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THE ROLE OF LAW IN COMBATING GLOBAL WARMING

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A research report submitted to the Faculty of Health Sciences, Steve Biko Centre for Bioethics, University of the Witwatersrand, Johannesburg, in partial fulfilment of the requirements for the degree of Master of Science in Medicine in the field of Bioethics and Health Law

Johannesburg, 2009

DECLARATION

I, James Nugi Ndung'u, declare that this research report titled:

THE ROLE OF LAW IN

COMBATING GLOBAL WARMING

is submitted for assessment for the MSc Med (Bioethics & Health Law) course is my own unaided work except where I have explicitly indicated otherwise. I have followed the required conventions in referencing the thoughts and ideas of others. It is being submitted for the degree of MSc Med (Bioethics & Health Law) in the University of Witwatersrand, Johannesburg. It has not been submitted before any degree of examination at this or any other university.

Signature 10th day of October, 2008

DEDICATION

I dedicate this work to my late Dad for his great vision and inspiration and most of all to my lovely Mum for instituting the virtues of hard work, discipline and humility in me.

ABSTRACT

This research report provides the reader with an overview of the current state of Earth as far as global warming and climate change is concerned. I describe how global warming is largely a consequence of humanoid behaviour from our past to our present behaviour focusing on self-centred materialism and consumerism. In the current economic paradigm, selfishness has become a prized commercial resource as humans continue to plunder, dominate and use earth's resources with impunity. I explain ways in which the traditionally conceived views humans had concerning nature, including support by some religions, are changing, albeit slowly. This is accomplished by looking at changes in some concepts in two of the world's major religions: Christianity and Islam. I describe the current physical state of the environment as the resource for human life. Because of its current state, I look at the importance of an ethical view of the environment. My major focus though is on the ways in which the emergence of the concept of international environmental law and its principles such as equitable utilization and apportionment have relevance and may prove to be the best deterrent in the attempt to stem global warming. I conclude this overview by making suggestions and recommendations concerning the Kyoto protocol - and how global warming can be tackled through an effective legal regimen.

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PREFACE

The MSc Med (Bioethics & Health Law) course is designed to provide postgraduate students with the academic tools and background to examine complex issues arising in the life sciences and health law. In this course, (60%) sixty percent of the course mark come from successful completion of course work while (40%) forty percent comes from our research report. Because I found the unit *Environmental Bioethics* so interesting, I decided to use one of the issues raised in it as the topic of my research report.

In this research report I will try to provide the reader with an overview of the current 'State of the Planet' and how the Law may prove to be the most important means by which we can, if enacted, at least contain the damage we have already done to our planet.

In my introductory chapter, I will briefly provide an overview of our common history identifying that as humans, we considered ourselves sufficient to dominate and use Earth's resources with impunity. This will lead to the second chapter in which I will look at the rise of environmental ethics and the influence of two of the many religions on our generally anthropocentric worldviews. In that section, I will provide examples of current thinkers within some religious groups which display a tendency to include the idea of respecting Earth as opposed to exploiting her.

In my third chapter, I will provide basic information concerning the importance of an understanding of our atmosphere under the pressure of Climate Change and Global Warming. This also has relevance to my central chapter.

My fourth chapter is the central chapter. In it, I will examine the concept of International Environmental Law and identify the principles of International Environmental Law and state sovereignty. I overview such important areas as due care for the environment and well as precautionary action, the concept of intergenerational equity and good "neighbourliness". Equitable utilisation and apportionment are also discussed. The idea that Earth is a commons and that all of us have an ethical[1] obligation to protect her is overviewed in such topics as: Termination of unlawful activities and the making of reparation, the preservation of *res communis* and the common heritage of humankind, and the duty to cooperate in solving trans-boundary environmental problems. I will close that chapter with identifying some common, but differentiated obligations and outline some ideas concerning peaceful settlements of environmental disputes. I then will close the chapter highlighting some of the keynote provisions found in the Kyoto Protocol

[1]If we as humans do not accept our ethical obligation to protect Earth, then the law may serve to step in and ensure environmental protection.

In my concluding chapter, I will make a few suggestions and recommendations concerning the Kyoto Protocol. Then, concerning the human inhabitants of planet Earth, I will conclude with the thought that should worldviews not change, International Environmental Law at least will exist to ensure the continuation of Earth and its biotic community.

A limitation to my research report, which did not become evident until I became immersed in the topic, was keeping as close to the required count of between 10,000 - 15,000 words as possible. This became difficult, because I would have liked to include more information concerning this topic. I hope, though, I have sufficiently introduced the reader to at least the highlights of the problem of harms to the environment - specifically climate change and global warming - and how Environmental Law may play a role in saving our planet.

Chapter 1 Early Humans and the Environment

Around two million years ago, humans developed to the point at which our larynxes and brains were matured sufficiently to make it possible for us to speak. One thing that happened, because we could speak, was to communicate with each other. This is because our instincts are to be "social creatures". However, there were both burdens and benefits with being 'social'.

In the early Palaeolithic period (about 30 000 to 35 000 years ago), humans had extended across the planet. At that time, the population of the planet was around one million humans (Star 1973). We had evolved from our earliest ancestors significantly, both biologically and culturally.[2] For almost four million years, while we were evolving, we wandered the continents in small nomadic bands. Establishing a cooperative tribe and extending such collaboration to other tribes was vital. It is from these early links that societies and cultures arose changing over millions of years of evolution (Plotkin 1986). We used diverse strategies to help ensure our survival such as selfish individualism, altruism,[3] and 'tit for tat' strategies (Axelrod and

[2] For example, we used fire for cooking, warmth and protection against other predatory animals. Musical instruments, flaked stone tools, portable art and artefacts, implements, and equipment were part of early hunter-gatherer societies.

[3] Altruism, it has been argued, is incompatible with evolution. Through analogous behaviour studied between various animal species it was discovered that altruism must be

Hamilton 1981: 1390-1396). Through social mechanisms such as these (plus our genetic modifications and instincts), we slowly shifted from loose bonds into tribal groups.

Mithen (1996), an archaeologist, tells us that the archaic human mind was one in which social behaviours were somewhat isolated from dealings with the natural world, including other human tribes and material culture- in other words, we were somewhat 'shy'. If this is true, then this proclivity plus low human population density meant that early humans rarely came across other tribes. Undoubtedly, on the ecology side, early hunter-gatherer societies did not have much trouble with waste disposal. The nomadic lifestyles and low population density of our ancestors allowed wastes and even material possessions to be thrown away with no damage to the environment; what possessions we had were few, and soon recycled in the biodegradation of primary organic debris.

Around 40 000 to 50 000 years ago behaviourally modern humans developed. Barber and Peters (1992: 305-352) propose the catalyst was the development of a full language system, which in combination with biological changes, made sophisticated communication possible. With

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distinguished based on different kinds as well as different classes of recipients. The traditional definition is an act beneficial to a recipient but performed at cost to the altruist. According to Mayr (2001: 257-260) there are three different kinds of altruism: (1) Altruism for the benefit of an individual's own offspring, (2) Favoured treatment of close relatives or 'Kin Selection,' and (3) Altruism among members of the same social group

sophisticated communication humans could pass on comprehensive information, distinguish between past, present, and future, reflect symbolically and abstractly, envisage, and reason. Such changes led to an abrupt and dramatic change in subsistence patterns in the late Stone Age.

In higher animals such as humans, adaptations articulated themselves in instincts, tastes and habits that would be group-beneficial, for example, resource sharing and the avoidance of communal dangers. Undoubtedly, there was a social hierarchy based on gender, and the beginnings of a social system were further developed. Supernatural beliefs appeared in the late Palaeolithic (Old Stone Age). Apart from chiefs or tribal leaders, the social group was dominated by 'witch doctors' or 'shamans' to whom was attributed the power of communiqué with spirits. It is during this era that myths emerged (De Laet 1994: 640).

With the move to agriculture and sedentism, humans lived in closer contact with each other, and with water-sources, plants both gathered and cultivated, and animals, hunted and domesticated.[4] Environmental conditions, biological and cultural human development led to the progressive development of agriculture, fishing, and animal husbandry.

[4] I refer to the cultural stages of the Palaeolithic (9000-4000 BCE), to the Neolithic (4000-1200 BCE) to the Protohistoric (1200 - beginning of CE) to current times.

For example, agriculture extended to Ancient Greece by about 6000 BCE from the Near East, with proof of both plant and animal domestication (Bender 1975: 13). At first livestock consisted mostly of sheep and goats with the main crops grown being emmer, barley and einkorn (*ibid*: 20). Soil erosion too resulted from human misuse of the land, with, according to archaeologists van Andel, Zagger and Demitrack (1990), a major stage of soil erosion happening after the advent of farming. Further, they give substantiation that after the first millennium BCE there was serious intermittent soil erosion in many places, 'compatible with a model of the control of the timing and intensity of landscape destabilisation by local economic and political conditions' (*ibid*).

Water-sources were significant factors in human development with archaeological evidence revealing constructed human communities in Europe and Asia over 12 000 years ago, for the most part built near water sources. Then as now, water availability helped to establish both where and how people live and influenced the way in which they interrelated with each other, for good or ill.

During prehistoric times (which changed dramatically with the advent of the trade routes), physical and social conditions of the majority of humankind may well not have been ideal, but neither were they in a

constant state of crisis. In spite of severe conditions, by the end of the Palaeolithic our ancestors selectively propagated plants and animals, cultivated the soil and cared for domestic animals. Expanding populations depleted or wiped out large game resources by successful hunting (Todd 1987: 265-267) – just as humans do today.

While the control of fire is argued to be the earliest human technology (Mumford in Rifkin 1999: 7), the technology involved in the development of agricultural practices must be recognised as a major factor in the increase of infectious diseases. Why is this so? The production of grains for eating resulted in a huge array of dietary resources and prepared the way for enormous expansion of human populations, trade routes and commerce, and tremendous societal changes. This incredible cultural change was not merely quantitative, but represented a noteworthy change from all earlier human behaviour. It was as Klein (2000: 33) says, a 'creative revolution' - one that demonstrated technological ingenuity, social formations, and ideological complexity.

Improved grain production effected by hybridisation increased human population growth, land control and distribution. It also influenced the development of trade routes. When grain became a staple, large populations of people were needed for sowing seed and reaping harvests.

Land had to be cleared, water-sources diverted for crops, storage facilities constructed for excess, and so on. Land, water sources, and the people who worked them resulted in divisions of labour as well as the relegation of societal roles, including the creation of power bases of those who controlled such factors.

During the Neolithic the 'chief' became the 'king,' whose role became hereditary and whose powers were more and more of a military nature. Likewise, in society's evolution the powers of the traditional healers or shamans progressively became coupled with secular, economic and political powers. The shift from hunter-gatherer, with a tradition of sharing produce equally, to food making replaced interdependency and reciprocity with struggle for the ownership of the greatest possible amount of resources. According to De Laet (1994: 644), 'the advent of the concept of property conduced theft, plunder, and war'. This may have represented the preamble of moral dilemmas into human society and the source of questions concerning right and wrong, good and bad, justice, and distribution of wealth. As trade, commerce, and power developed, these connections grew during and with the changeover from agrarian societies to industrialisation.

Our worldviews are often influenced by those in powerful positions. Importantly, our worldviews normally mirror the principal view of humans

as the centre of the universe. Predominately Western worldviews contributed to the process of the division of humans from the environment and negated its intricate web of interrelationships and interdependency. However, what must also be contemplated is our own biological evolutionary model. Large brains, opposable thumbs, bipedal, upright posture, language, the capability to think, imagine, and reason are some distinctive human biological endowments. As a species, we are unquestionably the prevailing force of life on Earth today.[5] We often believe we are all-powerful and apart from the rest of the environment However as I will show, we mislead ourselves.

[5] For example, humans inhabit every continent (over-populate the Earth), fish the seas (kill the oceans), create splendid cities (generate decaying slums), tame rivers (pollute water sources), bring water to the deserts (create new deserts), harness the atom (build weapons of planetary destruction), and tinker with genes (move non-consequentially in unknown parameters).

Chapter 2 Ethical and religious considerations concerning the environment

2.1. Environmental ethics

The history of environmental ethics shows us that shifts in ideas concerning the relationships between humans and the environment do not happen instantly. The prevailing deep anthropocentric worldview, fortified by the world's great religions, started to lose some pre-eminence because of the insights of Charles Darwin.

Together with Thomas H. Huxley, Darwin initiated the dismantling of the human position on top of the *Scala naturae*. In the footsteps of Darwin and Huxley, Gifford Pinchot ([1947] 1987) and John Muir ([1916] 1981) also raised concerns about human mishandling of the environment. Pinchot's conservation philosophy was, however, welfarist and human-centred (Elliot 1998: 2). Motivated by anthropocentric and utilitarian values, he saw material resources as commodities to be used sparsely (Ehrenfeld 1981: 177).

Similarly, Muir's philosophy, which inspired Aldo Leopold's *Land Ethic*, emphasised a 'wise use' of resources. These steps, albeit in the correct direction, were nonetheless prudential. In other words, the best way to

avoid the 'tragedy of the commons' (Hardin 1995: 330) was through urging enlightened self-interest (Callicott 1995: 160).

Through gradual development, we recognize concepts of human responsibility to the environment emerging. In this, human morality is obliged to re-evaluate its hitherto strictly anthropocentric and dichotomous axiology to include newly found values into the traditional ethical framework. Connections established in the human-nature relationship are described in Callicott's (1995: 274) words concerning the land ethic saying:

'… [it] does not cancel human morality, neither does it leave it unaffected'.

Almost for the first time in contemporary moral philosophy, the specific enquiry of the intrinsic value of nonhuman entities and the need to 'globalise' ethics in the situation of humans and nature arises (Sosa 1996: 51). Like Callicott, Sosa acknowledges that questioning the intrinsic value of human and nonhuman life does not indicate that we can do wholly without any of the traditional anthropocentric ethics. But this could not happen without, and thus requires, a moving away from our traditional human chauvinism in a nonanthropocentric way.

In environmental ethics, the debate then appears to centre on how much nonanthropocentrism is justified and acceptable. The answers diverge from *e.g.* weak or enlightened anthropocentrism, to biotic egalitarianism to Gaian ethics. The choice, says Sosa (ibid: 59), is

> *… either to limit intrinsic value to the survival of the human species, or to make nature the beneficiary of ethical competence.*

Related to this quote, authors Pierce and VanDeVeer (1995) chose 'The Elusive Broader View' as the title introducing their work. To look beyond our normal myopia (perceiving the world created for only human benefit) they request us to consider that our actions, both as individuals and collectively, depend mainly upon what we believe to be good, right, and permissible, in other words what we consider to be of value (*ibid*: 1).

With some exceptions, the idea of us being connected and related to / in / of nature is not a concept that has been disseminated in Western moral philosophy. In addition, the power of Western philosophy on Western culture has over time served to enhance the separation of us from our environment. One major difficulty is that our actions are defined by what we are educated to be of value or what we recognize as a good or good. It would appear that any prerequisite to an ethics concerning the environment

must ultimately rest on the acknowledgment of a relationship between humans and the environment. In the search to define itself, environmental ethics, has been variously considered from a simple addition of prevailing social ethics, to redefining philosophy as a whole, to a reformulation of essential responsibilities to our planet.

Broadly, we can say that environmental ethicists come together around the belief that we are guilty in the continuing degradation of our planet. This is because our major worldview considers nature only as a commodity. Environmentalists seek to change this worldview. As Griffin (1996: xiii) writes, 'The human proclivity to evil in general, and to conflictual competition and ecological destruction in particular, can be greatly mitigated by a world order and its worldview'. Integrated then in all environmentalist perspectives is the idea of a human-environment relationship (the biotic community).

In my previous chapter, I noted that as early humans we created myths in an attempt to understand a world that we could not comprehend. Later, we went from myths to magic. In our social development, our religions or belief systems played a major role in the creation of our worldviews and ways of life. Such religions and belief systems served to place humans in a position "above" the rest of the biotic community. This was the

predominant position for all major religions until about the late 1960's onwards when scientific understanding of the global condition and persistent environmentally conscious voices began to permeate the global consciousness. Since that time, there has been within the major religions a steady call for greater religious or belief system openness concerning the human-environment relationship. I will overview two approaches to this relationship in the next section.

2.2 Religion and the environment

Across the world's major religions, there is an increasing awareness of the dangers of environmental destruction including climate Change and the urgent need to confront the problem. In an era in which we are far more accustomed to thinking and talking about religious conflict than religious harmony, the environmental crisis provides unexpected potential for religious cooperation and moral understanding.

There are several reasons why it is important to discover a common environmentalist ground amongst religions and belief systems. For one thing, they can play a major role in raising public consciousness about e.g. Climate Change, Global Warming and conservation issues just as they have done in the past on issues such as the need for international debt relief for

poor countries.[6] Building global coalitions to tackle such environmental issues requires bringing together not only governments and businesses, but also the constituents of civil society, which includes religious and similar organizations. Developing greater religious cooperation and unity around environmental issues may be a basis for strengthening interfaith dialogue and collaboration to help solve problems of religions conflict in other spheres, thereby acting as an antidote to the clash of civilizations that we seem to be willing into existence through our tendency to focus on our differences rather than on our similarities.[7] In the following sections, I will overview some major trends in two of the world's major religions: Christianity and Islam. [8]

2.1 Christianity and the Environment

In 1967, Lynn White, Jr., a theological historian, published a now-famous article on *The Historical Roots of the Ecological Crisis.* In this publication he argued that Christianity, and to a lesser extent Judaism, were the main

[6] Religions are able to mobilize millions of people to take action, as has been seen through human history, for instance in the struggle against slavery and the slave trade in the eighteenth and nineteenth centuries.

[7] An example of this tendency is demonstrated in a Google Scholar search for the phrase, 'religious conflict' brings up 543,000 pages whereas a search for 'religious cooperation' lists only 26,000, 'religious unity' 89,000 and 'religious harmony' 141,000. The searches were conducted on 20/02/2007 using the 'exact phrase' function.

[8] The reason for using these two religions as examples is two-fold: the first is because word-count considerations required extensive editing of this section which originally covered all major religions and second, because I thought that contrasting what to some might appear as starkly oppositional do share many ideals.

culprits responsible for environmental degradation. Taking the story of creation in Genesis as his starting point, he (1967: 1205) accused Christianity (particularly in its Western form) of

> *… being the most anthropocentric religion the world has seen … [and of promoting the idea that] … no item in the physical creation had any purpose save to serve mans purposes … By destroying pagan animism (in which every tree, river and animal had its guardian spirit) … Christianity made it possible to exploit nature in a mood of indifference to the feelings of natural objects … Combined with the Christian emphasis on perpetual progress, this was a recipe for ecological disaster.*[9]

Christian ecologists have been defending themselves against White's accusation ever since adherents of the broad range of Christian groups and churches have attempted to demonstrate a strong environmental ethic within Christianity. [10] Ecological thinkers in the Christian tradition frequently point out that the Bible's mention of man having 'dominion' over the Earth

[9] White's work was consistent with a long sociological tradition evident in the writings of Max Weber and Richard Tawney. They argued that the rise of Protestantism from the sixteenth century was a fundamental basis for the development of capitalism, and its associated exploitation of natural resources as well as a culture of over consumption (Tawney 1980: 74).

[10] It is to be acknowledged that Protestants, Roman Catholics, and Orthodox Catholic believers sometimes differ in the texts they use to do so.

should not be construed as a form of domination but rather of stewardship, where man is charged with respecting and preserving Gods creation.[11] While admitting that nature cannot be worshipped in and of itself (which would be paganism), Christian ecologists emphasize that it is possible to see signs of Gods omnipotence and benevolence in the beauty of the natural world. They point out that in the Old Testament it says that humans and animals should rest on the seventh day of each week, and allow seven years for the land to rejuvenate after harvests.[12]

There has been some reluctance from Christian leaders to make explicit statements on specific environmental needs such as the necessity to tackle Global Warming / Climate Change. [13, 14] However, across the main

[11] See for example, Jay Mc Daniel's chapter The Garden of Eden, The Fall and Life in Christ: A Christian Approach to Ecology. In: Mary Evelyn Trucker and John A. Grim (Eds). 1993. *Worldviews and Ecology.* Lewisburg, PA: Bucknell University Press at 75-75 the covenant made after the flood is not only with Noah (and his descendants) but with 'all flesh' or 'every living creature' and that there are ideas of conservation in the old testament, such as that humans and animals should rest on the seventh day of each week, and also seven years allowing the land to rejuvenate.

[12] Many Christian ecologists draw on texts in the New Testament with environmental significance, for example, when Jesus says 'consider the lilies of the field,' this is in addition to the sayings concerning the responsibility of humans to alleviate suffering in the non-human world.

[13] The current and previous Popes, for example, have generally spoken about 'ecological crisis' and the importance of 'protecting the natural environment' rather than the 'problem of climate change' or 'global warming' (Ruether 2000: 604-611; Pedersen 1998:26). Mc Daniel Jay Supra note 10:John Paul II (1990).

[14] It should be noted that Migliore (2006), a representative from the Vatican, recently made direct reference to climate change in a call for 'ecological conversion' saying: *The world needs an ecological conversion so as to examine critically current models of thought as well as those of production and consumption...it is the Holy See's hope that opportunities like (making the Kyoto protocol fully operational) may favor the application of an energy strategy which is both global and shared in the long term, capable of satisfying short and long term global energy needs, protect human health and the*

Christian practicing lay population spectrum, there is now a strong movement and acceptance of the need to tackle environmental issues such as Climate Change, and those who dissent are becoming increasingly marginalized.

2.2 Islam and the Environment

Seyyid Hossein Nasr, a prominent scholar of Islamic approaches to ecology, has argued that most Muslims (along with non-Muslims) are walking through our current ecological crisis,

> *… like sleepwalkers … this sleepwalking, by the majority is taking place despite the powerful and persuasive spiritual teachings of Islam about the natural world and the relation of human beings to it …* (Nasr 2003: 85)

He points out several reasons why Islam has been relatively slow to respond to Climate Change and other environmental problems. First, 'the governing classes of the Islamic world have their eyes only on emulating 'the West when it comes to the question of science and technology,' and this science and technology has devastating environmental consequences. Second, migration from rural to urban areas has resulted in many Muslims losing

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environment ,and establish precise commitments that will effectively confront the problem of climate change.

their connection with the natural landscape. Third, traditional scholars *(ulama)* who are the custodians of Islam, have failed to address environmental issues in their efforts to promote Islamic teachings, partly due to being more focused on preserving the integrity of Islam from attacks from outsiders and opponents (ibid: 87-93).

The primary sources of Islamic teaching about the natural environment are the Qur'an, the collections of *Hadiths* (stories about the Prophet) and Islamic law (al-sharia), in addition to *Sufi* texts and the Islamic arts. Islamic ecological thinkers and scholars emphasize that, in the Quran, the cosmos itself is Gods first revelation and the natural world including water,[15] trees, mountains and animals, are emblems or signs *(ayat)* of God. Like in the

Christian textual tradition, creation is sacred but not divine, for divinity belongs to God alone. [16] Finally, an overarching ecological idea in the Qur'an is that God announced that he would create a vicegerent (*Khalifa* on

[15] Concerning water, Islam contains the egalitarian ethic that water must be shared equally, with the ecological consequence that no living creature - including animals - can be deprived of water if it is available. This was noted pointed out by Haq (2001) in an interesting article: 'Islam and Ecology: Toward Retrieval and Reconstruction, *Daedalus,* 130 (4) :168.

[16] It is of interest that there appears to be a clearer emphasis in the Qur'an than in the Bible those non-human creatures have a direct revelation with God. Because humans are part of nature, the doctrine of 'self-injury' (*zulm*) implies that to destroy the balance of the natural world is to destroy oneself. See Hann,'s 1987 book *Being Peace*: 157. Another example is in the books of *Hadith* when the Prophet encouraged the planting of trees and showing kindness to animals. There is also strong opposition to wastefulness and unnecessary destruction of nature to satisfy greed. In addition, Islamic law has numerous injunctions to protect and guard water, forests, and other community resources. See Nasr (2003):97-99.

Earth, with human beings as his servants *(ibad)*, acting as custodians or guardians of the entire natural world (Haq: 2001: 168).

All this adds up to a potentially strong environmental ethic. However, due to the decentralized and fragmented nature of Islamic authority in different countries, where there are multiple centres' of leadership, it is difficult to find statements that represent a general position within Islam on the environment, and ecological thinking.

However, the World Muslim League has issued an Islamic Faith statement on ecology saying,

> *Humanity is the only creation of Allah to be entrusted with the overall responsibility of maintaining planet Earth in the overall balanced ecology that man found.*[17]

This can be analysed further in the context of legal principles like the public trust doctrine, which is a cornerstone of modern environmental law relating to the protection and use of essential cultural and natural resources .It holds that certain natural resources are held by the sovereign in trust and on behalf of all the citizens because of their unique characteristics and central

[17] For interesting reading concerning various contemporary religious approaches to environmental problems(including this quote at 61.}), see Palmer, Martin & Finlay (2003) *Faith in Conservation. New Approaches to Religions and the Environment,* Washington DC: World Bank.

importance. This follows the realisation that certain assets are inherently public and not subject to ownership by either the state or private actors. One of the most important pieces of legislation underlying this doctrine in South Africa is the *National Water Act of 1998*(Act No.36 of 1998).Section 3(1) thereof for example provides as follows:[18]

"As a public trustee of the nation's water resources, the National Government acting through the minister must ensure that water is protected, used, developed, conserved and managed and controlled in a sustainable manner, for the benefit of all persons and in accordance with its constitutional mandate."

Subsection 2 thereof further provides as follows:

"*Without limiting subsection (1), the minister is ultimately responsible to ensure that water is allocated equitably and used beneficially in the public interest while promoting environmental values."*

These are just two overviews on religious or belief systems. With the exception of Buddhism and some of the beliefs found in Hinduism mainly, humans have been placed by their religions on the top of divine creation. Thus, it is easy to understand that this anthropocentric position has been

[18] Section 3(1)(2) of *The National Water Act of South Africa* 1998.Act no. 36 of 1998.

promulgated into mainstream consciousness-into our worldviews and ways of life.

Now we see that the Polar Ice Cap is melting, threatening low-lying countries, ecological systems, and species. As most of the world is enduring high temperatures and lack of rain, shortage of water is becoming a world problem. For example, it is affecting the production of food grains, shifting species and threatening their habitats, disrupting human populations thus causing wars and civil strife as populations are displaced. Time is running out. Unfortunately, there is no sign of awakening in sight. People of religion must forget their theological differences and work together to save Earth from ruin.

While there is a turn away from strong anthropocentric approaches to environmental issues, what is necessary for change is that we adopt a new worldview. In this new worldview we should place more emphasis our interest in surviving and place less interest on being at the "top of the heap" concerning our own value.[19] In closing, I quote from Rabbi Warren Stone (2007)

[19] Bryan Norton's view on an environmental ethic is relevant as he reconceptualises the humans-environment problem pragmatically. Briefly, Norton retains the intrinsic value of humans while shifting the focus to, through environmental ethics, an enlightenment of our preferences. So enlightened, we ideally will develop a broader worldview: an environmental conscience.

In a world where matters of faith seem so often and so tragically to divide us, there is no issue that aligns us more deeply than our shared dependence upon and sacred responsibility to this tiny planet, enfolded within its fragile atmosphere, spinning in the vastness of time and space.

Chapter 3 Environmental Concerns: Global Warming and Climate Change

3.1 The atmosphere

In chemical properties, Earth's atmosphere has existed in roughly the same proportions over several hundred million years as nitrogen ($N_{2)}$, oxygen (O_2), argon (A_r), carbon dioxide (CO_2) and trace elements.[20] These, are in a continuous state of flux. They react with continents and oceans to form weather patterns in a constant process of renewal and recycling. The atmosphere on Earth provides the major source of certain chemicals necessary for life on this planet. Atmosphere controls the Earth's surface environment by regulating both the quality and quantity of solar radiation that enters and leaves the biosphere.

Early humans made no significant changes to this natural process. However, later our human technology resulted in atmospheric imbalance. The major factors attributed to contemporary human influences are (1) the release into the atmosphere of pollutant gases and particles not usually present there in significant amounts, and (2) changes in the concentration of natural atmospheric elements (Nadakavukaren 2000: 417). Because the Earth is a closed system, every element that goes into the system, although

[20] Neon, helium, krypton, xenon, hydrogen, methane, and nitrous oxide are the trace elements.

it may circulate and change form, nonetheless remains within. The consequences of making the sky a convenient dumping ground for volatile wastes should be obvious. 'Vanishing into thin air' is a physical impossibility.

There are two important issues concerning human activities in relation to the Earth-atmosphere system. The first is depletion of the ozone layer. Ozone, although a rare atmospheric gas, is vitally important in protecting life on Earth from the ultraviolet rays of the sun. In the early 1970's atmospheric chemists identified that certain pollutant emissions into the atmosphere had the potential to disrupt the atmospheric chemical equilibrium and thus the integrity of the ozone layer. A second major concern is the rising levels of atmospheric carbon dioxide (CO_2). Global warming because of CO_2 induced enhancement of the greenhouse effect is one of the most pressing and politically charged global environmental issues of contemporary times, as I will pint out in my next chapter. .

Levels of atmospheric CO_2 have been rising since the dawn of the industrial revolution because of the consumption of fossil fuels to power society. When fossil fuels are burned, one of the primary combustion products released is carbon dioxide. Long ago, excess carbon dioxide, for example released through natural volcanic activity, was gradually absorbed by the

oceans and eventually incorporated into carbonate rock, or photosynthesised by plants into a neutral element. The volume of CO_2 now released exceeds the capacity of Earth to reabsorb it naturally. Since 1950, annual carbon emissions worldwide have risen four-fold, reaching a high of 6.3 billion tons in 1998 (Brown *et al.* 1998: 67).

3.2 The Greenhouse Effect

The cumulative result is called the 'greenhouse effect'. In the same way as the glass in a greenhouse permits light to enter but prevents the escape of heat, thereby warming the air within, so the absorption of infrared ground radiation by CO_2 and its subsequent re-radiation back towards Earth helps to maintain an average global temperature of 15^{o} C . Without CO_2 in the atmosphere, the Earth's surface temperature would fall to about 0^{o} C, making life as we know it impossible. The process of Global Warming is an alteration in the global energy balance sufficient to cause a 2^{o} increase in the world's temperature, relative to its 1990 value, before the end of the 21st century (Nadakavukaren 2000: 427).[21] And if the problem of excess CO_2 was not enough, there are other gases contributing to the greenhouse effect such as methane (CH_4), nitrous oxide (N_2O), Chlorofluorocarbons (CFCs),

[21] CO_2 levels, for example have risen from 275 parts per million 200 years ago to 350 ppm today, and are projected to reach 500 ppm by the end of the next century. Current global carbon emissions are estimated to be about 4 percent of the stock of CO_2 in the atmosphere attributable to human activity and about 1 percent of total atmospheric carbon. (Shogren & Toman (2000); Hollicik and Cooper (1997: 159); Weyant (1993: 27-30); Moore (1992: 112).

sulphur hexafluoride (SF_6), perfluorocarbons (PFCs) and hydroflurocarbons (HFCs) (Houghton and Jenkins 1996: 62).

The impact of the greenhouse effect is evidenced in, for example, the arrival of spring in the far North earlier than in the 1970s, the melting of mountain glaciers in Switzerland and other Alpine regions, the global rising of ocean temperatures, an increase in air temperature in the far North, sea-ice melting due to increases in air and water temperatures, and distributive patterns of plant and animals. There are already noticeable changes in the migration patterns of birds and butterflies, as well as the spread of certain disease vectors into areas where they have never been previously identified (Martens and Hall 2000: 105).

3.3 Global Warming

The cumulative result of Global Warming will include, but not be confined to, diminished crop yields, heat-induced declines in animal fertility, migration of insects to other regions, shifts in the balance of pest and predator species, loss of biodiversity, shifting weather patterns creating heavier monsoon seasons, for example in India, less precipitation in Northern America, and global rises in sea temperatures and levels. It is anticipated that Egypt may lose 15% of its arable land to encroaching seas by the end of the 21st century; in Bangladesh a sea level rise of even three

feet will inundate one-sixth of the country's land area (Nadakavukaren 2000: 434). The warming effect of oceans will exacerbate hurricanes and storm surges, affecting three-quarters of the world's population living within 60 km of all coastlines (*ibid*). This disruption[22]will unsettle and displace human, animal and plant populations.

3.4 Different perspectives on Global Warming and Climate Change

Most scientists agree that the enhanced greenhouse effect is leading to rising temperatures, [23] referred to as Global Warming, and other changes in the atmospheric environment known as Climate Change (a term that in common usage also include natural change.})

Article 1(2) of the 1992 *United Nations Framework Convention on Climate Change* defines it as:

> *… a change of climate, which is attributed directly, or indirectly to human activity that alters the composition of*

[22] Rising sea levels brought on by global warming have the potential to threaten populations in many major cities, reduce fertile agricultural land, jeopardise the purity of fresh water supplies, and even compromise the physical existence of some nations. This is not to mention the resultant acidity of the air, formation of acid rain, unbalancing of ecosystems, deterioration of buildings, death of forests, reduction of crop yields, disappearance of wetlands and lakes, extinction of species, and so on.

[23] The causal relationship between the build up of greenhouse gases and an increase in global temperatures has not been defined conclusively and hence is subject to debate. Nevertheless, the expected linkages have stimulated international efforts to control emissions and thereby mitigate any possible rise in temperature. There is a concern by some that absent coordinated action, Global Warming could have undesirable, even catastrophic results.

the Global atmosphere and which is in addition to natural climate variably observed over comparable time periods ...

Article 1(5) thereof further defines 'Greenhouse Gases' as those gaseous constituents of the atmosphere, both natural and anthropogenic, that absorbs and re-emit infrared radiations.

Article 1 (1) further defines 'Adverse effects of Climate Change' as changes in the physical environment on biota resulting from Climate Change which have significant deleterious effects on the composition, resilience or productivity of natural and managed ecosystems or in the operation of socio-economic systems or on human health and welfare. Article 1 (4) further defines emissions as the release of greenhouse gases and/or their precursors into the atmosphere over a specified area and period. The convention does not however define Global Warming.

In a piece on his web log, Dr. Roger Piellke, Sr. offers a definition of global warming writing,[24]

[24] Pielke Sr., Roger A *"Erroneous Presentation of My Views On Climate In The Media"*.Climate science (blog) Available Online at http://www.climatesci.org/2006/07/25/misquotation_0f_my_views_on_climate_science/.Retrieved on 2008-01-15.

Global Warming or cooling is determined by the difference in joules between incoming heat (from the sun) and radiative heat loss from the climate system. In effect, there are only two things that could cause global warming or cooling; a change amount of energy received, such as a change in the radiant existence of the sun or a change in the partitioning of the energy in the Earths ocean atmosphere system.

3.5 **International incentives concerning Climate Change and Global Warming**

Concern about the accumulation of greenhouse gases in the atmosphere and possible effects on global temperatures have led to a series of international initiatives for collective action.[25] These include the *United Nations Framework Convention on Climate Change* (UNFCCC) signed at Rio de Janeiro in 1992. At the Rio Convention, countries pledged to reduce voluntarily carbon emissions to 1990 levels by 2000; a meeting in 1995 in Berlin of the *Conference of Parties* (COP), created at the Rio Conference, to define a structure for further action; and the *Kyoto Protocol* on Global Warming of December 1997 (Sparber and O'Rourke 1998: 67).

[25] For discussions concerning global actions see for example: Houghton, Jenkins and Ephraim's (1990), Houghton, Callander Varney (1992), and Houghton, Meiva Filho, Callander, Harris Kattenberg, and Maskell (1995).

Under the *Kyoto Protocol,* thirty-eight developed countries are to reduce greenhouse gas (GHG) emissions by approximately 95 percent of 1990 levels by 2008-2012. The United States is to lower its discharges of carbon dioxide (CO_2) to 93% of their 1990 emissions. These actions will not be without costs, although neither the costs nor the benefits of emission controls are known with certainty. Uncertainty arises because of a lack of conclusive information (a) the human sources and pace of temperature change; (b) the costs, and benefits of Global Warming and their distribution across countries; (c) the costs, benefits and effectiveness of different forms of regulation; and (d) the extent of treaty compliance by sovereign countries (ibid: 32).

Over time, new information will be generated regarding the nature and pattern of temperature change, its effects on different parts of the world and the costs and benefits of addressing it. This new information is a public good because it can serve to reduce uncertainty about the environmental problem and its solution. The associated reduction in uncertainty will allow constituencies to assess how Global Warming and its associated regulations will affect them, and this in turn will allow politicians to assemble clearer positions for international negotiations and for devising international transfers to those countries that expect to bare inordinate costs from regulations. Accordingly, international treaty compliance will be much

more likely, and since international actions depend on voluntary adherence to treaty provisions, this is an important point. Other aspects affecting compliance are the costs of compliance on the economies of intransigent countries and weak or non-existent enforcement mechanisms.

Global Warming is an open–access resource problem. As mentioned, with access to the atmosphere unrestricted, are released as by-products of human activities and other natural sources across countries. Regardless of their origin, the gases are spread around the globe with potential external effects. Under debate are whether and how much the further accumulation of the gases from human actions will generate a damaging rise in global temperatures. The United States currently is the largest emitter (U.S. DoE: 1998). The macroeconomic effects, however, are uncertain because they depend on each country's energy intensity of production, energy sources and importantly on the magnitude and pace of emission reductions implemented on a microeconomic level, there will be distributional effects within and across countries, both from Global Warming and from regulation. Some countries appear to be more vulnerable to any negative implications of Global Warming and within countries; energy intensive industries are apt to endure the most of emissions controls. Taxpayers may be called on to fund the implementation and monitoring of regulations, and to pay for compensating transfers to sectors harmed. Further, they may be

required to pay for side payments to other countries as increments to participate in collective action.

Consumers may also be affected if costs and prices rise from a shift to less polluting forms of production. On the other hand, those constituencies that favour action to mitigate potential Global Warming will benefit. These heterogeneous constituent effects and the uncertainty confronted by each party in calculating the next effects of the treaty create political problems for politicians with implications for the success of international collective action. The public choice bargaining issues raised by uncertainty have been neglected in the literature.[26]

Effective collective action to address potential Climate Change will be a formidable challenge. The very nature of global environmental externalities presents incentive problems. Abatement by any country benefits others as a public good, but if abatement is costly to a country's citizens, its politicians have incentive to invest less in optimal and free ride on kickbacks taken

[26] A large and growing literature has emerged about the scientific phenomena of Global Warming, its possible effects, various regulatory instruments and the role of International law in environmental policies. Some selected citations are Cline (1992), Diersen (1998), Hanafi (1998), Hoel (1997), Hollick &Cooper (1997), Houghton (1997) Moore (1998), Nordhaus (1991 a, 1991 b, 1993) Paterson (1996), Poterba (1993) Shogren and Toman (2000), Schmalendee (1993a, 1993 b,) Weyant (1993) and Wiener (1999). A recent assessment of the impact on the US is available at http://www.acrio.org/NationalAssessment/index.html

elsewhere. Research on collaborative action to address more tractable, local common property resources indicates that these incentives problems can occur even where there is agreement about the magnitude of the problem and the aggregate benefits of resolving it.[27] Bargaining of such issues becomes more complex in international environmental agreements where the benefits and costs are very uncertain and differentially spread across and within countries, and where compliance among sovereign countries is voluntary.

One of the problems that we can see repeating itself has at its core ethical basis not just how we see the world, but greater issues concerning how we view ourselves as a part of a larger complex system – including "voluntariness". To voluntarily agree to a plan, or an idea no matter how just it may be still relies largely on what we as humans value. I have shown how the permeation of a strong anthropocentric worldview, fostered by most religions lulled us into thinking we were omnipotent. In keeping, another problem is that in the quest for power, the idea of technology as a universal 'fix' was not only embedded but also mediasised in our

[27] Free riding on international environmental resources is discussed by Bac (1996). Barret (1994) addresses the importance of self enforcement of environmental treaties. Regime formation to facilitate international agreements in the face of potential free riding, cheating and conflicting incentives is discussed within the context of agreements on vessel source pollution, Barents Sea fishery and acid rain in Young (1999). The importance of the parties heterogeneities and the skewness of the proposed share distribution as significant sources of political conflict in bargaining is described by Libecap (1989). These are the same lessons that are drawn from the cartel literature as to when cartels can be self enforcing.

consciousness. This resulted in, amongst other things, the formation of a public myth, the myth of technology as omnificent. This created false assurances e.g. Whatever we might do to our environment, technical means would be found to remedy any ills.

It is not surprising that the evolution of a global reliance on technology seemed to supply a cushion on which we rely, blissfully assuming that whatever occurs, someone somewhere somehow will offer the technological means to thrust us out of the predicament. However, as Vogel (1996: 6) points out,

> *… technology allows us to affect the natural world in ways both outside and within ourselves in ways that are cumulative, irreversible and planetary in scale..*

In addition to our anthropocentrism, it seems that our dependence on technology alone appears to be ill grounded as well.

Chapter 4 Global Warming, Climate Change and the Law

4.1 The Concept of International Environmental Law

International Environmental Law is a relatively young branch of International Law. Since the 1970's in particular, it has developed in response to a mounting concern for the state of the environment. However, this is not to say that before the 1970's environmentally relevant law did not exists. As early as the nineteenth century, *Marine Fisheries Agreements*[28] were concluded and treaties containing anti-polluting provisions and regulating fisheries in international rivers (Lammers 1984: 124 -141).

During the first decades of this century treaties relating to the protection of certain species of wildlife (migratory birds, fur seals)and floura and fauna in general were adopted [29] and, since the 1930s anti-pollution treaties have been concluded. Furthermore, legal arrangements came into being which are environmentally relevant even though inspired by other objectives.

Examples are e.g. the provisions in the *GATT 1947* dealing with the protection of animal or plant life and the conservation of natural resources,

[28] For example, the 1882 North Sea Fisheries Convention
[29] For example, in 1990 a Convention on the Preservation of Wild Animals, Birds and Fish in Africa was signed in London, followed by, in 1902, a Convention for the Protection of Birds Useful to Agriculture (Paris) and in 1911 a Convention on the Preservation and Protection of fur seals (Washington.)

particularly Article XX, Sub (b) and (g),[30] , Article 130 R of the *1991 Maastricht Treaty* on the European Union and the preamble of the 1994 Agreement establishing the new World Trade Organization. It includes among its goals the 'optimal use of the world's resources in accordance with the objective of sustainable development'. Similarly, other Uruguay Round texts, for example the Agreement on Agriculture, refer to the need to protect the environment.[31]

In addition to treaty law, several general principles of classical international law are relevant for states rights and obligations with respect to nature conservation and environmental protection; primarily, this is the principle of territorial sovereignty. Although in earlier times states assumed 'full' and 'absolute' sovereignty to mean that they could freely use resources within their territories regardless of the impact this might have on neighbouring states (the so called Harmon Doctrine) few would argue today that territorial sovereignty is an unlimited concept enabling a state to do whatever it likes. Of course, state sovereignty cannot be exercised in isolation because activities of one state often bear upon those of others and,

[30] Charnovitz (1991: 37 -55), GATT Secretariat (1992) Petersmann (1993:67) De Waart (1992: 93 -98).
[31] The relevant texts are reproduced in an article in the International Environmental law Journal titled, *'International Environmental Law: Sovereignty versus the environment* 33 (1994) 1 -52.

consequently, upon their sovereign rights. As Oppenheim put it as early as 1912:

> … *'a state in spite of its territorial supremacy, is not allowed to alter the natural conditions of its own territory to the disadvantages of the natural conditions of the territory of a neighbouring state for instance to stop or to divert the flow of a river which runs from its own into neighbouring territory…*[32]

Thus, the principle of territorial sovereignty finds its limitations where its exercise touches upon the territorial sovereignty and integrity of another state. Consequently, the scope for discretionary action arising from the principle of sovereignty is determined by such principles and adages as 'good neighbourliness'' and *'utere tuo ut alienum non laedas' (*You should use your property in such a way as not to cause injury to your neighbours) as well as by the principle of state responsibility for actions causing trans-boundary damage. It is not easy to trace the exact origin of such principles nor to determine their precise implications. Apart from references in the

[32] Oppenheim (1912:243 -244)

literature, [33] the strongest support for these principles and their implications can be found in international case law.

International Environmental Law as I have shown has its roots in Classical International Law yet; it could be argued that International Environmental Law has emerged as a new branch of international law only recently. This is because of the increasing number of treaties, which have resulted from the perceived need for a legal response to global environmental degradation.[34] . Over-exploitation of natural resources, loss of biodiversity, desertification, (tropical) deforestation, pollution of International waters, deforestation, pollution of international waters, threat of Global Warming, and ozone layer depletion are the most pressing concerns.[35]

4.2 Principles of International Environmental Law and State Sovereignty

The main principles of International Environmental Law concerning nature conservation and environmental protection, emerging from treaty law, International case law, 'soft law' instruments such as the Stockholm and

[33] See for example, Pop (1980); Kirgis (1972) and Smith (1988)
[34] Major textbooks include Kiss and Shelton (1991); Birnie and Boyle (1992). See also Sands (1993)
[35] See World Commission on Environment and Development (1987)

*Rio Declaration*s, and the literature are summarized below. Not every principle has the same scope or status in international law.

Some are well established, while others are still emerging. Some entail primarily injunctions or prohibitions for states (and peoples) to act in a certain way in their own jurisdictions, while others primarily relate to obligations with respect to neighbours, International areas or the Global Environmental as such.

4.3 Permanent Sovereignty over natural resources

It is a well-established practice and accepted, as law, that within the limits stipulated by International law every state (and under certain conditions a people) is free to manage and utilize the natural resources within its jurisdiction and to formulate and pursue its own environmental and developmental policies.[36]

However, states have to conserve and utilize their natural wealth and resources for the well-being of their people. This is stipulated in Paragraph 1 of the 1962 *Declaration on Permanent Sovereignty* and Article 1 of the *Human Rights Covenants*. Moreover, they have to take into account the

[36] See Principle 21 of the Stockholm Declaration Principle 2 of the *Rio Declaration*, and Article 3 of the Biodiversity Convention

interests of other state as well as those of present and future generations of humankind. [37]

Thus concerning Global Warming and Climate Change, whereas states have permanent sovereignty over natural resources within their jurisdiction, the same is subject to the well-being of their people. Therefore, they have to take into account the interests of other states as well as those of present and future generations of humans.

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4.4 Due care for the environment and precautionary action:

The principle of 'due diligence' or 'due care' with respect to the environment and natural wealth and resources are among the first basic principles of environmental protection and preservation law. They take root in ancient and natural law as well as in religion (for example, in the Christian notion of 'stewardship'). Apart from constant monitoring, it may require an assessment of the environmental impact of plans envisaged. There is an increasing emphasis on the duty of states to take preventive measures to protect the environment.[38]

[37] See for example Article 30 of the CERDS and the Stockholm and *Rio Declaration*s
[38] Hey (1992) and Hohmann (1992b)

The emergence of this 'precautionary principle' is reflected in multilateral treaty law, such as the *GATT,* the 1982 *Law of the Sea Convention,* the 1991 *ECE Convention on Environmental Impact Assessment,* the 1992 *Climate Change and Biodiversity Conventions*, the 1994 *Convention to Combat Desertification* and the 1994 *European Energy Charter Treaty.* [39] In its work on International liability, the ILC stresses 'foreseability' as an important factor in determining whether a state is liable or not[40] .

The 'precautionary principle' is also incorporated in principles is and 19 of the *Rio Declaration*. However, what the precautionary approach exactly entails and what its consequences are has not yet crystallized. This is small wonder since it touches deeply on the discretion of states with regard to policy. While it may be somewhat premature to label the precautionary principle as established in International Law, it can without doubt be termed as an emerging principle.[41]

4.5 Inter-generational equity

[39] See, for example, Article XX (b) and (g) of the GATT, Articles 192, 204 and 206 of the 1982 Law of the Sea Convention, Article 3.3 of the Climate Change Convention, Article 6 of the Biodiversity Convention, Article 4 of the Convention to Combat Desertification and Article 19.1 of the European Energy Charter Treaty.
[40] See Birnie and Boyle (1992:96)
[41] Ibid at 98

According to this 'emerging' principle as coined by Weiss,[42] States must take into account the interests of both present and future generations. States are under an International prohibition to manage their natural environments in such a way as to conserve its capacity for sustainable use by future generations as well as to conserve their fauna and flora, including endangered wildlife species and wetlands of International importance. An inter –generational equity necessitating assistance by the industrialized states to developing states, forms –as Weiss argues – an inherent part of the fulfilment of our inter-generational obligations.[43]

4.6 Good Neighbourliness

Good neighbourliness gave rise, among other things, to the well established principle that states may not use their territory and resources under their jurisdiction in such a way to cause significant harm to the environment of other states *(sic utere tuo ut alienum non laedas)* and, more recently, to areas beyond national jurisdiction. It may not be easy to determine the exact scope of this obligation and its implications. Certainly not all instances of trans-boundary damage resulting from activities within a states territory can be prevented or are unlawful. This clearly follows from *Trail Smelter Case (United States V. Canada,* awards in 1938 and 1941).

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[42] See the impressive book by Weiss (1989) and also the work of Chowdhury (1992).
[43] Weiss (1989:97)

The arbitral tribunal decided that, first, Canada was required to take protective measures in order to reduce the air pollution in the Columbia River Valley caused by Sulphur Dioxide emitted by Zinc and Lead Smelter Plants in Canada, only seven miles from the U.S. –Canadian border. Secondly, it held Canada liable for the damage caused to crops, trees, e.t.c. in the state of Washington and fixed the amount of compensation to be paid. Finally, the tribunal concluded more generally, in what no doubt constitutes its best known paragraph: "…..under the principles of International Law…… no state has the right to use or permit the use of its territory in such a manner as to cause injury by fumes in or to the territory of another or to the properties or persons therein, when the case is of serious consequence and the injury is established by clear and convincing evidence" (Harris 1991: 245).

It is also relevant to refer to the *Lac Lanoux case (Spain V. France,* Award in 1957) on the utilization by France of the waters of Lake Lanoux in the pyrenee for generating electricity. For this purpose, part of the water had to be diverted from its course through the trans-boundary Carol River to another river, the Ariege. According to Spain, this would affect the interests of Spanish users, but France claimed that it had ensured restoration of the original water flow and had given guarantees so that the needs of Spanish users would be met. France and Spain were unable to resolve this issue by

negotiation, and therefore submitted it to arbitration in 1956. This led to an interesting award dealing with the rights and duties under general international law of riparian states in relation to an international watercourse. [44]

The tribunal concluded that the works envisaged by France did not constitute Infringements of the Spanish rights under the Treaty of Bayonne and its additional Act of 1886, because France had taken adequate measures to prevent damage to Spain and Spanish users, and for other reasons. As to the question whether the prior consent of Spain would be necessary, the Tribunal was of the opinion that such an essential restriction on sovereignty could only follow from exceptional circumstances, such as regimes of joint ownership, co-imperium or Condominium but not from the case in question. According to the Tribunal, prior agreement would amount to 'admitting a 'right of assent' a 'right of veto' which at the discretion of one state paralyses the exercise of the territorial jurisdiction of another. However, France was under an obligation to provide information to and consult with Spain and to consider Spanish interests in planning and carrying out the projected works. According to the Tribunal, France had sufficiently done so. While the Tribunal clearly emphasized the hard core nature of the principle of territorial sovereignty, it also admitted that it must function within the realm of International Law: "Territorial sovereignty plays the

[44] For an extensive review and discussion of this case, see Lammers (1984:508-517); Gervais (1960:372-434); & Layin and Bianchi (1959: 30).

part of a presumption. It must bend before all international obligations, whatever their source, but only for such obligations.[45] From this award are derived in general international law, as Lammers puts it "a duty for the riparian states of an International watercourse to conduct in good faith consultations and negotiations designed to arrive through agreements and settlements of conflicts of interests."[46] There is an increasing trend to demand environmental impact assessment, within the context of national or regional arrangements.[47]

Important criteria for determining what is permissible and what is prohibited might be:

(a) The likelihood of significant harmful effects on the environment and on potential or current activities in another state.

(b) The ratio between prevention costs and any damage.

(c) The impact on other states capacity to use their natural wealth and resources in a similar way.

(d) The health of the population of another state. [48]

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[45] 24 *ILR* (1957) 120

[46] Lammers (1984: 517)

[47] See the 1991 ECE Convention on Environmental Impact Assessment in a Transboundary context, Espoo (Finland).

[48] See Principle 3 of the UNEP Draft Principles of Conduct on Shared Natural Resources and Articles 10 -12 of the General Principles Concerning Natural Resources and Environmental Interferences As Adopted by the Brundtland Commission's Expert Group on Environmental Law.

This principle is of particular relevance to Global Warming especially because the developed countries are the greatest emitters of the greenhouse gases yet the developing countries are the ones that will be greatly affected by the adverse effects of Global Warming.

4.7 Equitable Utilization and Apportionment

This principle is closely related to the previous one and implies, firstly, that states should utilize resources and the environment in such a way that other states can utilize them as well or at least obtain a reasonable and equitable share.[49]

From this it follows, secondly, that states must coordinate and cooperate for the 'optimum use' (in international fisheries law also referred to as 'maximum sustainable yield') of resources and prevent trans-boundary damage. This principle is relevant to all forms of shared resources, including fresh water resources land, fisheries resources and gas and oil deposits.[50] At the same time, its meaning in practice often raises serious controversy.

4.8 Prior Information, consultation and early warning

[49] See Lammers (1984:364 -371), Schacter (1977: 64 -74) and Brundtland Experts Group's Legal Principle 9

[50] See Article 83.1 of the 1982 Law of the Sea Convention and Article 11 of the 1994 Convention to Combat Desertification

Whenever trans-boundary resources are at stake or activities within the territory of one state may seriously affect the environment in other states, or persons or property therein, states are under an obligation to inform and consult those other countries well in advance. In the event of a trans-boundary environment disaster (such as a tanker accident, nuclear explosion or toxic discharge) or even less acute environmental problems, states are under an obligation to warn other states and to cooperate to contain and solve these problems.[51]

4.9 State responsibility and liability

States have a duty to abstain from measures of economic and environmental policy that are incompatible with their international obligations. Initially, this implied first a prohibition against causing significant environmental harm to other states.[52] In modern International Law this prohibition extends to 'International Law' (high seas, deep seabed, outer space), which are beyond the limits of national jurisdiction. The emergence of obligations

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[51] · See IAEA Convention on Early Notification of a Nuclear Accident, Vienna 26 September, 1986, which entered into force 27 October, 1986, and the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency, Vienna 26 September, 1986, which entered into force 26 February, 1987; UN Convention on the Transboundary Effects of industrial accidents, 17 March, 1992; the Nordic Convention on the Protection of the Environment, 5 October, 1976; and also the ILC work on International Liability for Injurious Consequences. Arising out of Acts not Prohibited by International Law.

[52] Under classical International law, the victim state had to meet rather restrictive standards before it could successfully invoke the responsibility of another state for trans-boundary harm. For example, the *Trail Smelter* tribunal referred to it as "clear and convincing evidence of significant harm."

emanating from principles such as 'due diligence', (Inter-generational equity) and protection of the rights of indigenous peoples may in future also give rise to state responsibility for policies with respect to conservation of natural resources and wealth within a state's own territory. Since 1949, the topic of state responsibility has been on the agenda of the ILC, but the ILC has still not finalized the codification of International Law with respect to state responsibility for wrongful International Acts and for injurious consequences arising from acts not prohibited by International Law. The question is when damage caused by a country to its own environment and to its natural resources and wealth or to those of a neighbouring state amounts to an International act which give rise to liability and an obligation to make amends, financially or otherwise. In its draft Article 19 on state responsibilities, the ILC included among international crimes: a serious breach of an international obligation of essential importance for the safeguarding and presentation of the human pollution of the atmosphere or of the seas. [53]

The 1992 *Rio Declaration* does not address the substance of this matter but as did the 1972, Stockholm Conference (Principle 22) merely calls for the further development of International Law regarding liability and compensation for external environmental damage (Principle 13).

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[53] Article 19.3 sub (d) of the Draft Articles on State Responsibility, *ILC Year Book 1980,* Vol II, Part two 30-34

4.10 Termination of unlawful activities and the making of reparation

From the previous principle, it follows that states are under an obligation to terminate activities, which have been found to be unlawful or incompatible with their International obligations and make reparation for damage inflicted. In principle, reparation should be designed to restore previous conditions *(restitutio in integrum)* or, if this is not possible, to compensate, financially or *in natura,* for damage and injury inflicted. In environmental texts, the second aspect of this principle is also referred to as 'the polluter pays principle' or as the 'principle of compensation for the victims of environmental damage'.[54]

However, the Polluter Pays Principle (PPP) is of a much wider scope since it also includes such concepts as internalization of environmental costs. In prices of goods and services and the passing on by the state of the reparation costs to polluters, such as private parties.

4.11 Preservation of *res communis* and the common heritage of (hu) mankind

[54] See, for example, OECD Recommendations in *14 ILM (1975) at 234 and 28 ILM (1989),at 1320 and the recently concluded council of Europe's Convention on civil liability for damage resulting from activities dangerous to the environment,Lugano,1993.See also principle 16 and 13 of the Rio Declaration.*

These principles relate first to areas beyond national jurisdiction, such as the high seas, the ocean floor, outer space, and perhaps Antarctica.[55] Various conventions provide that these areas may not be used as waste dumping places and that their resources should be used in the interest of humankind as a whole.[56] In future, these principles may also gain relevance for the protection and conservation of the intrinsic value of nature and the environment and of what belongs to all of us, such as major ecological systems of our planet and biological diversity.

For example, the 1985 *Ozone Layer Convention* seeks to prevent such adverse effects as 'changes in climate which have significant deleterious effects on human wealth or on the composition, resilience, and productivity of natural and managed ecosystems or on materials useful to mankind'.[57] The third preamble paragraph of the 1992 Convention on Biological Diversity provides that conservation of biological diversity is 'a common concern of human kind'. Similarly, it is acknowledged 'that change in the Earth's climate and its adverse effects are a common concern of

[55] It is a controversial question whether the Antarctic Continent and the Antarctic Environment can be viewed as part of the *res communis* or the common heritage of humankind. Antarctica is still subject to territorial claims by seven states. However, these claims are 'frozen' under the 1959 Antarctic Treaty. The 1991 Protocol to the Antarctica Treaty on Environmental Protection has prohibited mineral exploitation for 50 years

[56] See Article 4 of the 1979 Moon agreements and Article 140 of the 1982 Law of the Sea Convention

[57] Article 1.15 of the Vienna Convention on the Protection of the Ozone Layer.

humankind'.[58] Although this backsliding of the notion of 'heritage' to that of 'concern' is unfortunate, the reference to the interest of the International community as a whole in preserving the environment is maintained. In the *Nuclear Test cases (Australia/New Zealand V. France,* 1974), Australia suggested that there is a general interest of all states, a right *erga omnes* to seek the protection of important environmental rights; *in causa* the right of the International Community that atmosphere testing does not take place.[59]

4.12 Duty to cooperate in solving trans-boundary environmental problems

The duty of states to cooperate is well established as exemplified by Chapter IX of the *UN Charter* and the 1970 Declaration on Principles of International Law. This is of particular concern especially with regard to Global Warming. Since Climate Change is a multigenerational and global issue (as carbon dioxide remains in the atmosphere for decades and states are affected indiscriminately), it is therefore an imperative that the international community cooperates in resolving it. If an effective legal regime to combat Global Warming is to be realized, there is also a duty of industrialized countries to contribute to developing countries efforts to pursue sustainable development. In both cases such assistance may entail

[58] Preamble of the 1992 *Convention on Climate Change*
[59] See Memorial by Australia to the ICJ, reproduced in part in Dixon and McCorquodale (1991:454 -455)

financial aid, transfer of environmental sound technology and cooperation through international organizations. The establishment of the Global Environment Facility (GEF), a joint project of the World Bank, UNEP and UNDP, which recently entered its phase II (1994 -1997), can be seen as the first major step in carrying out this obligation. Transfers of technology provisions are most notably included in t*he Montréal Protocol to the Ozone Layer Convention*, the *Climate Change Convention,* and th*e Biodiversity Conventions.*

4.13 Common but differentiated obligations

As in other fields of international law, such as International Trade and Monetary Law, International environmental instruments differentiate between industrialized and developing countries. An example is the *Climate Change Convention.* The objective of which is to achieve the stabilization of greenhouse gas concentrations in the atmosphere at a level, which would prevent dangerous anthropogenic interference with the climate system, and which commits industrialized countries to take measures with the aim of returning by the year 2000 to the 1990 emission level of greenhouse gases.

The rationale for differentiation is two fold: firstly, it is recognized that so far, the bulk of global emission of greenhouse gases have originated in industrialized countries and thus they should bear the main burden of

combating Climate Change. Secondly, developing countries need access to resources and technologies in order to be able to achieve sustainable development. All states are subject to a number of duties, including the duty to take precautionary measures with respect to Climate Change and the obligation to cooperate in preparing for adaptation to the impacts of Climate Change, and the duty to develop integrated plans for especially vulnerable areas and resources. [60]

Article 4.7 of the *Climate Convention* provides that the extent to which developing countries will effectively implement their commitments under the convention will depend on the provision of financial resources and technology by industrialized countries. It is recognized that social and economic development and poverty eradication are the first priorities of developing countries. The convention identifies various subcategories of developing countries, nearly all of which are characterized by special geographical features (for example, small island or land locked) or environmental features (such as low lying coastal areas or fragile ecosystems), and designated special measures for them.

4.14 Peaceful settlement of environmental disputes

[60] Articles 3.3, 3.4 and 4.1 (e) of the United Nations Framework Convention on Climate Change (1992)

Most international environmental treaties embody provisions spelling out how disputes should be settled. The majority stipulate that the parties involved should first aim to resolve disputes through negotiation. If this is unsuccessful, most treaties provide for further arrangements which may involve the assistance of third parties. For example, Article 11 of the *Vienna Convention on the Protection of the Ozone Layer* provides for mediation and conciliation. Article 19 of the 1991 *Madrid Protocol on Environmental Protection to the 1959 Antarctic Treaty* includes the possibility of having resort to either an arbitral tribunal or the ICJ. Other treaties provide that the dispute will be submitted to either arbitration or the ICJ if negotiations have proved unsuccessful.[61] However, in virtually all of these cases the dispute settlement clauses are optional. [62]

Chapter 39.10 of *Agenda 21* addresses modalities for avoidance and settlement of disputes in the filed of sustainable development and recommends, where appropriate, recourse to the ICJ. The Court established an Environmental Affairs Chamber in 1993. However, since international organizations (other than UN specialized agencies in the context of advisory procedure), environmental associations and potentially affected individuals have no direct standing with the court, the need for a new International

[61] Examples include Article 11 of the 1985 Ozone Layer Convention; Article 20 of the 1989 Basel Convention; Article 14 of the 1992 Climate Change Convention; and Article 27 of the 1992 Biodiversity Convention

[62] For an exception see Part XV of the 1982 Law of the Sea Convention

Court for the Environment has recently been advocated by international environmental lawyers. [63]

4.3 **Some key provisions of the Kyoto Protocol**

Fears of Climate Change contributed to the formation of an environmental regime, which lead to the 1992 *United Nations Framework Convention on Climate Change. The 1997 Kyoto Protocol* is an additional to the convention and attempts to reduce greenhouse gases to 5% below 1990 levels. This protocol required ratification by 55 parties to the Convention and accounted for 55% of 1990 level carbon dioxide emissions before it could enter into force. Thus ensuring that no one state could veto it. These requirements proved vital when the United States, one of the chief negotiators of the protocol,[64] rejected it on the 27th March 2001. It was only with Russia's ratification on the 16th February 2005 that this treaty entered into force.

The USA is the world's largest polluter 36.1% of 1990 emissions were from the USA and its rejection of the Kyoto Protocol has made it more difficult for the remaining countries to meet those targets and limited the treat's

[63] See Draft Resolution of the International Committee on Environmental Law in *EPL* 24 (1994: 204).
[64] Grubb M. Vrolisk, C & Brack D, (1999). The Kyoto Protocol: *A Guide and Assessment,* the Royal Institute of International Affairs at 36.

scope and effectiveness. [65] In this regard the principles of international environment law discussed above to wit: state responsibility and liability, duty to cooperate in solving trans-boundary environmental problems and good neighbourliness come into play and they cannot ignored if an effective legal regimen towards combating Global Warming and Climate Change is to be achieved.

Climate change is a multigenerational and global issue as carbon dioxide remains in the atmosphere for decades and states are affected indiscriminately. Therefore, a global response is required to combat it. The Kyoto Protocol is not ideal: its targets will not significantly slow Climate Change nor are developing nations bound by its requirements, however as stated by Robert Stavins, 'it's the only game in town."[66] One of the major weaknesses of the Kyoto Protocol is that it has largely focused on commitments and given scant attention to enforcement.

International law can be separated into two categories: Traditional and Modern. Traditional or functional law is concerned with practical issues

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[65] Unknown. (2004) *Climate Change: The Big Emitters (Online)* London BBC News available from: http://news.bbc.co.uk/1/hi/sci/tech/3143798.stm (Assessed 21st March, 2005).
[66] Stavins, R (2005) *Forging A More Effective Global Climate Treaty,* Environment, Vol 46 Issue 10 at 24

such as diplomatic immunity, which was common practice before being codified into law. It is inductive as it draws on norms and customary law.

Modern law is normative or deductive where an objective is set and laws are created to change behaviour to meet that objective. Human rights law and environmental law fall into the second category because they both try to change state behaviour rather codify existing behaviour, this explains why it has taken seven years to get reluctant states ratify Kyoto. Again, this is another major weakness of the Kyoto Protocol as a regime for combating Global Warming.

It is common for treaties to be negotiated. Yet loopholes exist, which allow for multiple interpretations of the text. This creates a dilemma for negotiators. On the one hand, they can 'water down' a treaty so that the maximum number of states are involved or on the other hand, be uncompromising in order to protect the integrity of the treaty. The negotiators at Kyoto watered it down to the extent that the protocol does little to combat Climate Change because the USA is not involved, developing nations are not held accountable and the target is only 5% below 1990 levels. Again, the International Environmental Law principle of duty to cooperate in solving Tran's boundary environmental problems comes into play and it is imperative that the world at large cooperates and adopts a

common approach to Global Warming if indeed an effective legal regimen towards combating Global Warming is to be realized.

The *Kyoto Protocol* introduces three preventing mechanisms that give it flexibility and make it less costly for states to reduce emissions. The first mechanism, defined in Article 6 is the 'Joint Implementation' (JI) strategy: this allows emissions-reducing projects to be carried out in Annex 1 Countries (industrialized states that have ratified the Kyoto Protocol) by other Annex 1 Countries. The resulting reductions count towards the emissions target of the nation carrying out the project. Article 12 is a similar strategy, termed the 'clean development mechanism' (CDM). The CDM allows emission-reducing projects by Annex 1 states in states that have not ratified the protocol.

Both mechanisms give flexibility to parties of the treaty, in the hope that emissions can be reduced in the cheapest and quickest areas first. Although developing nations have managed to avoid being party to the protocol, the CDM allows these projects to be undertaken in such countries. Article 17 outlines the third and final flexibility mechanism allowing for emissions trading. Each state is given an allocation of emissions if a state is going to exceed its allocation, it can purchase emission units from a state, which has not exceeded its allocation. This allows states to comply and raises money

that can be used for environmental projects. Due in part to these flexibility mechanisms, Article 26 does not allow nations to sign on with any reservations. [67]

Article 18 gives authority to the conference of parties (COP) to 'approve appropriate and effective procedures and mechanisms to determine and address cases of non-compliance.' The procedures created under this article monitors emissions trading outlined in Article 17 above. The seventh COP meeting created two branches of a compliance committee in 2001, 'a facilitative branch, and an enforcement branch.'[68]

The facilitative branch provides resources and assistance to countries that are in danger of breaking the Kyoto Protocol. The enforcement branch reviews the evidence and decides whether a state is complying with its requirements. If it breaches, the enforcement branch notifies the state and gives it 100 days to meet the reporting or emission requirements. [69] If the state continues to fail it, must make up the difference in the next period and undercut its target by 30%. In addition, states will be 'shamed' as their

[67] Article 26 of the Kyoto Protocol simply states, *'no reservations may be made to this protocol.*
[68] Unknown (no date) *'Compliance under the Kyoto Protocol,* (Online). New York, United Nations Framework Conventions on Climate Change. Available from http://unfccc.int/kyoto mechanisms/compliance/items 3024. Php (Assessed 14th March, 2005).
[69] The emission target can be made up through emissions trading

breach of the protocol is made public. The enforcement mechanisms outlined above does make the Kyoto Protocol harder law; however, its effectiveness is questionable. Many states will not meet their emission targets; and if too many states breach the agreement, the Kyoto Protocol will be weakened, as states will feel less pressure to comply. [70]

It is imperative to note that enforcement of International law comes via horizontal pressure from other states, as opposed to domestic law where enforcement comes from vertical pressure from an internal legal system where an enforcement mechanism is in place. It follows that states are not constrained by international law. They act in their own self –interest.

States are not compelled to make binding international agreements, nor are they compelled to abide by them when they do. Hence, politics and the International Environmental Law's principle of duty cooperate in solving trans-boundary environmental problems. Both play a pivotal role in the formation of International agreements. The United States was one of the Chief Architects of the Kyoto Protocol yet decided to reject it. [71]

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[70] Unknown (2005) *UK could 'Miss Kyoto Gas Target' (online).* London, BBC News. Available from http://news.bbc.co.uk/1/hi/sci/tech/4399323. stm. (Accessed 1st April 2005). Spain, Portugal and Ireland have made no progress and the UK may not hit its target.

[71] Grubb, M. Vrolisk, C and Brack, D (1999). *The Kyoto Protocol: A guide and Assessment,* The Royal Institute of International Affairs 1st Ed at 112

The rejection came in early 2001 when Condoleezza Rice stated, 'Kyoto is dead.'[72]

George Bush declared he did not support the Kyoto Protocol because, 'it would have cost our economy $400 billion and we would have lost 4.9 million jobs… (and the protocol)…exempts 80% of the World, including major population centres such as China and India from compliance' 81. The Clinton administration signed Kyoto, knowing there would be problems ratifying it. In response to Kyoto, the US Senate passed the *Byud-Hagel* resolution in 1997, which rejected the ratification of a treaty which developing nations are not obliged to comply with or if it will have a deleterious affect on the US economy.

This resolution was passed 95-0. [73] Therefore, even if the environmentally conscious Al Gore had won the presidency in 2001, it is unlikely the Senate would have ratified it. This underscores the pivotal role played by parties and the International Environmental Law principle of duty to cooperate in solving trans-boundary environmental problems in the formation of an effective legal regimen to combat Global Warming. The Kyoto Protocol is

[72] Kahn, G. (2003). *'The Fate of the Kyoto Protocol under the Bush Administration', Berkeley Journal of International Law* Vol 21 Issue 3 at 551
[73] Kahn. Ibid at 550

ineffective, as it does not significantly reduce emissions. The omission of developing nations and some of the biggest polluters from the protocol means that are treaty cannot have the global reach the issue requires.

CHAPTER 5 Conclusion and recommendations

In this Chapter, I will conclude by focusing more on two key issues I have raised in the body of my research report: The Kyoto Protocol and thoughts concerning the human inhabitants of planet earth.

5.1 Concerning the Kyoto Protocol

The Kyoto Protocol is the most prominent and complex global environmental regimens of our time, characterized by modest, differentiated emission reduction targets for a limited number of nation states, a relatively short time horizon, a solid institutional structure (including IPCC, the UNFCCC Secretariat, and yearly (Cop's) and a variety of novel, flexible policy instruments (emissions trading, JI and CDM).

An effective regimen consists of many participants realizing ambitious emissions reduction objectives. The existing institutional infrastructure, the endorsement of most nation states to the UN Climate Convention, and the existence of flexible International instruments constitute major opportunities for realizing such a regimen. Yet, the main threat is the lack of incentives to engage in actions: the nature of the climate issue, a global public good, induces actors to engage in free rider behaviour, especially in the absence of effective enforcement. Therefore, a well functioning future

regimen must use both the carrot and the stick to induce actors, both domestically and internationally to assume substantial measures.

Participation can be attractive by linking climate to other issues, be they of a domestic nature (local air, public health and safety, production efficiently, e.t.c.) or a global kind (poverty abatement in developing countries, reconversion of polluting industry in transition countries, or international strategic business alliances in industrialized states.)

On the other hand, the system should also sanction non-participation. In the absence of an effective global environmental authority, the Climate Change regimen should be self-enforcing setting strongest efficiency standards for major sources of emission, (power plants, energy-intensive factories, vehicles, e.t.c.) and denying non-compliers marked access to participating countries constitutes an effective self –enforcing regimen, at least if the regulated areas has a sufficient critical Mass (Holden 2003:14). The Kyoto Protocol does not prescribe any specific measures and in this regard, it is weak; only targets are determined (Bartsch 2000: 19, Oberthur and Ott 1999: 47). It has a flexible implementation design. Countries have discretion as to the locus of taking measures (at home versus abroad); timing (only the cumulative effect counts); nature of actions (physical versus accounting measures); and nature of gases addressed (different

combinations of six GHG's are possible. The protocol has no financial provisions for its implementation (apart from some help for developing countries). In case of non-compliance additional reduction commitments for the post budget, periods are to be assumed; no financial or commercial sanctions are foreseen for non –compliance (Gupta 2001:34) collective management requires formal commitments as well as mechanisms for enforcing compliance.

Current efforts to slow Global Warming have focused on commitments and given scant attention to enforcement. They have followed the, 'standard mode' when creating International environmental treaties: set commitments. First, defer procedures for enforcement until later, and rely on 'soft' or non-existent) measures for enforcing compliance. However, the evidence that supports use of the 'standard model' is misleading and does not apply to Global Warming. In most international environmental agreements, it has been possible to defer or ignore enforcement procedures because nearly all commitments have been modest and enforcement has not been necessary. What little wisdom exists on the design of enforcement procedures is based heavily on the experience in the *Montréal Protocol on Substances that Deplete the Ozone Layer*. However, a close look at that experience shows that deferring the creation of enforcement procedures in particular, the protocols 'non –compliance procedure' until after most commitments were

in place, severely weakened the procedures. This is because it was feared that strong enforcement would consent only in response to incentives especially large compensation programs and threats of trade sanctions that are actually external to the protocol's enforcement system.

The design of an effective Global Warming legal regimen must focus on enforcement mechanisms as well as commitments. Failure to do so will only perpetuate the shallowness of International Environmental Law. Commitments that appear bold but have little direct impact on a country's behaviour except where changes in behaviour are in the country's self-interest. A system of tradable permits is most vulnerable to unravelling if cheating is rampant, but a trading system in which permit holders are liable for non compliance ('buyer liability') is the easiest to enforce because the market would impose enforcement with price signals. "Flaky" permit sellers would command a lower price than would trustworthy vendors. However, the concept of emission trading, which is included in the 1997 Kyoto Protocol on Global Warming, will be still born because it requires the impossible task of distributing permits worth trillions of dollars. That leaves other alternatives, such as coordination of carbon taxes or other national policies, which are not easily enforced.

Policy makers are thus in a quandary. If they focus on setting prices or quantities of emissions, they must overcome a huge hurdle enforcement for which prior experience with International Environmental Law (e.g. the Montréal Protocol) is an imperfect guide and conventional wisdom is worse than no guide at all.

Mechanisms much more powerful than those offered by the 'standard model' will be needed. Policy makers could focus commitments on 'liberal states' in which internal public pressure, for example, from environmental groups, and robust legal systems make it possible to enforce international commitments from inside (ground-up) rather than the outside (top-down). But international cooperation on prices and quantities that is restricted to such nations is unlikely to slow Global Warming by much, because those states account for a declining fraction of the emissions that cause Global Warming. One partial solution is because the liberal nations, which are most likely to comply with demanding commitments, are also the major centres of technological innovation. Carbon intensive energy is the most important source of Global Warming. Over a period of five decades and beyond the timescale that is most relevant for Global Warming technological change can eliminate emissions of greenhouse gases, probably at remarkably low cost because that time scale is longer than the turnover of capital stock. A regimen that coordinates efforts to promote development and deployment of

new energy technologies could focus on these liberal nations. The resulting new technologies could spread worldwide from this innovative core through the normal operation of private markets. Some rules on quantities and prices would also be needed to promote diffusion, but they would be complements rather than central elements of international collective action on Global Warming and less needy of strong enforcement. Such a procedure is not as elegant as coordinating world prices or quantities which, in principle, would be economically most efficient, but it is an attribute that pure price and quantity approaches probably lack-it could work.

Another imperfection in the Kyoto Protocol is the fact that it is grounded in the concept of burden sharing, as reflected in the underlying principle of common but differentiated responsibilities. Such a focus can be a deterrent to the participation of the private sector, whereas a focus on opportunity sharing would be more effective in catalysing the constructive engagement of business and industry in the reduction of CO_2 emissions. The Kyoto Protocol and the related political debate have tended to disregard or in some cases, downplay the considerable costs associated with inaction and the increased Climate Change related disasters that will manifest as a result. These factors should be better communicated to the public who in turn can bring more pressure to bear on and generate more support from decision makers and the political establishment at large. In particular, voters in the

developed world need to understand the consequences of having an overly intensive metabolism.

The limitation of targets presents another problem in the Kyoto Protocol. It is imperative to note that targets alone will not solve the Climate Change problem by 2012, unless the technology needed for redressing the problem is fully developed. The Kyoto Protocol was negotiated on the faulty assumption that the necessary technology would be developed sooner that actually possible (i.e. within 15 years as opposed to the more realistic period of two generations). A more efficient approach would have first identified what was necessary to solve the problem of Climate Change and then negotiate agreement regarding the necessary technology that would be required to abate the problem.

Finally, a global agreement without the US is highly problematic because it shifts responsibility to reduce away from the world's largest emitter of carbon dioxide. The Kyoto Protocol has demonstrated the growing awareness that the climate problem cannot be saved by nation states alone. If anything its weakness demonstrate the need to more effectively engage the key actors, in particular businesses, if substantive results are to be effectively delivered.

5.2 Concerning the human inhabitants of planet Earth

In my first chapter I showed that from the onset, because of our genetic endowments, we found we could control the environment- at least to a large extent. We continued on this path of domination enforced by our religious belief systems that promoted an anthropocentric approach to the environment. Our cultures buoyed up this position and we evolved or acquired a worldview that places us above or separate from nature. When societies formed, they went in different directions but for the most part retained anthropocentrism. They often accompanied it with a human vice - greed. Now the collective results of our behaviours are confirmed in documented environmental degradation. A noteworthy area of such is found in Global Warming and Climate Change.

Environmental ethics may help us out if we can use tools such as education as roads to achieve an environmental conscience. *The Porto Alegre Declaration on University, Ethics and the Environment* (1995: 221) includes these words:

> *The 21st century university ought both to bridge and to blend the sciences and humanities into an integrated whole. To speak effectively on environmental issues, the university should abandon the dogma that science*

> *deals with a domain of objective facts and the humanities with a domain of subjective values. Scientific inquiry is directed by our values and the revelations of science often inform, expand and transform our values in unexpected ways.*

To meet such challenges, 'we have,' says Lutzenberger (1996: 43), 'to start an ethical revolution'. To reach this, he claims, 'philosophers and theologians must learn a great deal about science and technology'. Likewise, we might add, scientists must learn a great deal about philosophy, theology and the law. The point is that we are faced with a magnitude of environmental dilemmas. The will to address them does not lie within a single discipline. Rather it should be multidisciplinary, yet voiced as a single consensus of like-minded environmentally sensitive individuals.

How do we compete with worldviews that now virtually consist in viewing the environment as a commodity and where our wants and desires take precedence over rationally enlightened choices? First, it seems that there are problems in educational systems. Like Ehrenfeld, Rolston (1996: 163) blames higher education for 'producing the knowledge to degrade the planet'. He (*ibid*: 189) further says that 'a university education that is not environmental education is no education at all'. Furthermore, he asserts:

> *…Colleges and universities are supposed to defend the arts and the sciences, the wisdom of the human genius … The knowledge accumulated in the universities ... is of great genius. Yet it has destabilised human life on our home planet … But if this explosion of knowledge and its resulting empowerment has introduced a planet in crisis, perhaps the genius of the university is not what we thought (ibid: 135-136).*

The least one could say is that Rolston censures traditional academic education, which, in his view, promotes unethical rather than ethical behaviour. But how do we begin to attend to the challenge? Madsen (1996: 72) has a pragmatic approach. In his view, ideally, education should follow three steps. It should:

1. Promote environmental awareness;
2. Understand information concerning environmental problems; and
3. Commit to work towards protecting and restoring the environment.

Mainly Western worldviews supported humans as separate from their environment. This, of course, is in addition to our particular evolutionary biological model. As we developed, our religious and belief systems also

contributed to the idea that somehow it was acceptable for us to "conquer", "dominate" and "be superior" over all other living things. We also must consider the role of economic systems and developments where consumerism and greed have dominated our lives – at least in most parts of the world. The arrival of Environmental Ethics served to challenge many archaic beliefs and raise new questions. Yet, it seems that although people may claim to care about Earth that their actions do not reflect this supposed concern. A single discipline such as Ethics by itself is not sufficient to make this change – it requires the cooperation of e.g. cultures, societies, educators, religions, worldviews, politics, and as I have highlighted in this research report, Environmental Law.

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TREATIES / CONVENTIONS

The 1997 Kyoto Protocol to The United Nations Framework Convention on Climate Change.

The 1992 United Nations Framework Convention on Climate Change

The 1992 United Nations *Rio Declaration* on Environment and Development.

The 1972 United Nations Stockholm Declaration on the Human Environment.

The 1962 United Nations Declaration on Permanent Sovereignty.

The 1982 United Nations Convention on the Law of the Sea.

The 1992 United Nations Climate Change and Biodiversity Convention

United Nations Charter (1945)

Protocol on Environmental Protection (Madrid Protocol 1991)

The 1985 Vienna Convention for the Protection of the Ozone Layer.

The 1987 Montréal Protocol on Substances that Deplete the Ozone Layer.

The 1882 North Sea Fisheries Convention.

Waiver from the Wits Medical Research Ethics Committee.

Because my research report did not involve human participants, I was given a waiver from the University of the Witwatersrand Human Research Ethics Committee (Medical). The reference number for this waiver is W-CJ-190608-3.

ACRONYMS

CDM- Clean Development Mechanism

COP – Conference of Parties

EU – European Union

ICJ – International Court of Justice

IPCC- Intergovernmental Panel on Climate Change.

JI – Joint Implementation Strategy

UN – United Nations

UNFCC – United Nations Framework Convention on Climate Change.