University College of Law: Journal of law use & Environmental law, vol. 20, N.2 (Spring 2005), PP.403-421. Online: <http://www.jstor.org/stable/42842978>, accessed: 08/09/ 2016.
- Mattson, D.J & Clark, S.G. 2011. *Human dignity in concept and practice*. Springer: Policy sciences, vol. 44, N. 4(November 2011), PP. 303-319. Online: <http://www.jstor.org/stable/41486845>, accessed: 05/09/2016.
- Maynard, T. 2008. *Climate change: Impact on insurers and how they can help with adaptation and mitigation*. Palgrave MacMillan journals: The Geneva papers on risk and insurance. Issues and Practice, vol.33, N.1 (January 2008), PP.140-146. Online: <http://www.jstor.org/stable/41952979>, accessed: 05/09/2016.
- Message of His Holiness Pope Benedict XVI for the celebration of the world day of the peace* (1 January 2010).
- Message of His Holiness Pope Francis on the occasion of the 20th conference of the parties to the United Nations framework convention on climate change*. Lima, 1-12 December 2014.
- Message of His Holiness Pope John Paul II for the celebration of the world day of peace* (1 January 1990).
- Message by H.A.H. Ecumenical Patriarch Bartholomew upon the day of prayer for the protection of the creation* (01/09/2012).
- Moellendorf, D. 2011. *A Right to sustainable development*. Oxford University Press: The Monist, vol. 94, N. 3, Morality and climate change (July 2011), PP. 433-452. Online: <http://www.jstor.org/stable/23039153>, accessed: 15/09/2016.

- Monsengwo, L. 2016. Speech: A vin nouveau, outre neuve. Online: <http://www.congo10.com>, accessed: 26/12/2016.
- Muller, C et al. 2011. *Climate change risks for Africa agriculture*. National academy of sciences of the United States of America, vol. 108, N. 11 (15 March 2011), PP. 4313-4315. Online: <http://www.jstor.org/stable/41061111>, accessed: 05/09/2016.
- Narum, D. 1993. *International cooperation on global warming and the right of future generations*. Springer: Policy sciences, vol. 26, N. 1 (February 1993), PP. 21-40. Online: <http://www.jstor.org/stable/4532275>, accessed: 13/09/2016.
- O'Donnell, J. 1997. *Faith in God the Creator*. GB Press-Gregorian Biblical Press: Gregorianum, vol. 78, N.2 (1997), PP. 309-328. Online: <http://www.org/stable/23580024>, accessed: 22/07/2016.
- O'Hara, D.P & Abelsohn, A. 2011. *Ethical response to climate change*. Indiana University Press: Ethics and the Environment, vol. 16, N. 1(Spring 2011), PP. 25-50. Online: <http://www.jstor.org/stable/10.2979/ethicenviro.16.1.25>, accessed: 09/07/2016.
- O'Neill, J. 1993. *Future generations: Present harms*. Cambridge University Press on behalf of royal institute of philosophy, vol. 68, N. 263 (January 1993), PP. 35-51. Online: <http://www.jstor.org/stable/3751063>, accessed: 13/09/2016.
- Outcome of the U.N. Climate change conference in Paris. 21st session of the conference of the parties to the United Nations Framework convention on climate change (COP 21)*. 30 November 2015.
- Overcash, M et al. 1997. *Environmental management for the future and discussion*. Royal society: Philosophical transaction: Mathematical, Physical and Engineering Sciences, vol. 355, N. 1728, Clean Technology: The Idea and the Practice (15 July 1997), PP. 1299-1308. Online: <http://www.jstor.org/stable/54750>, accessed: 10/09/2016.
- Palliser, J. 2011. *Revisiting recycling*. National science teacher association: Science scope, vol. 35, Science for all (November 2011), PP. 14-17. Online: <http://www.jstor.org/stable/43183150>, accessed: 10/09/2016.

- Paranjape, M. 2016. *Hinduism and Climate Change*. Online: <http://sanskritimagazine.com/indian-religion/hinduism-climate-change>, accessed: 06/06/2016.
- Parson, E.A et al. 1999. *Joint implementation of greenhouse gas abatement under the Kyoto protocol's "Clean development mechanism": Its scope and limits*. Springer: Policy sciences, vol. 32, N.3 (September 1999), PP. 207-224. Online: <http://www.jstor.org/stable/4532460>, accessed: 08/09/2016.
- Peach Brown, H.C. 2011. *Gender, climate change and REDD+ in the Congo Basin forests of Central Africa*. Commonwealth forestry association: The International forestry review, vol. 13, N. 2, Special Issue: Forests and gender (2011), PP.163-176. Online: <http://www.jstor.org/stable/24310666>, accessed: 10/09/2016.
- Pearson, R.G.2016. *Reasons to conserve nature*. Cellpress: Trends in Ecology & Evolution, vol. 31, N.5 (May 2016), PP. 366-371
- Paterson, B. 2006. *Ethics for wildlife conservation: Overcoming the human-nature dualism*. Oxford University Press: Bioscience, vol. 56, N.2 (February 2006), PP. 144-150. Online: [http://www.jstor.org/stable/10.1641/0006-3568\(2006\)056](http://www.jstor.org/stable/10.1641/0006-3568(2006)056), accessed: 03/09/2016.
- Patrick, J.M. 1990. *Environmental crisis*. The Furrow, vol. 41, N.10 (October 1990), PP. 588-590. Online: <http://www.jstor.org/stable/27661840>, accessed: 29/09/2015.
- Protected Areas in the Congo Basin: Falling both people and biodiversity?* 2014. Rainforest foundation, UK. Online: <http://www.rainforestfoundationuk.org>, accessed: 10/09/2016.
- Quane, H. 2005. *The Right of indigenous peoples and the development process*. The Johns Hopkins University Press: Human rights quarterly, vol. 27, N. 2 (May 2005), PP. 652-682. Online: <http://www.jstor.org/stable/20069800>, accessed: 05/09/2016.
- Ramesh, J. 2010. *Governance for ecological security*. Indiana International Centre: Indiana International Centre Quarterly, vol. 37, N. 1(Summer 2010), PP. 2-11. Online: <http://www.jstor.org/stable/23006451>, accessed: 05/09/2016.
- Ramirez, J.M. 2005. *Peace and development in Africa*. Professors world peace academy: International journal on world peace, vol.22, N.3 (September 2005), PP. 51-73. Online: <http://www.jstor.org/stable/20753497>, accessed: 11/07/2016.

- Rio Declaration on environmental and development*. Rio De Janeiro from 3 to 14 June 1992.
- Robinson, J & Bradley, M. 2006. *Climate change and sustainable development: Realizing the opportunity*. Springer on behalf of royal Swedish academy of sciences: *Ambio*, vol. 35, N.1 (February 2006), PP. 2-8. Online: <http://www.jstor.org/stable/4315675>, accessed: 08/09/2016.
- Shalizi, Z & Lecoq, F. 2010. *To mitigate or to adapt: Is that the question? Observations on an appropriate response to the climate change challenge to development strategies*. Oxford University Press: *The World Bank research observer*, vol. 25, N.2 (August 2010), PP. 295-321. Online: <http://www.jstor.org/stable/40891377>, accessed: 09/07/2016.
- Shaoping, G & Lin, Z. 2009. *Human dignity as a right*. Brill: *Frontiers of philosophy in China*, vol. 4, N. 3 (September 2009), PP. 370-384. Online: <http://www.jstor.org/stable/40343932>, accessed: 05/09/2016.
- Sheshadri, R. 2005. *Pygmies in the Congo Basin and conflict*. ICE Case studies 163.
- Sobrevila, C. 2008. *The role of indigenous peoples in biodiversity conservation: The Natural but often forgotten partens*. The World Bank: Washington, D.C. Online: <http://www.siteresources.worldbank.org/INTBIODIVERSITY/Resources/Roleofindigenouspeoplesinbiodiversityconservation.Pdf>, accessed: 20/04/2016.
- Sokolowski, R. 1981. *Knowing natural law*. Peeters publishers/*Tijdschrift voor filosofie: Tijdschrift voor filosofie*, 43 Ste Jaarg. , Nr. 4 (December 1981), PP. 625-641. Online: <http://www.jstor.org/stable/40883759>, accessed: 05/09/2016.
- Sonwa, D et al. 2009. *Adaptation for forests and communities in the Congo Basin*. ETFRN News50. Online: http://www.r4d.dfid.gov.uk/PDF/outputs/climatechange/ETFRN_50_forests_and_climate_change93-100.Pdf, accessed: 22/04/2016.
- Spears, J.S. 1983. *Replenishing the world's forests: Tropical reforestation: An achievable goal?* Commonwealth forestry association: *The Commonwealth review*, vol. 62, N.3 (192) (September 1983), PP. 201-217. Online: <http://www.jstor.org/stable/42606312>, accessed: 10/09/2016.

- Streck, C & Scholz, S.M. 2006. *The Role of forests in global climate change: Where we come and where we go*. Wiley on behalf of the royal institute of international affairs (Royal Institute of International Affairs 1994-), vol. 82, N, 5 (1 September 2006), PP. 861-879. Online: <http://www.jstor.org/stable/3874204>, accessed: 10/09/2016.
- The Earth as witness: International Dharma teachers' statement on climate change*. 2014. Online: <http://www.oneearthsangha.org/articles/dharma-teachers-statement-on-climate-change/>, accessed: 20/02/2016.
- The Time to Act is now: A Buddhist Declaration on climate change*. 2005. Online: http://fore.yale.edu/files/buddhist_climate_change_statement_5-14-15.Pdf, accessed: 06/06/2016.
- The Philosophical Genesis of the Ecological Crisis*. 2013. Albany: State University of New York Press. Online: <http://www.sunnypress.edu/pdf/62765.Pdf>, accessed: 14/11/2016.
- The Speech of the Pope Francis to the U.N.* 2015.
- Buddhism and climate change 2015*. Online: <http://www.clubs.psu.edu/up/ipl/Buddhism.Pdf>, accessed: 06/06/2016.
- Tokarczyk, R.A. 1993. *National law as the universal basis of social order*. Franz Steiner verlag: ARSP: Archiv fur rechts-und sozialphilosophie/Archives for philosophy of law and social philosophy, vol. 79, N.1 (1993), PP. 70-79. Online: <http://www.jstor.org/stable/23679910>, accessed: 05/09/2016.
- Tucker, J & Ludi, E. 2012. *Empowerment and equity*. London: Overseas development institute. Online: <http://www.oecd.org/dac/povertyreduction/50157953.Pdf>, accessed: 30/04/2016.
- UNEP. 2011. *The Democratic Republic of Congo: Post-Conflict environmental assessment synthesis for policies makers*. Online: <http://www.unep.org>, accessed: 25/11/2015.
- United States conference of Catholic Bishop*. 14 November 1991.
- Vucetich, J.A et al. 2015. *Evaluating whether nature's intrinsic value is an axiom of or anathema to conservation*. Conservation biology, vol. 29, N. 2 (2015), PP. 321-332.
- Waldron, T. 1990.*Creator of heaven and earth*. The furrow, vol. 41, N. 6 (June 1990), PP. 335-343. Online: <http://www.jstor.org/stable/27661766>, accessed: 22/07/2016.

- Waskow, A. 2015. *250 Rabbis sign rabbinic letter on the climate crisis*. The shalom center. Online: <http://www.theshalomcenter.org/250-rabbis-sign-rabbinic-letter-climate-crisis>, accessed: 06/06/2016.
- WCED (*world commission on environment and development*) 1987.
- Weiss, E.B. 1990. *Our rights and obligations to future generations for the environment*. American society of international law: The American journal of the international law, vol. 84, N. 1 (January 1990), PP. 198-207. Online: <http://www.jstor.org/stable/2203020>, accessed: 13/09/2016.
- Willis, K.J & Gillson, L. 2004. *How "Virgin" Is Virgin rainforest?* American association for the advancement of science: Science, New series, vol. 304, N.5669 (16 April 2004), PP. 402-403. Online: <http://www.jstor.org/stable/3836660>, accessed: 10/09/2016.
- Williston, B. 2012. *Climate change and radical hope*. Indiana University Press: Ethics and the environment, vol. 17, N. 2, Special Issue on climate change (Fall 2012), PP. 165-186. Online: <http://www.jstor.org/stable/102979/ethicenviro.17.2.165>, accessed: 13/09/2016.
- Wolfe, C. 2003. *Understanding natural law*. Penn State University Press: The good society, vol. 12, N.3, Symposium: Natural law and secular society (2003), PP. 38-42. Online: <http://www.jstor.org/stable/20711143>, accessed: 05/09/2016.
- Woodwell, G.M et al. 1988. *CO2 Reduction and reforestation*. American association for the advancement of science: Science, New series, vol. 242, N.4885 (16 December 1988), PP.1493-1494). Online: <http://www.jstor.org/stable/1702346>, accessed: 10/09/2016.
- Woolgan, D. 1941. *Creation and re-creation*. Wiley: Blackfriars, vol. 22, N. 253 (April 1941), PP. 178-186. Online: <http://www.jstor.org/stable/4382962>, accessed: 02/08/2016.
- WWF (*world wild fund*) 2014.
- ZeMeka, E. 2006. *Sustainability of dense and humid African forests: The end of the tunnel or the crossing of the desert?* Commonwealth forestry association: The International forestry review, vol. 8, N. 1, Special Issue: Africa-its forests and their

future (March 2006), PP. 54-64. Online: <http://www.jstor.org/stable/4374254>, accessed: 10/09/2016.

Ziaka, Y. *The "Imperative of Responsibility" According to Hans Jonas*. Online: http://www.base.alliance-respons.net/docs/yziaka_Prince-respons-eng.pdf, accessed: 14/11/2016.

Dictionaries and Encyclopaedias

Hanks, P & McLeod, W. T. Eds.1986. Collins Dictionary of the English Language. London- Glasgow: Collins.

Leopold, A.C.2012. *Stewardship*. Boyce Thompson institute for plant research at Cornell University, Ithaca, NY: Elsevier Inc, vol.4 (1998), PP. 225-232. In Encyclopaedia of Applied Ethics, 2nd Ed. (2012). Online: <http://www.sciencedirect.com.oasis.unisa.ac.za/science/referenceworks/9780123739322>, accessed: 28/09/2016.

Merriam-Webster Dictionary. 2016. *Myth*. Online: <http://www.merriam-webster.com/dictionary/myth>, accessed: 01/10/2016.