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Art4tat

ACRONYMS

AWG-LCA	Ad Hoc Working Group on Long term Cooperative Action under the UNFCCC
CBD	Convention on Biological Diversity
CDM	Clean Development Mechanism – Kyoto Protocol
CER	Certified Emissions Reduction – Kyoto Protocol
CMP	Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol
CONAP	*Consejo Nacional de Áreas Protegidas* / Guatemalan National Council of Protected Areas
COP	Conference of the Parties to the UNFCCC
CO_2	Carbon Dioxide
EEZ	Exclusive Economic Zone
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
GDP	Gross Domestic Product
GEF	Global Environmental Facility
GHG	Greenhouse Gas
IATTC	Inter-American Tropical Tuna Commission
ICCAT	International Commission for the Conservation of Atlantic Tunas
INAB	*Instituto Nacional de Bosques* **/** Guatemalan National Forest Institution
IPCC	Intergovernmental Panel on Climate Change
IUCN	International Union for Conservation of Nature
IWC	International Whaling Commission
JI	Joint Implementation – Kyoto Protocol
MAGA	*Ministerio de Agricultura, Ganadería y Alimentación* / Guatemalan Ministry of Farming, Livestock, and Food
MARN	*Ministerio de Ambiente y Recursos Naturales* / Guatemalan Ministry of Environment and Natural Resources

OAS	Organization of American States
OCRET	*Oficina de Control de Áreas de Reservas Territoriales del Estado* / Guatemalan National Bureau of Land Reserves
OECD	Organization for Economic Co-operation and Development
RFMO	Regional Fisheries Management Organization
SIGAP	*Sistema Guatemalteco de Áreas Protegidas* / Guatemalan System of Protected Areas
UNCED	United Nations Conference on Environment and Development
UNCLOS	United Nations Convention on the Law of the Sea
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
WSSD	World Summit on Sustainable Development

UNITS USED IN THE RESEARCH

ft	foot
ha	hectare
in	inch
nm	nautical mile
m	metre
m^3	cubic meter
mm	millimetre
km	kilometre
sq km	square kilometre
T	ton

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INTRODUCTION

Guatemala is a country with a very distinctive geography, climate, history and people. Currently, the future of the country is closely linked with its ability to deal with a number of pressing matters including the establishment of a robust economy which can withstand global recessions; the long-term stability of its political structures; and the adoption of appropriate measures to deal with the effects of natural disasters and climate change.[1]

Guatemala is prone to natural disasters and this is a matter which has to be taken into consideration when adopting climate change mitigation and adaptation strategies-- as will be seen in later chapters. This is mainly attributable to the geographic location of the country – Guatemala lies between the Caribbean Sea and Pacific Ocean which ensures frequent tropical storms and hurricanes.

A case in point is Hurricane Mitch and Tropical Storm Agatha which left the country in a devastated state in 1998 and 2010 respectively.[2] Hurricane Mitch (1998) resulted in $748 million USD in economic losses, 77% of which affected production sectors. Tropical Storm Stan (2005) caused $989 million USD in economic losses, over 1,400 deaths, and over ½ million victims, 70% of whom were indigenous peoples.[3] 3

The 2011 rainy season is already making ravages and the country is expecting more damages and devastation. Also, by the end of September 2011 the country suffered four consecutive earthquakes in less than two hours, causing panic among the people.

Recent scientific evidence from the 2009 Global Assessment Report on Disaster Risk Reduction indicates that Guatemala has been classified as one of the world's top ten countries most vulnerable to disasters.[6]

There are other geographical factors that need to be taken into account when dealing with climate change. In particular, the geographical location of the highlands, which lie along the Motagua Fault which has been associated with several major earthquakes and earth tremors in recent years. This is compounded by the location of the Middle America Trench, a major subduction zone which lies off the Pacific Coast where the Cocos Plate is sinking beneath the Ca

warming projected for the rest of the century, along with an increase in variability of rainfall, will affect the productivity of the agricultural sector.
Taking all these factors into consideration with the reality of Guatemala and the vivid consequences of climate change, the Ministry of Environment and Natural Resources (hereinafter: MARN) drafted the Climate Change National Policy which was approved by the President Álvaro Colom in December 2009. Also, part of the MARN mandate is to generate all the public policies related to the basin hydrographic, coastal zones, oceans and marine resources, therefore in 2008 the Ministry also elaborated the National Policy for the Integrated Management of Marine Coastal Zones which was approved by the President Álvaro Colom in December 2009. Both policies are examined separately in Chapter 5.

The consequences of climate change also impacts the Guatemalan marine coastal ecosystems.

Guatemala possesses a great natural richness resulting from its exceptional geographic location in Central America, with coasts on both the Pacific Ocean and the Caribbean Sea. The Guatemalan coast spans 402 km (254 km of Pacific coastline and 148 km of Caribbean coastline), and its marine extension is estimated to be more than 116,000 km^2.

Approximately 1,012 species of fauna in the Pacific Coast of Guatemala are estimated to exist. More than 70% of the species are present in three classes: fish (31.57%), birds (26.17%) and bivalves (15.78%). Among the most emblematic and globally important ecosystems present in this region are mangroves, which currently cover an area of 261.7 km^2.[15]

In addition, there are sandy and muddy beaches, which serve as important feeding grounds for coastal bird species (four species from the *Charadriidae* family and 29 species from the *Scolopacidae* family); and, nesting areas for

[15] MARN. Internal document, 2011

sea turtle species such as the Olive Ridley (*Lepidochelys olivacea*) and the leatherback (*Dermochelys coriacea*).[16]

Other ecosystems include estuaries and coastal lagoons, as well as herbaceous wetlands, which serve as areas for feeding, refuge and reproduction for many marine species; and, as resting areas for migratory birds, including the American White Pelican (*Pelecanus erythorhynchos*) and the Wood Stork (*Mycteria americana*). The ocean waters serve as foraging/breeding areas for the green sea turtle (*Chelonya mydas agassizii*) and the hawksbill turtle (*Eretmochelys imbricata*), and for reproduction of the humpback whale (*Megaptera novaeangliae*). The Pink Footed Shearwater (*Puffinus creatopus*) a pelagic bird classified as "vulnerable" on the International Union for Conservation of Nature (hereinafter: IUCN) Red List[17] is also present, as well as permanently submerged coral formations made up of colonies of hermatypic coral.[18]

The marine coastal area of the Guatemalan Caribbean forms part of the Mesoamerican Barrier Reef Ecoregion; and, in addition to coral reefs, it contains mangroves, coastal estuaries and lagoons and sandy beaches that originate from coral. Among the most globally important species present in the marine coastal region of the Guatemalan Caribbean are the manatee (*Trichechus manatus*), sea turtles (the hawksbill turtle, the green sea turtle and the loggerhead sea turtle *Caretta caretta*), the spiny lobster (*Panulirus argus*), the pink conch (*Strombus gigas*) and the White-tailed Tropicbird (*Phaethon lepturus*).[19]

The population in the coastal region of Guatemala consists of approximately 300,000 people living in 17 Municipalities. Guatemala's Exclusive Economic Zone (hereinafter: EEZ) and Territorial Sea Zone has an area over 116,000 km^2, in which diverse economic activities occur.

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[16] MARN. Internal document, 2011

[17]

Given this context, this research aims to recommend strategies for climate change adaptation and mitigation in Guatemala's marine coastal ecosystems, including the marine coastal zone for the conservation and sustainable use of its biological richness is a matter of great national importance because of the goods and services that they offer and provide.

This research is structured into six major chapters. Chapter 1 provides information about the science of climate change. Chapter 2 focuses on the international law on combating climate change, which includes the United Nations Framework Convention on Climate Change – UNFCCC, the Kyoto Protocol to the UNFCCC (referred as the Kyoto Protocol) and the Conference of the Parties (COP) to the UNFCCC. Chapter 3 relates climate change and Oceans Law highlighting the impacts of climate change in the oceans, the United Nations Convention on the Law of the Sea – UNCLOS and climate change under UNCLOS. Chapter 4 addresses the strategies for climate change adaptation and mitigation. Chapter 5 concentrates on the response in Guatemala with remarks on the First National Communication on Climate Change, the Climate Change National Policy and the National Policy for the Integrated Management of Marine Coastal Zones. Finally, Chapter 6 concentrates on the recommendations for further action and capacity building with the expected results.

CHAPTER 1 – THE SCIENCE OF CLIMATE CHANGE

SECTION 1. CLIMATE CHANGE, GLOBAL WARMING AND THE GREENHOUSE EFFECT

First of all, it is important to define important terms and concepts such as climate change, global warming and the greenhouse effect in order to better understand what the impacts of these phenomena are to give context to the discussion in subsequent chapters.

Climate Change is a periodic modification of Earth's weather conditions brought about as a result of changes in the atmosphere as well as interactions between the atmosphere and various other geologic, chemical, biological and geographic factors within the Earth system.[20]

The United Nations Framework Convention on Climate Change (hereinafter: UNFCCC) defines climate change as a change of climate, which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere; and, which is in addition to natural climate variability observed over comparable time periods.[21]

Climate change is thought to be linked largely to the emission of six greenhouse gases (hereinafter: GHG): nitr

An increase in that air temperature is mostly liked to have very serious consequences such as flooding or low-lying land as the polar ice caps melt, extreme weather events, changes in seasons, etc.[22]

In order to understand this definition it may be appropriate to refer to the work of the Intergovernmental Panel on Climate Change (hereinafter: IPCC),[23] which estimates that during the twentieth century the earth's surface warmed by about 0.74°C.

There has been a lot of discussion among the scientific community to determine the causes for this change. Some of them say that the change is due to the Earth's natural evolution, but there is some consensus among the scientific community that the Earth's warming is caused by human activity since the industrial period.[24]

This can be clearly seen in the data presented in Table 1 below which shows the dramatic variation in the Earth's surface temperature between the years 1860 and 2000.

Table 1. Variations in the Earth's Surface Temperature (1861-2000)[25]

[22] For more information about greenhouse gases, refer to: Britannica, Academic Edition: Greenhouse Gas, at: http://www.britannica.com/EBchecked/topic/683450/greenhouse-gas
[23] For more information about the IPCC, refer to IPCC official website, at: http://www.ipcc.ch
[24] For more information about the industrial period, refer to: Britannica, Academic Edition: Industrial Period, at: http://www.britannica.com/EBchecked/topic/197976/exercise/25981/Industrial-period
[25] Britannica, Academic Edition: Climate change, at: http://www.britannica.com/EBchecked/topic/121632/climate-change

Ominously, the IPCC 4th Assessment Report (AR4) in 2007 stated that warming of the climate system is “unequivocal” and that most of the observed increase in global average temperatures since the mid-twentieth century is “very likely” due to the rise in GHG generated by human activity.[26]

GHG are gas molecules that have the property of absorbing infrared radiation (net heat energy) emitted from Earth’s surface and reradiating it back to Earth’s surface, thus contributing to the phenomenon known as the greenhouse effect.

CO_2, methane and water vapor are the most important GHG; and, they have a profound effect on the energy budget of the Earth system despite making up only a fraction of all atmospheric gases.[27]

This is evident in the UNFCCC which defines GHG as those gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and re-emit infrared radiation.[28]

This effect is illustrated in the next Figure 1 which shows how the process works.

[26] For the complete text of the AR4 Report, refer to:
http://www.ipcc.ch/publications_and_data/publication

Figure 1. The Greenhouse Effect[29]

More recently, the data demonstrates

Climate scientists estimate that we need to see an emissions peak before 2020 and a 50% reduction below 1990 levels by 2050.[30] For industrialized nations, that translates to a reduction of 25% - 40% emissions below 1990 levels by 2020. Essentially, these are the targets which have informed the climate change policy debate at an international level.

Improving adaptive capacity at national, regional and global levels is vital to achieving these goals. This includes mitigation and disaster risk reduction efforts, insurance and other risk transfer mechanisms. Their broad use is needed to reduce the vulnerability of high-risk communities to inevitable climate impacts such as frequent floods, droughts and heat waves whose severity are foreseen to increase over the coming decades. That is why a risk reduction approach is fundamental; if not, economic growth and survival of the world's most vulnerable populations could be threatened.

Developing countries such as Guatemala will be most affected, and it is now evident that a pragmatic response by the international community is urgently required.

Essentially, the response has come in the form of the UNFCCC and its associated Protocol (commonly referred to as the Kyoto Protocol). Both of which will be thoroughly examined in the next chapter.

If we take into consideration that nothing is absolutely certain in science, since the physical sciences commonly say that something is "true", "certain" or "well-established" if the evidence suggest that there is less than a 5% chance (1 in 20) of it being wrong, it is important to say that in any estimates of future climate change there is a number of sources of uncertainty. Some of these arise from science itself, and some from the uncertainty of future human behaviour, especially future emissions of future emissions of GHG.

[30] Gateway to the UN System´s Work on Climate Change webpage, at: http://www.un.org/wcm/content/site/climatechange/gateway

In relation to future climate impacts, there are a number of different

minimize the causes of climate change and mitigate its adverse effects. Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing such measures, taking into account that policies and measures to deal with climate change should be cost-effective so as to ensure global benefits at the lowest possible cost. To achieve this, such policies and measures should take into account different socio-economic contexts, be comprehensive, cover all relevant sources, sinks and reservoirs of greenhouse gases and adaptation, and comprise all economic sectors. Efforts to address climate change may be carried out cooperatively by interested Parties.[34]

In conclusion, uncertainty should be seen not as a reason for inaction on climate change, but as a reason for proceeding cautiously with a readiness to adapt policies to changing insights and circumstances.

Accordingly to the Stern Review,[35] future climate change and projected impacts due to higher levels of CO_2 and increases in temperatures could result in sea level rise and extensive damage to corral reefs that will result in a rising number of species that face extinction.[36] These could be case of the fragile marine coastal ecosystems in Guatemala; therefore, integrated management plans are important to work towards an effective environmental sustainability.

Climate change affects everyone and every country in the world, in one way or another; hence, the importance of the UNFCCC, a framework for international action in tackling the prospect of global warming associated with emission of GHG.

The regulations and negotiations of the UNFCCC, the Kyoto Protocol and the Conference of the Parties to the UNFCCC, are nowadays important in the

[34] Article 3.1 of the UNFCCC, at: ht13.ant irotocol 82(:oco/oco/ocoySpan)TjEMC ET90 1/7fip Tw 16.19 0 Td[ospect oTd[(

international scheme and what happens in these forums affects the countries, especially those developing ones such as Guatemala, that did very little about the greenhouse gasses and are one of the most affected by the climate change impacts.

These international agreements are examined in detail in the next chapter and will give us a better understanding of the agreements and compromises between countries.

CHAPTER 2 – INTERNATIONAL LAW ON COMBATING

UNFCCC on 13 June 1992. The UNFCCC entered into force on 21 March 1994. Currently, there are 195 Parties (194 States and 1 regional economic integration organizati

- The need for precautionary measures in the absence of full scientific certainty, qualified by the need to be cost effective and comprehensive; and
- Parties have a right to and should promote sustainable development integrated with national development programmes, and they should cooperate to promote a supportive and open international economic system. Measures taken should not constitute a means of arbitrary or unjustifiable discrimination or a disguised restriction on international trade.

Also, the first paragraph of Article 4 of the UNFCCC commits all Parties to:[44]

- Develop, periodically update, publish and make available to the Conference of the Parties to the UNFCCC, national inventories of GHG emission sources and sinks;
- Formulate, implement, publish and regularly update national and, where appropriate, regional programmes containing measures to mitigate climate change; and, measures to facilitate adequate adaptation to climate change;
- Promote and cooperate in the development, application and diffusion, including transfer of technologies, practices and processes;
- Cooperate in preparing

- Communicate to the Conference of Parties information related to implementation.

This applied to all Parties. The second paragraph or Article 4 (Article 4.2) commits developed country Parties and others included in Annex I to more specific measures, namely the adoption of policies and measures that will demonstrate that developed countries are taking the lead in modifying longer-term trends in anthropogenic emissions consistent with the objective of the Convention.[45]

Of particular importance is the Conference of the Parties to the UNFCCC (hereinafter: COP), which meet every year to review advancement and to move the international process forward. There are also a number of subsidiary bodies and their Bureau.[46]

One significant aspect worth mentioning is that the UNFCCC omits to set down specific legally binding commitments on the Parties, but emphasizes the importance of precaution and places a large burden of responsibility on industrialized states to address the problems of climate change.

A key requirement is set down by Article 4.1, which requires all Parties, taking into account their common but differentiated responsibilities and their specific national and regional development priorities, objectives and circumstances, to provide inventories of emissions, implement mitigating programmes, promote technology transfer, manage sinks and reservoirs, plan adaptation to climate change, take climate change into account in domestic policy, gather scientific data, exchange information, promote awareness, and communicate with the COP.[47]

[45] Article 4 of the UNFCCC, at: http://unfccc.int/resource/docs/convkp/conveng.pdf
[46] The COP is the supreme decision making body of the UNFCCC. All governments that are Party to the UNFCCC are represented at the COP where they review and promote the implementation of the Convention and any other legal instruments that the COP adopts, including institutional and administrative arrangements
[47] Article 4 of the UNFCCC, at: http://unfccc.int/resource/docs/convkp/conveng.pdf

Understanding the system of the UNFCCC is important and a central feature is the classification of contracting Parties. In the first instance, Parties to UNFCCC are classified as: Annex I Countries which are 40 industrialized countries and economies in transition, as well as the European Union. Secondly, there is a classification which is referred to as Annex II Countries which is made-up of 23 developed countries and the European Union which are required to contribute towards the costs of developing countries), as well as Developing Countries.[48]

In accordance with the scheme for reduction set down by the UNFCCC and the Kyoto Protocol, which will be analysed in more detail in the next section, Annex I countries who have ratified the Kyoto Protocol, have committed to reduce their emission levels of GHG gasses to targets that are mainly set below their 1990 levels. They achieve this by allocating reduced annual allowances to the major operators within their borders. These operators can only exceed their allocations if they buy emission allowances, or offset their excesses through a mechanism that is agreed by all Parties to UNFCCC. This may be contrasted to the position of Annex II countries which are a sub-group of the Annex I countries. They comprise the Organization for Economic Co-operation and Development (hereinafter: OECD) members, excluding those whose economies were in transition back in 1992. Developing countries are not required to reduce emission levels unless developed countries supply enough funding and technology. This is the case for Guatemala.

[48] To see the complete countries classification, refer to Appendix II, Table 2

SECTION 2. THE KYOTO PROTOCOL

The Kyoto Protocol is an international agreement, a Protocol to the UNFCCC adopted in the city of Kyoto, Japan, on 11 December 1997.[49] In accordance with Article 24, it was open for signature from 16 March 1998 to 15 March 1999 at the United Nations Headquarters in New York City.[50] By that date, the Kyoto Protocol had received 84 signatures. The first countries to sign the Kyoto Protocol on 16 March 1998 were: Antigua and Barbuda, Argentina, Maldives, Saint Lucia, Samoa and Switzerland. Guatemala signed it on 10 July 1998.[51]

The Kyoto Protocol entered into force on 16 February 2005 in accordance with Article 23, that is the 9th day after the date on which not less than 55 Parties to the UNFCCC, incorporating Parties included in Annex I which accounted in total for at least 55% of the total carbon dioxide (CO_2) emissions for 1990 of the Parties included in Annex I, have deposited their instruments of ratification, acceptance, approval or accession.[52]

Presently, there are 193 Parties (192 States and 1 regional economic integration organization) to the Kyoto Protocol. The total percentage of Annex I Parties emissions is 63.7%.[53]

The detailed rules for the implementation of the Kyoto Protocol were adopted at COP 7 in Marrakesh in 2001, and are called the "Marrakesh Accords."

The Kyoto Protocol sets binding targets for 37 industrialized countries and the European Union for reducing GHG emissions. This amount has to be reduced to an average of 5% against 1990 levels over the five-year period of 2008-

[49] For more information about the Protocol, refer to: United Nations Treaty Collection, Chapter XXVII: No 7a. United Nations Framework Convention on Climate Change –UNFCCC, at: http://treaties.un.org/pages/ViewDetails.aspx?src=UNTSONLINE&tabid=2&mtdsg_no=XXVII-7-a&chapter=27&lang=en#Participants
[50] Article 24 of the Kyoto Protocol, at: http://unfccc.int/resource/docs/convkp/kpeng.pdf
[51] The Kyoto Protocol has 192 State Parties and 84 Signatories
[52] Article 23 of the Kyoto Protocol, at: http://unfccc.int/resource/docs/convkp/kpeng.pdf
[53] For more information about the status of ratification of the Kyoto Protocol, refer to: http://unfccc.int/kyoto_protocol/status_of_ratification/items/2613.php

Joint Implementation (known as JI), which allows developed countries to collaborate on projects that reduce overall emissions either by using cleaner technology or by creating new or better carbon sinks. The resulting emission reduction units (hereinafter: ERU), can be traded and used to offset carbon emissions in another location. The procedures for these joint projects are defined by the Conference of the Parties to the UNFCCC.[58]

For the system to work correctly under the Kyoto Protocol, countries actual emissions have to be monitored and precise records have to be kept of the trades carried out.

In practice, registry systems track and record transactions by Parties under the Kyoto Protocol mechanisms.[59] Reporting is done by Parties by way of submitting annual emission inventories and national reports under the Kyoto Protocol at regular intervals. A compliance system ensures that Parties are meeting their commitments and helps them to meet their commitments if they have problems doing so.[60]

The Kyoto Protocol, like the UNFCCC, is also designed to assist countries in adapting to the adverse effects of climate change. It facilitates the development and deployment of techniques that can help increase resilience to the impacts of climate change. With this in mind, the Adaptation Fund was established to finance adaptation projects and programmes in developing countries that are Parties to the Kyoto Protocol. The Fund is mainly financed by a share from the clean development mechanism project activities proceeds and other sources of funding.

Nevertheless, on the positive side, the Kyoto Protocol is seen as an important first step towards a truly global emission reduction system that will stabilize GHG emissions, and provides the essential structure for any future

[58] Article 6 of the Kyoto Protocol, at: http://unfccc.int/resource/docs/convkp/kpeng.pdf
[59] For more information about the registry systems under the Kyoto Protocol refer to: http://unfccc.int/kyoto_protocol/registry_systems/items/2723.php
[60] For more information about the compliance system under the Kyoto Protocol, refer to: http://unfccc.int/kyoto_protocol/compliance/items/2875.php

international agreement on climate change. However, there are many more challenges. The lost pressing is that by the end of the first commitment period of the Kyoto Protocol in 2012, a new international framework needs to be negotiated and ratified, one that can deliver the rigorous emission reductions that the IPCC has clearly indicated are needed.

In light of this, we should now turn to the work of the Conference of the Parties to the UNFCCC which plays and important role in moving the international process forward.

SECTION 3. CONFERENCE OF THE PARTIES TO THE UNFCCC

The Conference of the Parties to the UNFCCC (hereinafter: COP) is the supreme decision making body of the UNFCCC. All parties to the UNFCCC are represented at the COPs, where they review and promote the implementation of the UNFCCC and any other legal instruments that the COP adopts, including institutional and administrative arrangements.

The COP to the UNFCCC has convened annually since 1995. At the first COP meeting, an important milestone was reached when they reviewed the commitments made under the UNFCCC to see if they were adequate for achieving its objectives. As mentioned before, one of the conclusions was that there was a pressing need for an agreement to set down more binding legal obligations; this led to the subsequent negotiation of the Kyoto Protocol in 1997.

To date there have been 16 COPs and they have all contributed to some degree to the elaboration of the law and policy on climate change.[61]

[61] Each of the COPs meetings has been examined in detail in Appendix III

Climate change effects which result in increased levels of GHG in the atmosphere, will consequently lead to changes in the oceans.

These changes will be mostly seen in the form of ocean warming, sea level rise, ocean current change and ocean acidification.[68] In turn, these changes put marine ecosystems and coastal communities at risk, such as the ones that live close by the Guatemalan coastline. Also, these processes can impact biodiversity directly (for example where local temperatures exceed individual species physiological tolerances), or indirectly (for example, by altering habitat availability, species interactions or productivity.)

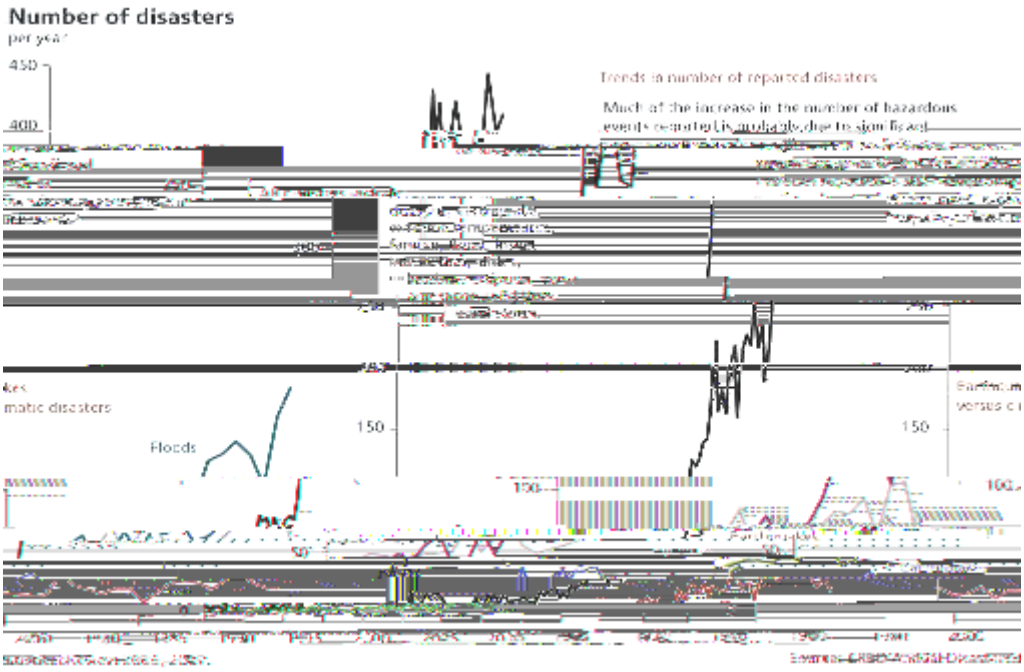
At this point, it is also pertinent to mention that there are many other potentially complex interactions between climate change and other phenomena such as coastline degradation, habitat destruction and invasive species, which must also be taken into consideration when adopting a climate change mitigation and adaptation strategy. Also, the adverse effects of climate change on food security and the sustainability of fisheries are of critical importance at a national and international level; therefore, have to be taken into consideration strategy-wise.

Similarly, climatic variability will, very likely, result in more frequent extreme events around the world. Although some cause and effects relationships are questioned by some members of the scientific community. Nonetheless, there appears to be an increase in the number of natural disasters and geo-hazards associated with climate change, as can be seen from the information shown on the next Table 2.

For vulnerable countries such as Guatemala, this will most likely represent an increase in the number of hurricanes and tropical storms; and this can have terrible consequences for both coastal communities --as previously mentioned.

[68] UNEP, FAO, and IOC/UNESCO.

Table 2. Number of Disasters per Year[69]



Thus, the information shown in Table 2, which comes from the Centre for Research on the Epidemiology of Disasters - CRED Annual Disaster Statistical Review 2006 – 2007, shows that there is a clear and rather dramatic increase in the number of natural disasters per year.

One needs to exercise considerable caution with such reports, as much of the increase in the number of hazardous events reported is probably due to significant improvements in reporting and data-gathering techniques, as well as other anthropogenic impacts such as population growth. Nonetheless, the number of floods and cyclones reported is still rising compared to earthquakes. In this context, there appears to be a relatively strong scientific case, which now links global warming with the increased frequency of natural hazards.

The IPCC 4th Assessment Report (AR4) has emphasized that if the planet's surface temperature increases by 2°C above pre-industrial levels, then a

[69] UNEP, FAO, and IOC/UNESCO. Blue Carb 0.0g1i4[(ew100appeawT[(ewe Reawo[(ewBl)4e)24( )6 of-4(He)-8(Bl)4

catastrophic collapse of ecosystems becomes possible with unforeseen, non-linear impacts on poverty and disaster risk.[70]

The IPCC has also confirmed that the geographic distribution, frequency and intensity of these hazards are already being altered significantly by climate change.

The 2009 Global Assessment Report on Disa

grasses. Benefiting from the excellent conditions available to support plant growth, vegetated coastal habitats rank amongst the most productive habitats in the world, comparable in production to the most productive agricultural crops.

Blue carbon sinks are strongly autotrophic, which means that these ecosystems fix CO_2 as organic matter photosyntheticaly in excess of the CO_2 respired back by biota, thus removing CO_2 from the atmosphere. Some of this excess carbon is exported and subsidises adjacent ecosystems, including open ocean and beach ecosystems.[75]

The remaining excess production of mangrove forests, salt-marshes and seagrass meadows is buried in the sediments, where it can remain stored over millenary time scales, thereby representing a strong natural carbon sink which combats climate change on an on-going basis.

Moreover, the increase of CO_2 and other GHG emissions are contributing to climate change. So, the oceans play a vital role in all of this, since they contribute to reducing atmospheric CO_2 levels through sequestration and reduction of the marine and coastal ecosystem degradation.

Today, it is generally accepted by the scientific community that the oceans are crucial in the global carbon cycle.[76] In particular, it is estimated that they represent the largest long-term sink for carbon since they store and redistribute CO_2. About 93% of the earth's CO_2 is stored and cycled through the oceans.[77] Indeed, one of the great strengths of the ocean is its resilience to absorb and mitigate pollution.[78]

[75] UNEP, FAO, and IOC/UNESCO. Blue Carbon. The Role of Healthy Oceans in Binding Carbon, UNEP/GRID-Arendal, 2009
[76] Ibid
[77] Ibid
[78] To see a figure regarding the Carbon Cycle and Blue Carbon, refer to Appendix II, Figure 4

The IUCN 2009 *The Ocean and Climate Change* report,[79] states that the ocean plays a critical role in our climate system and is significantly impacted by climate change and ocean acidification which are already impacting the ocean and will continue to cause harm unless successful mitigation and adaptation strategies are implemented quickly.

To date, the ocean has played only a minor role in international climate change discussions. Due to its importance in the global carbon cycle, as well as its potential for climate change mitigation and adaptation, it is necessary to include the ocean more clearly and pr

Before looking at its substantive provisions of the UNCLOS that apply to climate change, it is first necessary to mention a little bit about the history of modern Law of the Sea.

The scientist Arthur C. Clarke once said:

“How inappropriate to call this planet earth when it is quite clearly ocean”.[81]

This statement is very accurate since the ocean covers nearly 71% of the Earth’s surface and is divided into major oceans and smaller seas.

In the seventeenth century the Principle of the Freedom of the Seas doctrine was the established legal norm for the high seas.[82] As a consequence, this meant that the national rights and jurisdiction over the oceans was limited to a narrow belt of sea surrounding a nation’s coastline.

All the rest of the seas were proclaimed to be free to all and belonging exclusively to no one. In the mid-twentieth century the phenomenon to extend national claims over offshore resources began.

Although four conventions on the law of the sea

on the surface waters and under the sea. The Freedom of the Seas doctrine was threatened by the increased presence of maritime powers and the pressures of long distance navigation, transforming the oceans into another area for conflict and instability.

In the late 60´s the oceans were generating multiple claims, counterclaims and sovereignty disputes between the countries.

The need for updating law of the sea was imperative because the technological changes that had altered man’s relationship to the oceans had to be taken into account. This was process was helped along by a number of developments on the political front at an international level including a famous intervention.

On 1 November 1967, Malta's Ambassador to the United Nations, Arvid Pardo, made a call to the nations, in the United Nations General Assembly, for “an effective international regime over the seabed and the ocean floor beyond a clearly defined national jurisdiction".[84]

Pardo's urging began a process that lasted 15 years, resulting ultimately in the adoption of the 1982 UNCLOS. This work entailed participation by more than 150 countries representing all regions of the world in an international diplomatic conference: UNCLOS III.[85]

The UNCLOS was opened for signature on 10 December 1982 in Montego Bay, Jamaica. A very interesting fact is that the UNCLOS was signed by 119 countries on the very first day on which it was opened for signature, being this the first time of such involvement in an international law convention.[86]

The UNCLOS was adopted as a "Package deal", to be accepted as a whole in all its parts without reservation on any aspect. It entered into force in accordance with its Article 308 on 16 November 1994, twelve months after the date of deposit of the sixtieth instrument of ratification or accession (Guyana was the 60th State to adhere to it). At the time of writing, the UNCLOS has 157 signatories and 161 Parties.[87]

The UNCLOS establishes rules governing all uses of the oceans and their resources.

The preamble acknowledges the normative concept that “all problems of ocean space are closely interrelated and need to be addressed as a whole”.[88] It sets up rules for the uses of the oceans and also introduces new legal concepts and regimes and addressed new concerns.

The UNCLOS also provides the framework for further development of specific areas of the law of the sea, and it is the globally recognized regime dealing with all matters relating to the law of the sea. It was referred as a “Constitution for the Oceans”, by Tommy T.B. Koh of Singapore, President of the 3rd United Nations Conference on the Law of the Sea, at the time of its adoption in Montego Bay in 1982.[89]

Among the important features of the treaty are: navigational rights, territorial sea limits, economic jurisdiction, legal status of resources on the seabed beyond the limits of national jurisdiction, passage of ships through narrow straits, conservation and management of living marine resources, protection of the marine environment, a marine research regime, and a binding procedure for settlement of disputes between States.[90]

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[87] To see the complete chronological lists of ratifications, accessions and successions to the UNCLOS and the related Agreements as at 15 November 2010, refer to: http://www.un.org/Depts/los/reference_files/chronological_lists_of_ratifications.htm#The United Nations Convention on the Law of the Sea

[88] UNCLOS - United Nations Convention on the Law of the Sea, 5th paragraph of the Preamble

the Sea, which has competence to settle ocean related disputes arising from the application or interpretation of the UNCLOS.[92]

The UNCLOS also provides for the long-term conservation and sustainable use of marine living resources, and establishes the fundamental obligation of all States to protect and preserve the marine environment, including the obligation to prevent, reduce and control pollution of the marine environment from or through the atmosphere.

The Preamble of the UNCLOS declares that the States Parties recognize the desirability of establishing, with due regard for the sovereignty of all States, a legal order for the seas and oceans, which will facilitate international communication; and, will promote the peaceful uses of the seas and oceans, the equitable and efficient utilization of their resources, the conservation of their living resources and the study, protection and preservation of the marine environment.[93]

The State Parties to the UNCLOS bearded in mind that the achievement of the goals set in the UNCLOS will contribute to the realization of a just and equitable international economic order which takes into account the interests and needs of mankind as a whole and, in particular, the special interests and needs of developing countries, whether coastal or land-locked;[94] and believed that the codification and progressive development of the law of the sea achieved in the UNCLOS will contribute to the strengthening of peace, security, cooperation and friendly relations among all nations in conformity with the Principles of Justice and Equal Rights and will promote the economic and social advancement of all peoples of the world, in accordance with the purposes and principles of the United Nations.[95]

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Some years later, Part XI of the UNCLOS, which deals with mining of minerals lying on the deep ocean floor outside of nationally regulated ocean areas, in what is the area codified by UNCLOS as the international seabed area, raised many concerns for industrialized States such as the United States.[96]

The Secretary-General initiated a series of informal consultations among

For international treaties it is very important to be interpreted in the light of changing circumstances to avoid being caught to the time when they were negotiated.

Even though climate change effects are not specifically stated in the UNCLOS, it is very possible that the potential impact of temperature changes to marine ecosystems was within the contemplation of negotiators.

Nevertheless, the threat of temperature change to the marine environment was clearly identified by the inclusion of the term energy in the definition of pollution.[100]

Climate change science calculates an increase in energy within the atmosphere resulting from an increase of GHG. This will lead to a rise in energy in the oceans that will most likely bring changes in water temperature, sea level, ocean currents, etc. Such an approach can lead to the conclusion that GHG emissions will result in marine pollution as defined in Article 1.4 of UNCLOS.[101]

Part XII of UNCLOS entitled Protection and Preservation of the Marine Environment includes the different State obligations concerning the marine environment.

In Section I of Part XII, Articles 192 and 193 stipulate the general obligation of States to protect and preserve the marine environment[102] and the sovereign right of States to exploit their natural resources pursuant to their environmental policies and in accordance with their duty to protect and preserve the marine environment.[103]

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[100] UNCLOS -

Article 194.1 is very clear, it establishes the obligation of the States to take all measures consistent with the UNCLOS necessary to prevent, reduce and control pollution of the marine environment from any source, using the best practical means.[104] Here is where the foundation for the States obligation to mitigate climate change effects to protect and preserve the marine environment can be found.

These provisions are broad enough to allow for a State to claim that a failure by another State to mitigate climate change violates its obligations to preserve and protect the marine environment, and the compulsion to prevent pollution from spreading outside a State's jurisdiction results to be a vital provision.

Now, it is important to note that the substance of Part XII has not been interpreted by any international tribunal.

To give an example, in case of a claim and arguing that the obligation of States to protect and preserve the marine environment under UNCLOS extends to mitigating climate change, the claim must determine that a State in failing to mitigate the climate change effects violated its obligations under UNCLOS, and here is where the link can be made between the failure of a particular State to reduce GHG emissions and the impacts of climate change on the marine environment.

To see this more clearly, we must picture a hypothetical claim in which the existence of a small island State with minimum GHG emissions, is threatened

During his administration, former Guatemalan Minister of Environment and Natural Resources, Luis Alberto Ferraté Felice, constantly emphasized that forced adaptation and obliged mitigation measures are vital for the welfare of country.[109]

In the next chapter we will see the strategies for climate change adaptation and mitigation, some of which are already being implemented in Guatemala.

[109] MARN. Guatemala en COP 15: Ministro de Ambiente llega a Copenhague, 2009, refer to: http://marnguatemala.blogspot.com/2009/12/intervencion-del-el-ministro-de.html

CHAPTER 4 – STRATEGIES FOR CLIMATE CHANGE ADAPTATION AND MITIGATION

SECTION 1. THEORY ADDRESSING THE CLIMATE DIVIDE

A wide array of adaptation options are available, but more extensive adaptation than is currently occurring is required to reduce vulnerability to climate change. There are barriers, limits and costs, which are not fully understood.

Intergovernmental Panel on Climate Change, Synthesis Report, 2007[110]

Adapting to climate change impacts and the reduction of GHG emissions (mitigation), is the approach for societies to respond and reduce the rate and magnitude of the imminent changes.

The capacity of communities to adapt and mitigate is dependent on their socio-economic and environmental circumstances and the availability of information and technology.

There are two possible ways to cope with climate change effects: The first one is adaptation, an automatic or planned response to change that minimises the adverse effects and maximises any benefits. The second one is mitigation; that is, reducing the magnitude of climate change by reducing GHG emissions.

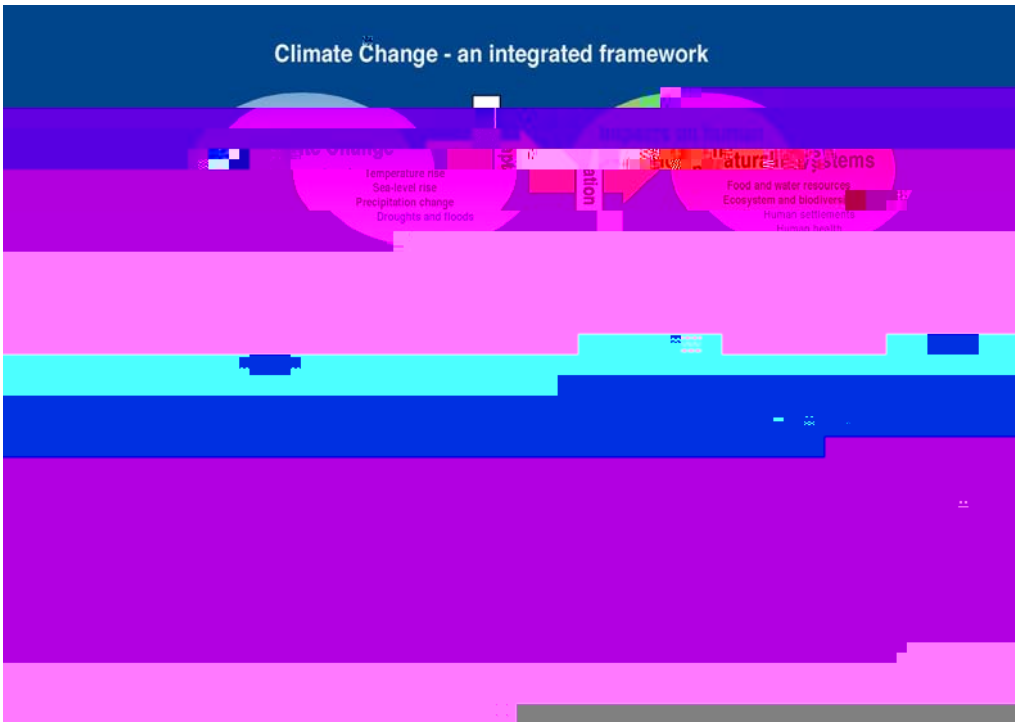
Adaptation is vital to cope with the already-happening climate change; while mitigation limits the extent of future climate change effects.

Adaptation is mostly a local challenge, while mitigation is a global process that will only be achieved by international cooperation and a common commitment.

[110] IPCC. Synthesis Report 2007, refer to: http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr.pdf

Figure 3 below illustrates that there is a clear relationship between adaptation and mitigation.

Figure 3. Climate Change: An Integrated Framework[111]



SECTION 2. ADAPTATION = COPING WITH CLIMATE CHANGE

The IPCC has always discussed the idea of adaptation to climate change as a second or third best response, something to be done only after every possible effort has been made to reduce GHG emissions.[112] Our ability to adapt is what must determine the targets we set ourselves for reducing GHG emissions. Therefore, mitigation policies should seek avoiding situations where the limits of adaptability are exceeded.

[111] IPCC slides, at:

One of the best ways to ensure adaptability could be to increase resilience or the capacity to cope with natural, year-to-year, climate variability. In Guatemala, for instance, this could mean flood or drought cycles.

Additionally, an increasing resilience to cope with greater extremes would be uneconomic, or at least inefficient, unless guided by an understanding of the direction and magnitude of climate change, an understanding of what to expect by informed foresight.

A handbook on methods for climate change impacts assessment and adaptation strategies has been developed by the UNEP,[113] which can be summarised in eight alternative but not exclusive strategies:

Bear losses	This is the baseline response of "doing nothing". Bearing loss occurs when those affected have failed to act until it is too late, or have no capacity to respond in any other way (for example, in extremely poor communities), or where the cost of adaptation measures are considered to be high in relation to the risk or the expected damages. The big problem with this solution is that losses may become unbearable.
Share losses	This involves a wider community on sharing the losses. Sharing takes place in traditional societies and in the most complex, high-tech societies. In traditional societies, mechanisms include sharing losses with extended families, villages or similar small-scale communities. In societies organised on a larger-scale, losses are shared through emergency relief, rehabilitation, and reconstruction paid for by government funds or public appeals, or through private insurance. However, insurance usually applies only when the risk is considered random and uncertain for the individual insured, not when it is predictable. Even with shared losses, the accumulated loss to society may eventually

[113] For the complete UNEP handbook refer to: http://www.ivm.vu.nl/en/Images/UNEPhandbookEBA2ED27-994E-4538-B0F0C424C6F619FE_tcm53-102683.pdf

	become unacceptable, at which point other actions must be taken.
Modify the threat	For some risk, it is possible to exercise a degree of control over the specific environmental threat. For natural events such as a flood or drought, possible measures include flood control works (dams, dikes, levees) or water storages. For climate change, attempts to modify the threat through such measures may quickly become too expensive, and the more sensible modification to reduce the threat is to slow the rate of climate change by reducing global GHG emissions and eventually stabilising greenhouse concentrations in the atmosphere. It is important to say that in IPCC terminology, measures that reduce climate change are referred to as “mitigation” of climate change, in distinction to “adaptation”, which is reserved for an optimal response to a given climate change.
Prevent effects	A frequently used set of adaptation measures involves steps to prevent the effects of climate change and variability.
Change use	Where the threat or reality of climate change makes the

and countries that are adversely affected by climate change, many of whom are not the countries that historically caused the problem such as Guatemala. This is a major source of conflict between some developed countries, whose historical emissions could be the main cause of climate change up to now, and the developing countries that will experience some major impacts in the near future.

Developed countries have more capacity to adapt because they can afford it. Developing countries agree in limiting GHG emissions, but their first priority is the welfare of their people in the face of increasing climatic disaster and the need for on-going economic development. In return for limiting their GHG emissions, developing countries are asking for help in disaster management and relief, development aid and assistance with adaptation to climate change and access to new less carbon-intensive technology.

Mitigation, in contrast to adaptation, needs more time to take effect due to the lags117gsn ,

least in developing countries, and to the non negligible chance of catastrophic changes.[120]

We also have to consider the fact that there is a large uncertainty about climate sensitivity to GHG. Nevertheless, urgent emissions reductions with very stringent targets need to be made. The reason for this is that for GHG such as CO_2 (that have long effective residence times in the atmosphere), reducing emissions below present levels has only a very slow impact on future concentrations.[121]

The IPCC 2007 report[122] stated that because of slow removal processes, atmospheric CO_2 will continue to increase in the long term if its emission is substantially reduced from present levels. About 20% of CO_2 emissions will remain in the atmosphere for “many millennia”. This is because stabilisation can only be achieved when continuing emissions are reduced to math the rate of natural (or artificially enhanced) removal of CO_2 from the combined atmosphere, active biosphere and upper ocean reservoirs into some reservoir, such as geological formations or deep ocean sediments, that cannot leak CO_2 back into the atmosphere. Shorter lived GHG will respond faster to reduced emissions, for example nitrous oxide, with a lifetime of about a century in the atmosphere needs only a 50% reduction in emissions to stabilise its concentration, while short lifetime gases such as methane (12 years) can stabilise concentrations at current emission levels.[123]

A complication arises in that aerosol pollution, which presently masks some of the greenhouse warming, is likely to be reduced by efforts to reduce CO_2 emissions, and this will rapidly reduce aerosol concentrations, making the

equivalent CO_2 concentrations somewhat larger.[124] Hence, a large emission reduction must be accomplished as quickly as possible. The longer the delay in reducing emissions, the more disastrous will be the potential outcome.

Risk-Based Adaptation

Adaptation needs to be an on-going and flexible process intended to reduce the exposure of societies to risks from climate variability, including extreme events.

In developing countries such as Guatemala, the levels of adaptation are far from adequate, due to the high costs imposed by variations and extremes in climate.

Risk is the combination of the likelihood and consequences of an event. Every country should have policies and plans to manage climate change risks. Such an approach would definitely strengthen decision-making processes by requiring that specific programs and projects include strategies and measures to manage risks arising from climate change variability.

Effective management of climate change related risks, through adaptation, prevents valuable resources from being wasted on disaster recovery and rehabilitation. If adaptation is reactive, as opposed to planned, the range of response options is likely to be narrower. In consequence adaptation may result to be more expensive, socially disruptive and environmentally unsustainable. The ideal scenario is that adaptation reflects current risks as well as the new risks associated with future climate change.[126]

In poor countries like Guatemala, most of the time people adapt to climate variability and change as a result of an extreme event (tropical storms, hurricanes, etc.), by their own resourcefulness or out of necessity, based on their understanding and assessment of the anticipated or observed effects, and on the perceived options and benefits for response. In some cases, such adaptation process will be adequate, effective, and satisfactory, but for many other circumstances, such adaptation (reactive) may not be satisfactory or successful.

[126] Mason Inman. Carbon is forever, 2008, refer to: http://www.nature.com/climate/2008/0812/full/climate.2008.122.html

The elements of a risk-based adaptation approach are:[127]

- Assessing the risks to human systems as well as natural systems;
- Quantifying the consequence component of risk in social, environmental, and economic terms;
-

With this risk-based adaptation approach, the results will most likely be a risk-management response that is coordinat

reduce GHG emissions, the resilience approach suggests shifting the majority of the policymaking attention to an agenda of resilience building and adaptation, two areas with which Governments particularly struggle. A plan for

Changes in Infrastructure and Behaviour

With the everyday increase of people living in big cities, it is clear that they will dominate global emissions. Evolutionary or adaptive structural changes to society are inevitable, and implicit in most forms of mitigation. How to reverse

Although the speed of tidal or other ocean currents is generally less than that of the wind, the much higher density of water means that ocean currents can provide the same power with smaller turbines than the wind.[145]

Geothermal Power

The forms of geothermal power now in use are:

- Shallow mild temperature rocks or soil used for direct heat extraction in winter and for cooling in summer;
- High temperature rocks containing super heated steam, usually in geodynamical active regions (volcanic regions or thermal springs and geysers) at depths less than 2 km, with temperature above about 250°C, used for direct electricity generation; and
- Hot dry rocks, often at depths of one or more km, where heat is extracted by pumping water through the rock layers turned into steam and used in electrical generators.

This heat comes from solar radiation near the surface, by conduction from the c 0.3171 Tw [( )-

The forms of geothermal24725r now in use are: en

It is of enormous interest because when it is burned to provide energy in a turbine or internal combustion engine, or used to produce electricity in a fuel cell, its only waste product is water.

The issue with this is how hydrogen can be generated without the emission of CO_2. If it is produced from fossil fuels it is not free from GHG emissions, or from local pollution at its point of production.

The most likely means of production of hydrogen are the reforming of natural gas, or the hydrolysis of water using electricity.[147]

Carbon Capture and Sequestration

vegetation and soils. Biosphere carbon stock management sustains that very large areas of land are potentially available and that these could be used to remove carbon from the atmosphere in large quantities, allowing CO_2 concentrations in the atmosphere to be not simply stabilised but reduced, thus enabling “overshoot” scenarios for GHG emissions.[149]

Geoengineering Possibilities

Geoengineering is a way of controlling or changing the climate so as to achieve a desired climatic state. The main attraction of geoengineering is that it may be cheap compared with the feared difficulties and large cost of reducing GHG emissions.[150]

The two geoengineering possibilities are:

- Reduce sunlight reaching the Earth´ssurface by reflecting it back into space via particles or mirrors placed in the upper atmosphere or space above the Earth; and
- Sequester large quantities of CO_2 in the oceans via fertilisation of the ocean to enhance biological capture of CO_2.

Some of these mitigation methods are too expensive to be implemented in developing countries like Guatemala.

As established in previous chapters, the effects of climate change are very visible in Guatemala and in many cases adaptation and mitigation are new concepts that people are beginning to understand and learn. This is why the MARN has been working lately on the response to these issues, which will be explained in detail in the next chapter.

[149] Pittock A. Barrie. Climate Change: Turning up the heat, 2005
[150] Ibid

CHAPTER 5 – THE RESPONSE IN GUATEMALA

The State of Guatemala is Party to the UNFCCC (approved by the Decree 15-95 of the Congress of the Republic of Guatemala) and the Kyoto Protocol (approved by the Decree 23-99 of the Congress of the Republic of Guatemala). In addition, the State has undertaken a series of programs aimed at taking immediate and effective actions on adaptation and mitigation of climate change.

Since ratification of the UNFCCC and the Kyoto Protocol, actions have been achieved to evaluate the impacts of climate change in the country. Those actions are largely focused on in

- Conservation, Protection and Improvement of Environment and Natural Resources Policy (Approved by Governmental Regulation No 63-2007, MARN 2007);[153]
- Preliminary Inventory of Emissions and Absorptions of GHG for the year 2000 as a basis (MARN 2007);[154]
- Installment of the Water Cabinet presided by the Vice-President of the Republic of Guatemala (Approved by Governmental Regulation No 204-2008);[155]
- Climate Change National Strategy and the Action Plan (MARN 2009);
- Installment of the Social Environment Cabinet presided by the Vice-President of the Republic of Guatemala (Approved by Governmental Regulation No 128-2008);[156]
- Participation in the COPs to the UNFCCC. The last participation of Guatemala was during COP 16 in Cancún, México, December 2009;[157]
- Climate Change National Policy (MARN 2009);[158]
- National Policy for the Integrated Management of Marine Coastal Zones (MARN 2009);[159]
- National Clean Development Proposal (MARN 2005);[160]
- Alignment, Harmonization and Appropriation Process of the International Cooperation in Environment and Climate Change (MARN 2009);

[153] To see the Governmental Regulation No 63-2007, refer to: http://www.marn.gob.gt/aplicaciones/normas10g/pdf/3.pdf
[154] To see the Preliminary Inventory, refer to: http://www.marn.gob.gt/sub/portal_cambio_climatico/docs/igei_2000.pdf
[155] To see the Governmental Regulation No 204-2008, refer to: http://www.vicepresidencia.gob.gt/v2/sites/default/files/gabinete%20agua_0.pdf
[156] To see the Governmental Regulation No 128-2008, refer to: http://www.vicepresidencia.gob.gt/v2/sites/default/files/socioambiental_0.pdf
[157] To see the international negotiation documents, refer to MARN-National Climate Change Program-International Negotiation, at: http://www.marn.gob.gt/sub/portal_cambio_climatico/index.html
[158] To see the Climate Change National Policy, refer to: http://www.marn.gob.gt/sub/portal_cambio_climatico/docs/politica_cc.pdf
[159] To see the National Policy for the Integrated Management of Marine Coastal Zones, refer to: http://www.marn.gob.gt/documentos/novedades/pmc.pdf
[160] To see the MARN Ministerial Regulation No 477-2005, refer to: http://www.marn.gob.gt/documentos/acuerdoond.pdf

- Installment of the Civil Society Board on Climate Change (MARN 2009);
- Installment of the Indigenous Board on Climate Change (MARN 2009); and
- Climate Change Regional Strategy (2010).[161]

Hard Law Options:

- The issue of the MARN Ministerial Regulation No 134-2003, in which the permanent Unit in charge of the matter was created, under the administrative figure of: National Climate Change Program, appointed to the MARN;[162]
- Incentives for Development Projects on Renewable Energy Law (Decree No 52-2003 by Congress-Republic of Guatemala);[163]
- Designation of the MARN as the National Designated Authority of the Clean Development Mechanism –CDM (Governmental Regulation No 388-2005);[164]
- The creation of the Clean Development National Office and the Regulation of its proceedings (MARN Ministerial Regulation No 477-2005);[165]
- Incentives Regulation for Development Projects on Renewable Energy Law (Governmental Regulation No 211-2005);[166]
- Installment of the Presidential Climate Change Commission (Governmental Regulation No 253-2009);[167] and

[161] To see the Climate Change Regional Strategy, refer to MARN-National Climate Change Program-International Negotiation, at: http://www.marn.gob.gt/sub/portal_cambio_climatico/index.html
[162] To see the MARN Ministerial Regulation No 134-2003, refer to: http://www.marn.gob.gt/sub/portal_cambio_climatico/docs/acuerdo_ministerial.pdf
[163] To see the Decree No 52-2003, refer to: http://200.12.63.122/Legislacion/ver_decreto.asp?id=238
[164] To see the Governmental Regulation No 388-2005, refer to: http://www.marn.gob.gt/aplicaciones/normas10g/pdf/9.pdf
[165] To see the MARN Ministerial Regulation No 477-2005, refer to: http://www.marn.gob.gt/documentos/acuerdoond.pdf
[166] To see the Governmental Regulation No 211-2005, refer to: http://200.12.63.122/Legislacion/Ver_acuerdo.asp?id=16235
[167] To see the Governmental Regulation No 253-2009, refer to: http://www.marn.gob.gt/sub/portal_cambio_climatico/docs/acuerdo_gubernativo.pdf

- Law Initiative No. 4139: Framework Law to Regulate the Reduction of Vulnerability, Obligatory Adaptation, Facing Climate Change and the Mitigation of GHG Effects (MARN 2009).

From this list of national initiatives, it

National climate change projections[172] indicate that average annual temperatures could increase by 1°C to 3°C by 2050, with the month of May being the hottest, with temperatures exceeding 28°C. Areas with higher temperatures are expected to expand, and this expansion will encroach upon areas in which temperatures are currently lower, such as mountainous ones. These scenarios include high, medium, and low climate sensitivities (1.5°C, 2.5°C and 4.5°C respectively) and a wide range of predictions of global warming based on increased GHG. All three scenarios (optimistic, moderate and pessimistic) point to an average reduction in precipitation by the year 2050 for the July-September quarter, with the month of August showing the most severe reduction. This will lead to an intensification of the *canícula*[173] ee. Aipita0.0s (optimistfromTw 8 3°C uponJ-0.0003 Tc 0.1276 Tw 21998 0 TtC,

country's twenty-two departments contain areas threatened by desertification. According to the vulnerability study for water resources, the scenarios for 2030 show a probable reduction in surface water flow of between 10% (moderate scenario) to 50% (pessimistic scenario).[177] This reduction in water flow, along with the predicted increases in temperature and decreases in precipitation, will result in a diminished water supply for ecosystems, human consumption, and irrigation, with consequential impacts on human welfare.

An increase in water demand of 300% by 2050 and 1,600% by 2100 has been estimated, while total water availability, compared to current levels, could fall by 35% for the B2 scenario and 63% for the A2 scenario by 2100.[178] This leads to an estimate of changes in water-use intensity that shows all Central American countries except Belize exceeding critical values of water stress to an extent similar to that of Egypt and some countries of the Arabian Peninsula today.[179]

An increase in the intensity of rainfall will produce an increase in the frequency and intensity of floods. Flow rate studies in the basins of the Nahualate, Coyolate, and Madre Vieja Rivers show an increase in average flow rates in May (the beginning of the rainy season) of 89% to 141% over historical averages.[180] Estimated erosion rates are 45 t. of sediment per ha. per year.[181]

Despite the increased risk of flooding, few structural measures have been taken at an operational level to prevent floods. In particular, there have not

[177] MARN. First National Communication on Climate Change. 2001

[178] The IPCC Special Report on Emissions Scenarios (SRES) estimates the global population, economic activity, and GHG emissions to the year 2100. These scenarios simulate the global climate

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been sufficient infrastructural projects for flood mitigation such as the construction of levees and the dredging of rivers. Moreover, many of the projects completed to date do not rely on appropriate technical studies that take climate change and variability into account. In some instances, the result is that some projects end up exacerbating problems downstream as well as creating a false sense of security.[182] Essentially, the cause of the problem is the absence of sufficient fiscal resources to undertake the large-scale capital projects that are needed to combat climate change. Thus, the occurrence of landslides on major infrastructural routes is a regular occurrence during the rainy season.

The increased frequency and intensity of extreme events (tropical storms, hurricanes, floods, and droughts), as well as altered temperature and precipitation patterns and rising sea levels, threaten ecosystems and biodiversity in Central America. Processes such as coastal erosion, depletion of aquifers, saline intrusion into groundwater; and, in some instances desertification are now common occurrences in some parts of Guatemala.[183]

On the other hand, the rise in sea level presents other risks, such as increased coastal erosion and coastal flooding that affect wetlands, estuaries, and the abundance and diversity of hydrobiological resources. One of the major consequences of these changes is that they bring about changes to marine ecosystems. Some of the possible changes in the Guatemalan ecosystems will be explained in the next section.

SECTION 3. CHANGES IN ECOSYSTEMS IN GUATEMALA AS A RESULT OF CLIMATE CHANGE

From the scientific studies that have been completed, it is evident that for increases above 2.5°C in the ambient temperature there will be major

[182] MARN. Analysis of Future Vulnerability of Water Resources to Climate Change, Climate Change National Policy
[183] MARN. First National Communication on Climate Change, 2001

changes in the structure and function of ecosystems, changes in ecological interactions, and shifts in the geographical distribution of species.[184] As a consequence, there are negative impacts on biodiversity and ecosystem services (e.g. water and food security.)

The effects of a changing climate on ecosystems have already been observed. Such observations include changes in the carbon and nitrogen cycles, species distributions, population sizes, timing of reproduction or migration and length of growing season.

With respect to expected changes in ecosystems in Guatemala, the country's First National Communication on Climate Change, simulated the distribution of ecosystems in accordance with each scenario and concluded that coniferous forests will be the most affected by climate change, due to habitat reduction caused by expanding dry areas. The composition of forests could be affected due to climatic variations, and this could result in the loss of species incapable of withstanding higher temperatures, reducing biodiversity. According to the optimistic, normal, and pessimistic scenarios, between 0.38% and 3.67% of Guatemala will undergo severe changes in forest cover. An increase in the frequency of forest fires is also expected.[185] Of course, these forests are not only important in the context of the role they play as a carbon sink but also there are an important asset in the emission trading scheme.[186]

Ecosystem functions are important because they provide services of benefit to humans. The main services provided by ecosystems, such as nutrient cycling, carbon sequestration, pest regulation and pollination, sustain agricultural productivity. In Guatemala, the main services provided by ecosystems are erosion control, food provisioning and products derived from biodiversity and

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agro diversity.[187] For example, Guatemala produces close to 19 million m^3 of timber, per year, with a high proportion (93%) to be used as wood fuel.[188]

Ecosystem services help reduce exposure or sensitivity and increase the adaptive capacity of most sectors of society. Ecosystem services provide agriculture with important factors of resistance and risk mitigation; and, the value of these increases when the climate is changing. When conditions change, the existence of a greater number and variety of interactions that facilitate the functioning of an ecosystem helps favour different groups of organisms (e.g., pollinators), so that they can continue to provide ecosystem services. Climate change has implications for the quality and extent of forests, the loss of genetic resources available for agricultural production, the loss of food and the distribution and productivity of certain species.[189]

Current climate change trends, combined with other pressures on ecosystems, will lead to reduced ecosystem services; and, this loss will reduce human well-being at all levels.[190] Some foreseen changes to ecosystem services include a decrease in the availability of water, food, timber, and fuel (provisioning services), a loss of genetic diversity (supporting services), altered flow volumes in streams, an increase in polluted runoff and changes in the distribution pattern of disease vectors and pests, due to changes in temperature (regulating services).[191] Some reported effects on biodiversity and ecosystems in Guatemala are changes in ecosystems composition and structure, changes in altitudinal and latitudinal distribution, and species isolation, with subsequent changes in services provisioning. In addition, there have been reported changes in water regimes and an increase in landslides. In Guatemala, the most affected ecosystems will be mountain forests (coniferous forests, cloud forests and evergreen tropical forests). As a result, the Government has highlighted the importance of building altitudinal

[187] MARN-CONAP. Preliminary assessment of Climate Change potential impacts on Biodiversity and Forests of Guatemala; recommendations for mitigation and adaptation, Draft version 2011
[188] UNEP. Global environment outlook:Latin America and the Caribbean GEO LAC 3, 2010
[189] FAO. Climate Change, 2008
[190] Locatelli. Facing an Uncertain Future: How Forests and People Can Adapt to Climate Change, 2008
[191] Pereita. Condition and Trends of Ecosystem Services and Biodiversity, 2005

corridors for climate change adaptation. This recommendation has been emphasized for the highlands zone.[192]

In Guatemala, some actions have been undertaken to evaluate the impacts of climate change in the country. Those actions are directed to identifying and implementing adaptation and mitigation measures. One of the actions is the Initiative for the Force Adaptation and Obligatory Mitigation Climate Change Guatemalan Law which is commented below.

SECTION 4. INSTRUMENTS WHICH FACILITATE ADAPTATION AND MITIGATION: THE INITIATIVE FOR THE FORCE ADAPTATION AND OBLIGATORY MITIGATION CLIMATE CHANGE GUATEMALAN LAW

The justification for this proposal is that in the last couple of years the country has experienced an increase in the magnitude and the frequency of natural phenomenons. Some of the effects of climate change in the country have included:

- Loss of human lives;
- The reduction of the availabilityand exhaustion of the water sources;
- The impact and changes in the geographic distribution and plague season, vectors, depredators and diseases;
- The space modifications in the life zones and in the normal climate conditions;
- The alterations and block in thetrophic chain (food chain) in the land and marine coast systems;
- Harvest loss and production capacity;
- The increase of the forest fires due to drought;
- The destruction of the infrastructure due to floods and landslides;

[192] MARN-CONAP. Preliminary assessment of Climate Change potential impacts on Biodiversity and Forests of Guatemala; recommendations for mitigation and adaptation, Draft version 2011

- The increase of alimentation insecurity;
- The loss of natural spaces and habitats;
- Impacts in the urban-marginal areas; and
- Environmental social and economic impacts, mainly in the agricultural, stockbreeding and fishing sectors.

After suffering the mayor effects of the drought in the dry corridor area complemented with a food crisis in 2009, the MARN saw the importance of concentrating the national efforts to reduce the vulnerability and increase the adaptation to the negative impacts of the climate change in the territory, hence a proposal for the Force Adaptation and Obligatory Mitigation Climate Change Guatemalan Law was generated.

This initiative has been considerate as a national emergency, a matter of national security since the country needs to be able to tackle the effects of climate change and react properly.

The law responds in form and in substance to the special nature of the problem. It opts for the principle to not create new instances unless it is absolutely necessary and reinforces the sector rectory and promotes the institutional leadership. It identifies, in the agenda of other sectors, the principal elements that need to be treated to contribute to the effort of the “force” adaptation and visualize the specific actors to guarantee the effects of the action. It also activates the Government, the Municipalities and the citizens in general to act in a coordinated, urgent and appropriate way to face the challenges ahead.

<u>The Proposed Structure</u>

CHAPTER II: GUIDING PRINCIPLE

a) *In Dubio Pro Natura*
b) Precaution
c) Who Contaminates Pays and Rehabilitates
d) Integrality
e) Cultural Identity
f) Support Capacity
g) Participation

CHAPTER III: DEVELOPMENT OF NATIONAL CAPACITIES AND TECHNOLOGY TRANSFER

a) Research
b) National Climate Change Information System
c) Planning and Organization of the Public Investment Process
d) Adaptation and Mitigation National Climate Change Action Plan
e) Territorial Regulations for the Climate Change Adaptation and Mitigation
f) Adaptation and Mitigation National Climate Change Action Plan
g) Territorial Regulations for the Climate Change Adaptation and Mitigation

CHAPTER IV: FORCED ADAPTATION TO THE CLIMATE CHANGE IMPACTS

a) Risk Management Related to Extreme Weather Phenomena
b) Guides for Vulnerability Reduction
c) Institutional Strategic Plans for Vulnerability Reduction and Climate Change Adaptation and Mitigation

CHAPTER V: OBLIGATED MITIGATION OF THE GREENHOUSE EMISSIONS

Section I: Emissions Reduction
Section II: Carbon Markets

CHAPTER VI: SENSITIVITY AND PUBLIC PARTICIPATION

CHAPTER VII: FINANCIAL RESOURCES

CHAPTER VIII: FINAL AND TRANSITORY DISPOSITIONS

Some important dispositions of the Climate Change Law Initiative include:

x Article 1 of the proposal states: “Theobject of the law is to establish the necessary regulations to prevent, plan and respond in an urgent,

the Guatemalan Official Journal. Once a law is published in the Official Journal it comes into force in the next eight days.

The MARN has been giving legal environmental consultancy to the Environmental and Ecology Commission of the Guatemalan Congress hoping that the law will be approved as soon as possible. This has been a great effort since the objective is to get the law approved before the general elections at the end of 2011.

SECTION 5.

adopts risk prevention practices, vulnerability reduction and improvement to the climate change adaptation and the contribution to the reduction of the GHG in the territory, so that the quality of the life of its inhabitants improves and also the impact capacity in the international negotiations of climate change gets strengthened.

The Specific Objects of the Policy are:

1) Development of climate change national capacities;
2) Vulnerability reduction and the improvement in adaptation to climate change; and
3) Mitigation of GHG emissions.

The Impact Areas of the Policy are:

1) Development of national capacities and technology transfer:
    a. Creation and transfer of technology and knowledge;
    b. Proper productive practices;
    c. National capacities in climate change and institutional coordination;
    d. Education and public awareness; and
    e. Indigenous people.
2) Vulnerability reduction and the improvement in adaptation and risk management:
    a. Territorial order for climate change adaptation and mitigation;
    b. Risk management and climate change adaptation; and
    c. Vulnerability reduction and climate change adaptation improvement in key sectors of the society.
3) Mitigation of GHG emissions:
    a. Climate change mitigation;
    b. Energy production and consumption making the most of the natural renewable resources;
    c. The use of forestry resources;
    d. Waste management;

e. Carbon markets; and
f. Innovative financial mechanisms.

The Guiding Principles of the Policy are:

1) The plans, actions and strategies have to have this policy as foundation;
2) Public participation has always to be taken into consideration;
3) The protection of human lives in climate change extreme events;
4) The protection of the agricultural production against climate change effects;
5) The infrastructure building plans have to have all the quality and security measures taking into consideration the vulnerability to climate change and the risks to be faced up;
6) To give preference to human labour over capital technology;
7) To apply the Principle *In Dubio, Pro Natura* (In case of a doubt, defer to nature);
8) To take into consideration the variability and climate change in the promotion of the traditional and ancestral practices for the use and management of the natural resources;
9) To take the precaution measures to anticipate, prevent, compensate and to reduce the climate change impacts;
10) To apply the Polluter Pays Principle (this principle states that the industrial corporation or persons responsible for causing environmental contamination must pay the costs of cleaning up, controlling the cause and preventing further fouling of the environment);
11) The integrated management of the water resources;
12) To incorporate the climate change variables in every plan and development instruments; and
13) To increase the institutional coordination in climate change matters.

The Climate Change National Policy was the main foundation for the Initiative of the Force Adaptation and Obligatory Mitigation Climate Change Guatemalan Law. The Policy and the Initiative are the results of the team

work lead by the former Minister of Environment and Natural Resources Luis Alberto Ferraté Felice.

National Policy for the Integrated Management of Marine Coastal Zones

As established before, the increased frequency and intensity of extreme events, as well as altered temperature and precipitation patterns and rising sea levels, threaten ecosystems and biodiversity in Guatemala. Processes such as coastal erosion, depletion of aquifers, saline intrusion into groundwater and desertificati

The vulnerability to natural disasters of these communities and the marine coast ecosystems have to be prevented reduced and mitigated by the implementation of risk management measures. Adaptation and mitigation measures, to ensure improved integrated coastal and aquatic resource management are therefore essential, both for restoring carbon sink capacity, as well as for health, livelihood, incomes and food security.

The Importance of the National Policy for the Integrated Management of Marine Coastal Zones lies in the fact that the Guatemalan coastline is around 402 km. It includes 7 Departments, 17 Municipalities and about 300 communities that live in the coastal zone. This implicates a direct influence on 300,000 people living in the c

The Specific Objects of the Policy are:

1) The restoration, conservation and integral management of the marine coastal ecosystems, hydrographic basins and its biological diversity; and, the effective management of its goods and services;
2) The protection of the natural marine and coastal resources and its services for the benefit of the Guatemalan people;
3) Better practices for the productive sector that guarantee the permanency of the ecosystems;
4) The access of the local communities to the goods and services of the marine and coastal resources;
5) The improvement of the knowledge and research of the ecosystems and marine and coastal resources;
6) Adaptation and mitigation strategies to reduce the vulnerability of the coastal communities;
7) The implementation of the rights and obligations that deriver from national and international laws regarding to the marine and coastal zone;
8) The empowerment of the local Municipalities to enforce the National Policy for the Integrated Management of Marine Coastal Zones; and
9) The harmonization of the National Policy for the Integrated Management of Marine Coastal Zones with other national initiative.

The Strategic Lines for the achievement of the Policy are:

1) Territorial order;
2) Economic processes and financial mechanisms;
3) Institutional Strengthening;
4) Upholding of the national and international laws regarding the coast and marine zone;
5) Promote the integral human development that guaranties the social and economic development which contributes to the reduction of the poverty and guaranties the food security;
6) Prevention of the degradation and contamination;

7) Creation and transfer of knowledge;
8) Ecosystem conservation and restoration; and
9) Climate change.

The MARN is now structuring the Strategy and Action Plan of the National Policy for the Integrated Management of Marine Coastal Zones for its implementation. Parallel to this, the MARN is also working on the strengthening of the territorial institutional coordination for the coastal and marine management, which is part of the integrated coastal zone management, as will be seen below.

SECTION 6. INTEGRATED COASTAL ZONE MANAGEMENT

The integrated management of the coastal zone and the hydrographic basins is set in the general objectives of the National Policy for the Integrated Management of Marine Coastal Zones.[196]

The reason for this is that the coastal zone in Guatemala is the one that receives the impacts of the inadequate management of high and half parts of the hydrographic basins.[197]

When the National Policy for the Integrated Management of Marine Coastal Zones was elaborated, different sectors where incorporated such as: Government institutions and non-Governmental organizations (health, education, ports, energy and mines), private sector (banana companies, African palm companies, mines) and civil society (associations, community counsels, comities).[198] The vision is that the natural goods and services that come from the coastal zone get incorporated as key elements for development.

[196] MARN. National Policy for the Integrated Management of Marine Coastal Zones, 2009
[197] MARN. Internal document, 2009
[198] MARN. National Policy for the Integrated Management of Marine Coastal Zones, 2009

With the elaboration of the Strategy and Action Plan of the National Policy for the Integrated Management of Marine Coastal Zones, now in progress, the objet is to support the conformation of management structures in the coastal zone, especially in the Caribbean Zone, where a managing group of the National Policy will be organized. This group will be formed by Governmental institutions, non-Governmental organizations, civil society and the private sector, especially small fishing associations.[199] The most interesting part of this exercise is that the action geographical field of the managing group will go beyond the coastal belt spreading to the high and half parts of the hydrographic basins, taking as managing axis the water resource.

Since the MARN does not have a specialized Unit in charge of all coastal and marine matters, the office in charge of the coastal and maritime subject is the Mesoamerican Biological Corridor/Mesoamerican Coral Reef System Unit.[200]

Now, it is important to mention that in May of 2010, the Guatemalan Vice Presidency in charge launched the Pacific Development Plan called: "Coastal Pacific: A Sea of Opportunities".[201] This initiative integrates the lines of economic, social and environmental development in the Pacific Coastal Zone, as can be seen in the next Figure 5. This plan links itself directly with the work program of the National Policy for the Integrated Management of Marine Coastal Zones.

The main object of this plan is to build an economic competitive region, socially integrated with environmental sustainability, from the shared potential territory. This plan represents the opportunity of establishing the port activity in the Pacific Zone as one of the work engines.

[199] MARN. Internal document, 2010
[200] For more information about the Mesoamerican Biological Corridor/Mesoamerican Coral Reef System Unit, refer to: http://www.marn.gob.gt
[201] For more information about the Coastal Pacific Plan, refer to: http://www.vicepresidencia.gob.gt/v2/content/litoral-del-pacifico

The objectives of the Coastal Pacific: A See of Opportunities Plan are:

- Socialdevelopment;
- Environmental and risk management;
- Productive development for family economies;
- Urban territorial order;
- Tourist development;
- Connectivity, infrastructure and mobility;
- Port development;
- Institutional strengthening; and
- Maritime development.

Figure 5. The Coastal Pacific Plan: A See of Opportunities[202]

Along with the integrated coastal zone management strategies, there are further actions and proposals that will be described in the next chapter.

[202] Office of the Vice President of Guat
cepresidencia.gob.gt/v2/content/litoral-del-pacifico

CHAPTER 6 – RECOMMENDATIONS FOR FURTHER

sedimentation during the Holocene (past 10,000 years), but excludes the continental shelf and ocean margins [and inland seas].[206]

The IPCC 4th Assessment Report (AR4) states that, globally, coasts are undergoing adverse consequences from climate change, such as sea level rise, inundation, erosion, and ecosystem loss.[207] The IPCC report also states that coasts are highly vulnerable to extreme events such as cyclones, extreme waves, storm surges, altered rainfall and runoff patterns; and ocean acidification. The overall impacts of climate change are "virtually certain to be overwhelmingly negative".[208] Climate change and its associated effects pose serious risks to coastal biodiversity.[209]

Climate change is projected to affect climate variability, increasing the frequency and severity of storm/tidal surges, tropical cyclones, hurricanes, etc. These phenomena also cause coastal flooding, erosion, saltwater intrusion into fresh waterways, salinization of soils, and destruction of coastal infrastructure. Global warming will also increase sea surface temperatures as surface waters absorb heat from higher air temperatures. Such altered temperature regimes can significantly affect the reproduction and survival of species unless they can adapt quickly enough.[210]

The conservation and sustainable use of Guatemala's biological richness is of great national importance, and its protected areas are an essential component of the country's conservation strategy.

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[206] Robert J. Nicholls et al.. Coastal Systems and Low-Lying Areas, in M. L. Parry et al., eds., Climate change 2007: Impacts, Adaptation and Vulnerability, Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge: Cambridge University Press, 2007

[207] Nicholls et al., op.cit.

[208] Ibid

[209] A. R. Watkinson, J. A. Gill, and M. Hulme. Flying in the face of climate change: a review of climate change, past, present and future, Ibis, 146, Suppl. 1, 2004

[210] Nicholls et al, op.cit.; Nicholas Harvey and Robert Nicholls. Global sea-level rise and coastal vulnerability, Sustainable Science 3, No. 1, 2008

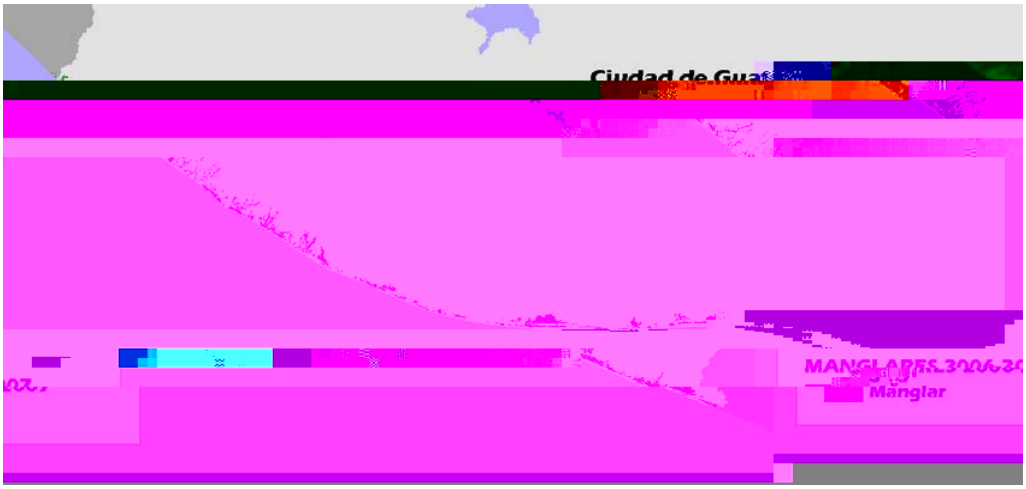
The Guatemalan System of Protec

Although the annual revenue from tourism in protected areas in Guatemala as a whole is estimated to be equivalent to 13% of the country's national budget, there is a lack of accurate statistics regarding tourism in the marine protected areas.[217]

SECTION 2. PINPOINTING THE P

Figure 6.

Figure 7: Mangroves Range in the Pacific Zone (2006-2007)[220]



The size of the marine area (currently under protection in Guatemala) is inadequate for the conservation of the representative marine coastal ecosystem, and significantly falls below the standards of the Central American region (15%) and the future objectives proposed within the Convention on Biological Diversity (hereinafter: CBD)[221] of 10%. A study performed by SIGAP's Gap Analysis Committee in 2009, which evaluated the management effectiveness of marine protected areas, revealed that on average, marine protected area management in the Pacific and Caribbean regions is not satisfactory.[222]

Overall, the current situation is that there is little capacity for environmental officials to effectively manage the marine coastal ecosystems, particularly within the Municipalities, which are responsible for the administration of natural resources within their jurisdictions as established by the Guatemalan Municipal Code and the Guatemalan Decentralization Act (Decree 14-2002). Equally critical has been the lack of inter-institutional and inter-sectorial coordination in developing national and local policies and programs for the

[220] PNUMA. Análisis de vacíos y omisiones para el Pacífico de Guatemala, en http://www.pnuma.org/agua-miaac/SUBREGIONAL%20MESO/MATERIAL%20ADICIONAL/BIBLIOGRAFIA-WEBGRAFIA/Modulo%201%20MIAAC%20en%20el%20contexto%20de%20gestion%20para%20DS/Analisis%20de%20Vacios/Doc%202.%20Analisis_Vacios_Marino-Costero.pdf
[221] For more information about the CBD, refer to: http://www.cbd.int
[222] MARN. Internal document, 2011

protection and sustainable use of marine coastal ecosystems. For example, activities of the agriculture and fishing sectors, which are under the supervision of the Fish and Aquaculture Management Direction[223] in the Guatemalan Ministry of Farming, Livestock, and Food (hereinafter: MAGA),[224] are usually carried out without any consideration given to their environmental impacts. MAGA, through the Guatemalan National Bureau of Land Reserves (hereinafter: OCRET),[225] is the entity charged with the administration of Territorial Reserves of the State of Guatemala (the 3 km. land belt along the coastline); and, implements programs and activities for the development of these areas with little coordination of environmental authorities (e.g. MARN and CONAP).

One of the issues that need to be addressed immediately is the lack of protection of marine coastal biodiversity and the loss and degradation of marine coastal ecosystems. Although marine-protected areas are considered by the Government of Guatemala as essential for the protection of marine coastal biodiversity, only six marine protected areas exist in the country, and they are insufficient to meet national conservation needs.[226]

The current marine protected areas also lack proper management and are

Figure 8: Marine and Coastal Stratum in the Guatemalan Pacific Zone[230]

However, there are some barriers that prevent the conservation and sustainable use of biodiversity in marine protected areas in Guatemala, which are shown in Table 3 below.[231]

Table 3. Guatemalan Marine Protected Areas barriers

Deficient legal and institutional framework for the conservation of biodiversity in marine coastal areas	A principal barrier to the effective protection of marine coastal biodiversity though marine protected areas and the promotion of their sustainable use is the lack of a legal and institutional framework that facilitates the coordinated development of conservation efforts among the various State agencies (e.g., MARN, CONAP and MAGA), Municipal Governments and the productive sectors (e.g. fishing, energy and maritime ports/transportation). Equally important is the lack of legal clarity regarding authority over protection and management that prevents effectively addressing the threats to marine coastal biodiversity, particularly unsustainable fishing practices, contamination of coastal and

[230] PNUMA. Análisis de vacíos y omisiones para el Pacífico de Guatemala, en http://www.pnuma.org/agua-miaac/SUBREGIONAL%20MESO/MATERIAL%20ADICIONAL/BIBLIOGRAFIA-WEBGRAFIA/Modulo%201%20MIAAC%20en%20el%20contexto%20de%20gestion%20para%20DS/Analisis%20de%20Vacios/Doc%202.%20Analisis_Vacios_Marino-Costero.pdf

[231] MARN. Internal document, 2011

	marine waters, loss of habitat and climate change impact.
Limited capacity of marine protected areas officials, local environmental authorities; and, private sectors to counteract existing threats to biodiversity	The protection of marine coastal biodiversity is also limited by the lack of skills by marine protected areas and local environmental authorities to develop effective planning and management of marine coastal areas; to monitor impacts on marine protected areas and biodiversity from coastal development; to implement measures that will allow to strengthen the resilience of marine protected areas and ecosystems to the impacts of climate change; to develop financial plans for the optimization of conservation based investments; and, to implement effective strategies for monitoring and control. In

SECTION 3. FURTHER ACTIONS AND PROPOSALS

With this overview, what needs to be done is to promote the protection of marine coastal ecosystems and the sustainable use of their goods and services through effectively managed marine protected areas in order to ensure their permanence, while at the same time contributing to improving the economic welfare of the Guatemalan population. These strategies will also help to shelter the shoreline from storms and extreme weather events that are imminent effects of climate change.

The protection and sustainable use of the Guatemalan marine coastal biodiversity of global, national, and local importance can be done by creating new marine protected areas in the Pacific region, expanding the existing ones, by improving marine protected area management effectiveness; and, by increasing marine protective areas revenues.

The development of an Integrated Guatemalan Marine Coastal Management Program is vital. This will be central for a strengthened institutional and regulatory framework for the conservation and sustainable use of marine coastal biodiversity and effective marine protected area management.

The Integrated Guatemalan Marine Coastal Management Program could be developed in a participatory manner so that the key local, regional and national stakeholders of the marine coastal zone of Guatemala (Government

SECTION 4. THE EXPECTED RESULTS

This actions combined, will result in a new institutional structure for marine protective areas management and the conservation and sustainable use of marine coastal biodiversity with more clearly defined goals, roles and responsibilities, as well as improved coordination, participation and financing mechanisms, all of these accordingly to the objectives of the Climate Change National Policy and the National Policy for the Integrated Management of Marine Coastal Zones.[234]

The proposed actions will enhance the institutional and individual capacities for effective marine protected area management and the conservation and sustainable use of marine coastal biodiversity.

The establishment of most needed Marine Units within the MARN and CONAP will be a way to strengthen their skills to promote marine coastal biodiversity conservation. These units will need to have the staff and funding necessary to cover management basic needs, to be properly equipped, and to have their operational procedures in place.

Funds will also be needed for the development of the management plans for the new marine protected areas in the Guatemalan Pacific region, as well as updating the management plans for the two existing marine protected areas to be expanded, and this will include the development of all technical studies (i.e., biophysical, socioeconomic and legal) related to their creation/expansion.)

These marine protected areas could be supported by monitoring plans designed to assess the status of their biodiversity and that will be integrated into a monitoring and surveillance program to monitor threats to ecosystems

[234] To see the objectives of the Climate Change National Policy and the National Policy for the Integrated Management of Marine Coastal Zones, refer to: http://www.marn.gob.gt/sub/portal_cambio_climatico/docs/politica_cc.pdf and http://www.marn.gob.gt/documentos/novedades/pmc.pdf

in Guatemala's marine coastal zones (e.g. contamination, unsustainable fishing, unplanned tourism and climate change) and facilitate Government decision making to reduce impacts.

A Monitoring and Surveillance Program will be needed. It could be supervised by the MARN and will have informational nodes in CONAP's headquarters and regional offices; and, in the four coastal Municipalities that will benefit from institutional strengthening actions as part of the implementation of the National Policy for the Integrated Management of Marine Coastal Zones.

The Monitoring System to be developed will facilitate the development of baseline information to determine the status of key species (e.g., sea turtles, the hammerhead shark, the whiptail stingray and the green spiny lobster), which will serve as indicators to evaluate future impacts.

The development of Participatory Resource Use Plans for marine coastal zones (in the Caribbean and in the Pacific), defining the permitted uses and restriction for marine coastal biodiversity and marine protected areas will complement the tools and mechanism that will increase the management effectiveness of the seven existing marine protected areas in Guatemala.

SECTION 5. CAPACITY BUILDING

A Skills-Building Program that will facilitate the delivery of the previously mentioned outputs will also strengthen the capacities of local and national stakeholders. The skills building program could include the training of Government officials (from Municipalities, CONAP, MARN, MAGA, INAB, and the Ministry of Defense/Navy), representatives from the private sector (e.g. energy, agriculture, maritime ports/transportation industries, tourism and urban development), and local communities in marine coastal planning, environmental monitoring, financial planning and the effects of climate change on marine coastal ecosystems, the training of members of fishing federations

The definition of Climate Change Guidelines for strengthening the resilience of marine coastal ecosystems to the impacts of climate change are vital, as well as the development and implementation of Conservation and Sustainable Use Plans for key marine species considering traditional use practices by local communities.

SECTION 6. SUSTAINABLE FISH MANAGEMENT

Stable catches and sizes of selected fisheries species in areas of the Pacific region can be achieved by updating Fishing Management Plans for species of commercial importance to include conservation criteria.

It will also help the creation of communal areas for responsible fishing with support from the Municipal Governments, and by promoting the adoption of appropriate measures from the Food and Agriculture Organization of the United Nations (hereinafter: FAO) Code of Conduct for Responsible Fisheries[235] by the local fishing groups, which may include fishing gear selectivity, protection of the aquatic environment and responsible aquaculture.

And most importantly, these fishing management plans will improve food security for local communities through the development of conservation strategies for key species and ecosystems of local economic importance.

By providing these socioeconomic benefits to the coastal communities, key stakeholders will become active participants in the conservation and sustainable use of marine coastal species and ecosystems of global importance; thereby strengthening their resilience to the impacts of climate changes.

The conservation of 6,725 ha. of mangroves on the Pacific Coast is also imperative. That is why the development of a Participatory Plan for the

[235] For more information about the FAO Code of Conduct for Responsible Fisheries, refer to: http://www.fao.org/docrep/005/v9878e/v9878e00.htm

modified by Decree 110-96),[237]

Development Program and Training Library Development, the establishment of a regional environmental monitoring and information system, and the developing of a web-based environmental monitoring and information system, as tools to organize and disseminate environmental data on reefs and ecosystems in the Mesoamerican Barrier Reef ecoregion. Targeted research supported field studies, including water quality flows and the developing of a hydrodynamic surface flow model. One of the objectives was the promotion of sustainable fisheries management through institutional strengthening; and, monitoring, and, to facilitate sustainable coastal/marine tourism, through policy dialogues and a cooperative action forum. Also, the project included the development of public awareness campaigns, that did provide formal/informal education; and, all of this was supported by the coordination of a regional steering committee, a consultative group, and the Program Coordination Unit.

This project in the Mesoamerican Barrier Reef ecoregion, had a duration of six years (2001-2007) and an approximate cost of $24.2 million USD.

The Millennium Development Goals for this project were to ensure the environmental sustainability and to develop global partnership for development.

The map in Figure 9 shows the areas of the project in México, Belize, Guatemala and Honduras.

Figure 9. Mesoamerican Barrier Reef System[238]

[238] Guatemalan Ministry of Environment and Natural Resources –MARN. Internal document, 2011

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The origin of the name Guatemala is Indian, but its derivation and meaning are still undetermined. Some hold that the original form was *Quauhtemallan*, indicating an Aztec rather than a Mayan origin, which means “land of trees”.

The country’s contemporary capital, Guatemala City, is a major metropolitan centre and Quetzaltenango in the western highlands has a major concentration of the Indian population. Interestingly, on the basis of cultural traits, the population is divided into two main ethnic groups: Ladinos and Maya, who make up the vast majority of Indians in Guatemala and form several cultures. The Ladinos comprise those of mixed Hispanic-Maya origin. While the Maya account for slightly less than ½ of the country’s total population, they make up about ¾ of the population in the western highland provinces. There are also some Spanish-speaking *Xinca* in southern Guatemala; and more than 15,000 *Garifuna* people of mixed African and Caribbean descent in the north-eastern port towns of Livingston and Puerto Barrios. Their ancestors came to the Central American coast from Caribbean Islands in the 18th century. Ladinos are the more commercially and politically influential group and they make up most of the urban population.[242]

Spanish is the official language; nevertheless, there are 20 Mayan languages, creating a social barrier even in the Indian communities.

Miguel Angel Asturias, an international recognized Guatemalan poet and novelist who won the Lenin Peace Prize in 1966 and the Nobel Prize in Literature in 1967 for his vivid literary achievement, deep-rooted in the national traits and traditions of Indian peoples in Guatemala and Latin America.[243] His work is strongly rooted in Guatemalan history, such as his 1946 novel *“El Señor Presidente”* (“The President”), a powerful attack on Guatemala’s military dictatorship.

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[242] Britannica, Academic Edition. Profile: Guatemala, at: http://www.britannica.com/EBchecked/topic/701217/Guatemala

[243] For more information about Miguel Angel Asturias refer to: Nobel Prize, the Official Website of the Nobel Prize, at: http://nobelprize.org/nobel_prizes/literature/laureates/1967/asturias-bio.html

Geography and Boundary Issues

Figure 2. Borders of Guatemala[244]

Guatemala is located in Central America and it is bordered by México to the north and west, the Pacific Ocean to the southwest, Belize to the northeast, the Caribbean Sea to the east and Honduras and El Salvador to the southeast. In terms of geographical size and population, it is relatively small country with an area of 109,117 sq km. and with a relatively large population, which is currently estimated at 14,377,000 people (2010 estimate).[245]

The longstanding territorial *differendum* between Guatemala and Belize dates back to the 1800. The position of Guatemala is that it inherited territorial rights of Belize from Spain at the time of its independence. Its present claim to the southern half of Belize and all of its islands (or Cayes) follows its rejection in 1940 of the 1859 "Convention between Her Majesty and the Republic of Guatemala relative to the Boundary of British Honduras." Article 1 of this treaty defined the borders of the British Settlement in Belize. However,

[244] Britannica, Academic Edition. Profile: Guatemala, at: http://www.britannica.com/EBchecked/topic/701217/Guatemala
[245] Ibid

Guatemala’s Constitution allows for a claim to challenge the entirety of Belize’s territory. Although there are claims that Britain reneged on a promise to build a road as part of the treaty, Article 7 states that the two countries would “agree conjointly to use their best endeavours” to establish the easiest communication route from the Atlantic Coast to the Capital of Guatemala. It is these and other claims, upon which the International Court of Justice will be called to judge. When Belize gained its independence from the United Kingdom of Great Britain and Northern Ireland (UK) in September 1981, Guatemala decided not to recognise Belize due to its on-going territorial claim, and as such consular relations were cut with both Belize and the UK. From 1975 successive United Nations resolutions endorsed Belize's right to self-determination, independence and territorial integrity. As relations improved, in September 1991 Guatemala decided to recognise Belize as a sovereign and independent State, while still maintaining its territorial claim. Guatemalan/UK diplomatic relations were resumed in December 1986. Since 2000, Belize and Guatemala have had a series of meetings under the auspices of the Organization of American States (hereinafter: OAS) in an attempt to resolve the dispute through peaceful negotiation. On 8 November 2000, Belize and Guatemala signed an Agreement on Confidence Building Measures, which provided a framework for managing disagreements and preventing incidents in the adjacency zone (a buffer zone extending 1 km. east and west of the border line). In September 2002, two OAS-sponsored facilitators (one each appointed by Belize and Guatemala), presented comprehensive recommendations to both countries on how the dispute could be settled, including some adjustment to the land border and new maritime limits giving Guatemala an EEZ of some 2,000 sq nm. (The Governments of Belize and Honduras each agreed to contribute 1,000 sq nm. to this zone.) The OAS Facilitators also recommended establishing a tri-national ecological park covering coastal, insular and maritime areas of Belize, Guatemala and Honduras; and, a substantial internationally financed Development Trust Fund. Although the Belize Government publicly supported these OAS recommendations, the Guatemalan Government, citing constitutional difficulties, officially informed the OAS in August 2003 that the country could not support them. Both Governments, however, continued to work with the

Soconusco, and consequently, considers that territory an integral part of the United Mexican States. Also, the limits of the new frontier were established in this treaty. In 1961 an exchange of notes between Mexico and Guatemala was made, constituting an agreement on the establishment of an international boundary and water commission.[248]

Climate

Since Guatemala is located within the tropics and with elevations ranging between sea level and more than 13,000 f. (4,000 m,), it experiences a diversity of climates. Predominantly it is a tropical climate with some geographical variations. Thus, for example below 3,000 f. (900 m.) in elevation the average monthly temperatures range between 70°F and 80°F (21°C and 27°C) throughout the year. This may be contrasted with the highlands where between 3,000 f. and per(N)]T-dese thastdi rangipron ilTj-ear.0.0008 Tc 5.

One critical factor in the climate is the occurrence of severe tropical storms, especially during the months of September and October, which often deluge the country with damaging floods. Strong winds accompanying these storms, as well as winter invasions of cold air, occasionally place crops at risk. Hurricane Mitch, one of the deadliest tropical hurricanes ever in the Atlantic Ocean, which brutally struck nearby Honduras and Nicaragua in October 1998, also caused extensive damage in Guatemala, displacing nearly 100,000 people.[250]

On the positive side, one of the most important things in the country is the rich biodiversity. The country has 14 ecoregions ranging from Mangrove Forests, to both ocean littorals with 5 different ecosystems. Guatemala has 252 listed wetlands, including 5 lakes, 61 lagoons, 100 rivers and 4 swamps. Of international significance is Tikal National Park, declared a National Park on 26 May 1955, having originally been established as a national monument in 1931. Tikal National Park was accepted as a United Nations Educational, Scientific and Cultural Organization (hereinafter: UNESCO) World Heritage site in 1979.[251] Tikal National Park and *Laguna del Tigre* (a Ramsar site) are located in the department of Petén within the Maya Biosphere Reserve of 2,112,940 ha, making it the second largest forest in Central America after Bosawas (northern part of Nicaragua). Guatemala iGuatemar08 Tc 0e Tw -mous in ses

Histórico) was established on June 23, 1994, as a part of a Peace Agreement between the Guatemalan Government and the Revolutionary National Unity of Guatemala, and the Accord for Firm and Lasting Peace was signed in 1996. In 1999 this Truth Commission found that 93% of human rights abuses during the war had been instigated by the security forces. The total number of people killed was over 200,000, 83% of the victims were Mayan and 17% were Ladinos. In 2000 and 2004 the Guatemalan State formally admitted guilt in several human rights crimes, paying damages to the victims. Regrettably, only a small number of the military personnel found to be responsible for the atrocities have been so far been prosecuted.[256]

Today, Guatemala is a relatively fragile democracy and a slow political and economic recovery continues into the early 21st century. Elections have been held regularly since 1996, but, because there are many political Parties, which tend to be small and short-

and, includes a catch of crustaceans, especially shrimp and such fish as tuna, snapper and mackerel, most of the catch is exported.[265]

Guatemala is a member of thr

In terms of the Oxford Poverty and Human Development Initiative (OPHI) and the Human Development Report Office of the UNDP, Guatemala places at number 116 in the Multidimensional Poverty Index, in the medium human development category.[270]

[270] For more information about the Multidimensional Poverty Index, refer to: Human Development Reports, at: http://hdr.undp.org/en/statistics/mpi
To see Guatemala's rank in the Index, refer to:
http://hdr.undp.org/en/media/HDR_2010_EN_Table5_reprint.pdf

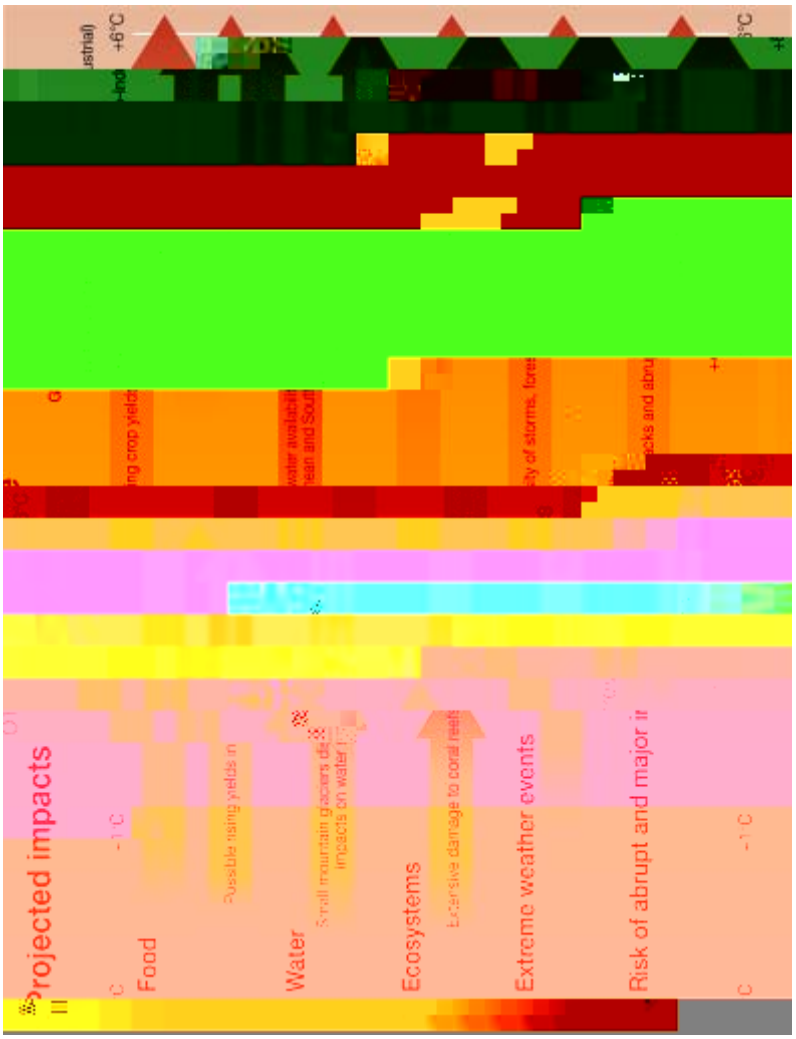
APPENDIX II – SUPPLEMENTARY FIGURES/TABLES

Table 1. Map of Drought Treat in Guatemala

Source: MARN::
http://www.sia.marn.gob.gt/aplicaciones/MARNIA/indexGIS.html

Reference: Footnote No 8, pp 12

Figure 1. Projected Impacts of Climate Change



Source: Stern Review, see: http://maps.grida.no/go/graphic/projected-impact-of-climate-change

Reference: Footnote No 36, pp 22

Table 2. UNFCCC Annex I and Annex II Countries List

Annex I Countries

Australia, Austria, Belarus, Belgium, Bulgaria, Canada, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Monaco, New Zealand, Norway, Poland, Portugal, Romania, Russian Federation, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, United Kingdom, United States of America and the European Union.

Annex II Countries

Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, United States of America and the European Union.

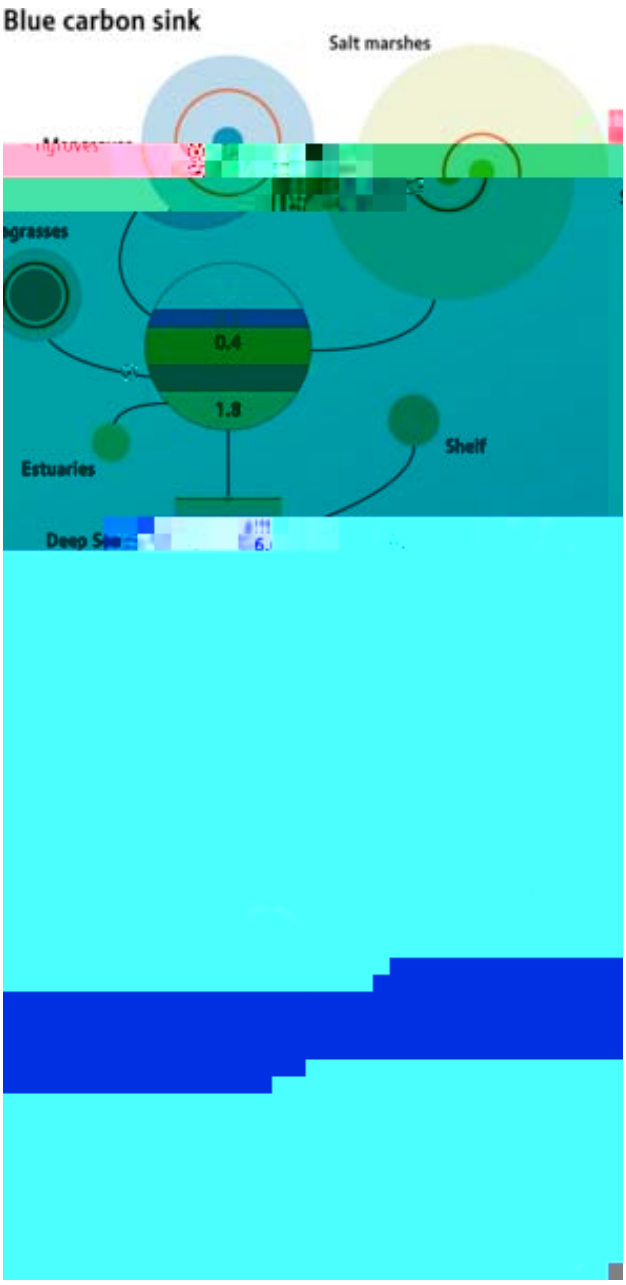
Reference: Footnote No 48, pp. 28

Figure 2. Atmospheric Circulation Patterns

Source: Blue Carbon - The Role of Healthy Oceans in Binding Carbon, see: http://maps.grida.no/go/graphic/atmospheric-circulation-patterns1

Reference: Footnote No 66, pp. 34

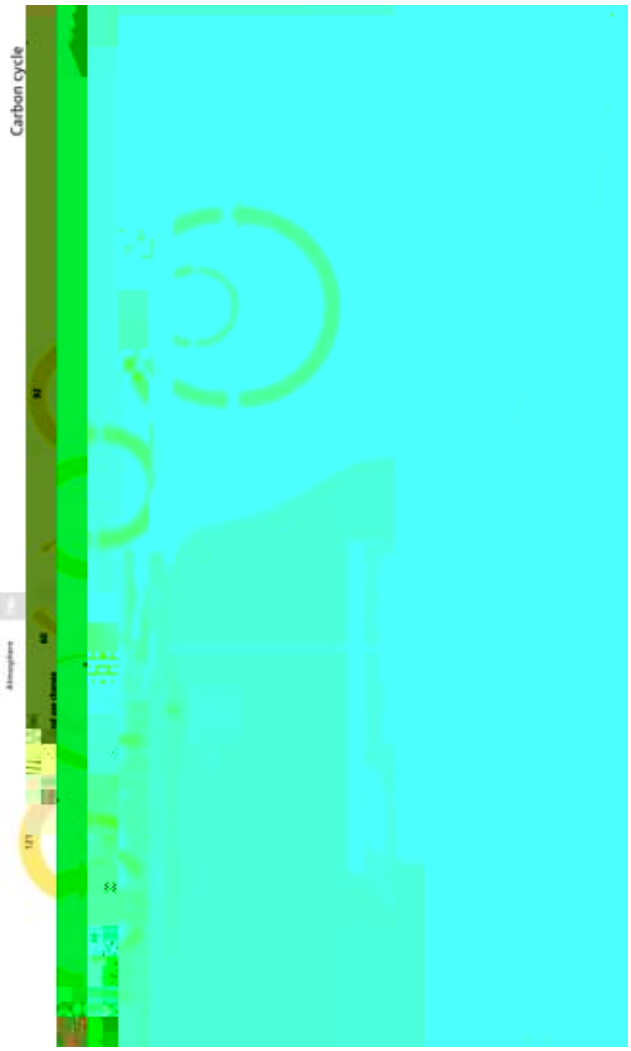
Figure 3. Blue Carbon Sinks



Source: Blue Carbon - The Role of Healthy Oceans in Binding Carbon, see: http://maps.grida.no/go/graphic/blue-carbon-sinks

Reference: Footnote No 74, pp. 37

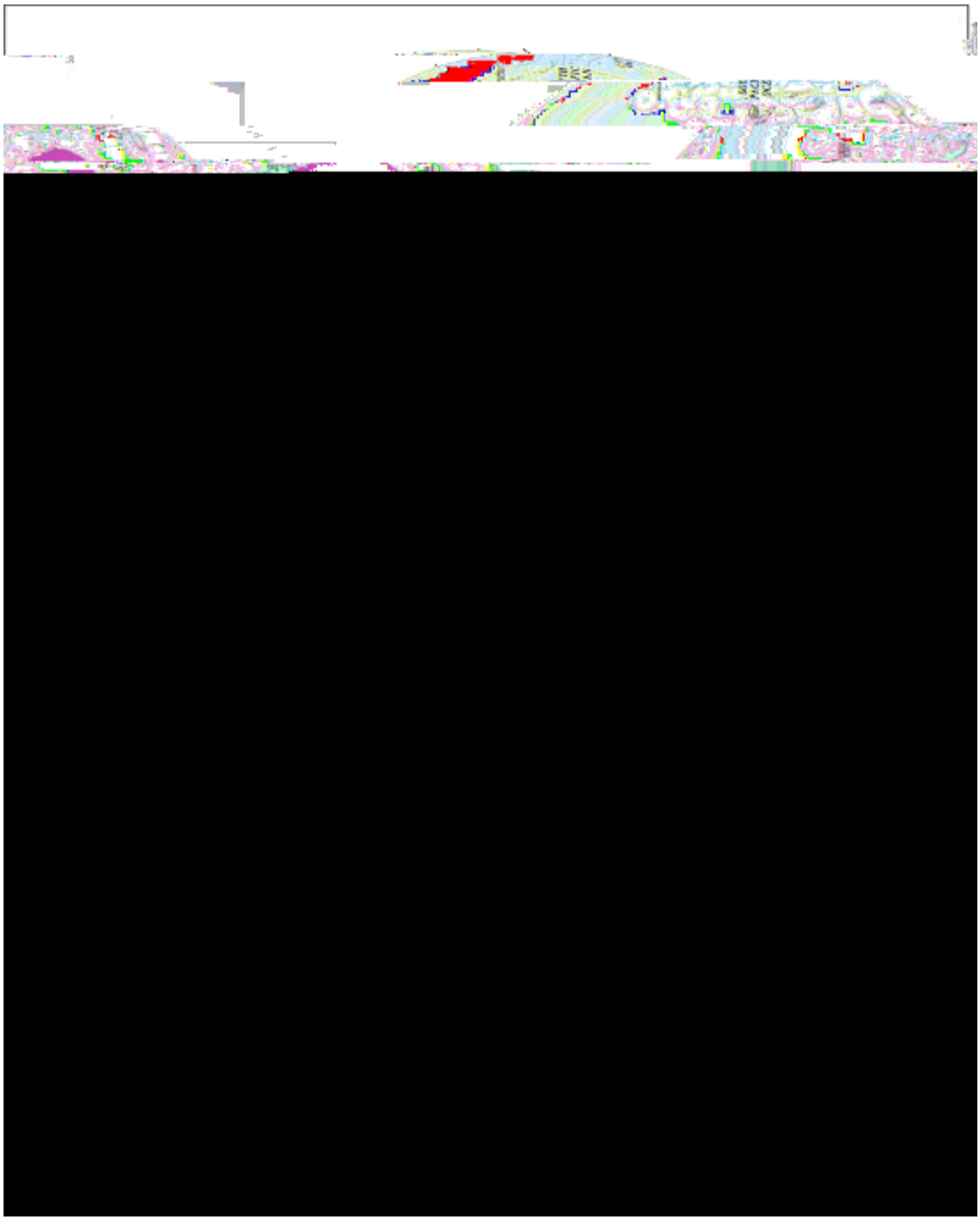
Figure 4. The Carbon Cycle and the Blue Carbon: The Role of Healthy Oceans in Binding Carbon



Source: Blue Carbon - The Role of Healthy Oceans in Binding Carbon, see: http://maps.grida.no/go/graphic/carbon-cycle1

Reference: Footnote No 78, pp. 38

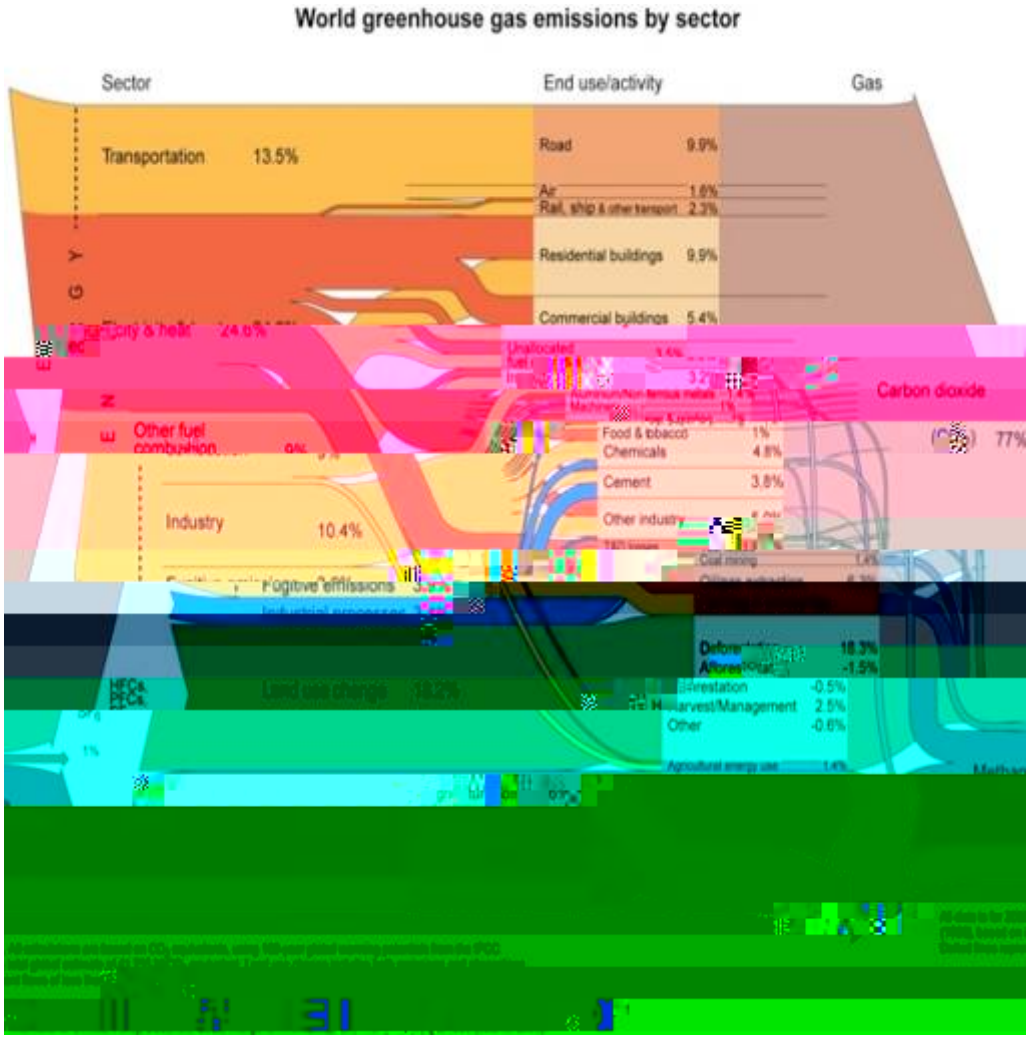
Figure 5. Maritime Boundaries of the World



Source: Dr. Ronán Long, Jean Monnet Chair of European Law, School of Law, National University of Ireland, Galway, Ireland.

Reference: Footnote No 90, pp. 42

Figure 6. World Greenhouse Gas (GHG) Emissions by Sector



APPENDIX III – CONFERENCE OF THE PARTIES (COP) TO THE UNFCCC

Each of the COPs will now be briefly examined.

COP 1: Berlin, Germany (Berlin Mandate)

March 1995 - At the first COP, several

This was a pragmatic approach and in many ways continues to reflect the concerns of the United States to this day.

COP 3: Kyoto, Japan (Kyoto Protocol to the UNFCCC)[272]

Action.[275] The focus of this Action Plan was to advance efforts and to devise mechanisms for implementing the Kyoto Protocol to the UNFCCC. Initially, the target was to complete this objective by 2000. During COP 4, Argentina and Kazakhstan expressed their commitment to take on the GHG emissions reduction obligation and they became the first two non Annex countries to do so.

COP 5: Bonn, Germany[276]

October 1999 - The COP 5 was primarily a technical meeting, and did not reach major conclusions regarding the legal and substantive detail of the blueprint for combating climate change.

COP 6: The Hague, Netherlands[277]

November 2000 - During COP 6, the discussions evolved rapidly into a high level negotiation over the major political issues. These included a major controversy over the United States proposal to allow credit for carbon "sinks" in forests and agricultural lands, satisfying a major proportion of the United States emissions reductions in this way. Moreover, there was disagreement over consequences for non compliance by countries that did not meet their emission reduction targets; and difficulties in resolving how developing countries could obtain financial assistance to deal with adverse effects of climate change and still meet their obligations to plan for measuring and possibly reducing GHG emissions. In the final hours of COP 6, despite some compromises agreed between the United States and some European Union countries, notably the United Kingdom, the European Union countries as a whole, led by Denmark and Germany, rejected the compromise positions, and the talks in The Hague collapsed. Jan Pronk, the President of COP 6, suspended it without agreement, with the expectation that negotiations would

275

later resume.[278] As a follow-on, it was later announced that the COP 6 meetings (termed "COP 6-2") would be resumed in Bonn, Germany in 2001.

COP 6-2: Bonn, Germany[279]

July 2001 - During COP 6-2 the United States delegation to this meeting declined to participate in the negotiations related to the Kyoto Protocol to the UNFCCC; and, chose to act as observers at that meeting. As the other Parties negotiated the key issues, agreement was reached on most of the major political issues, to the surprise of most observers given the low level of expectations that preceded the meeting.

The agreements included:
a) Flexible Mechanisms;
b) Carbon Sinks;
c) Compliance; and
d) Financing.

COP 7: Marrakech, Morocco (Marrakech Accords)[280]

October 2001 - During COP 7 the negotiators completed the work of the Buenos Aires Plan of Action, finalizing most of the operational details and setting the stage for nations to ratify the Kyoto Protocol to the UNFCCC. The completed package of decisions and measures are now commonly known as the Marrakech Accords. In line with their previous position at the UNFCCC, the United States delegation continued to act as an observer, declining to participate in active negotiations. Other Parties continued to express their hope that the United States would re engage in the process at some point, but indicated their intention to seek ratification of the requisite number of countries to bring the Kyoto Protocol into force (55 countries representing 55% of

[278] John Hickman & Sarah Bartlett, Berry College. Global Tragedy of the Commons at COP-6, refer to: Greens.org, at: http://www.greens.org/s-r/24/24-26.html
[279] For the list of COP 6-2 decisions, refer to: http://unfccc.int/meetings/bonn_jul_2001/session/6275/php/view/decisions.php
[280] For the list of COP 7 decisions, refer to: http://unfccc.int/meetings/marrakech_oct_2001/session/6273/php/view/decisions.php

developed country emissions of CO_2 in 1990). A target date for bringing the Kyoto Protocol into force was put forward, which was the World Summit on Sustainable Development (WSSD) to be held in Johannesburg, South Africa in 2002.

Briefly stated, the main decisions at COP 7 included:

a) Operational rules for international emissions trading among Parties to the Kyoto Protocol and for the Clean Development (CDM) and Joint Implementation Mechanisms;

b) A compliance regime that outlined consequences for failure to meet emissions targets but deferred to the Parties to the Kyoto Protocol, once it came into force, the decision on whether those consequences would be legally binding;

c) Accounting procedures for the flexibility mechanisms; and

d) A decision to consider at COP 8 how to achieve a review of the adequacy of commitments that might lead to discussions on future commitments by developing countries. This was a major ac

COP 9: Milan, Italy[285]

of the Kyoto Protocol beyond its 2012 expiration date and with a view to negotiating deeper cuts in GHG emissions.

COP 12/ CMP 2: Nairobi, Kenya[288]

November 2006 - In the COP 12/CMP 2 some progress was made in the areas of support for developing countries and the Clean Development Mechanism (CDM). The Parties adopted a five year plan of work to support climate change adaptation by developing countries; and, agreed on the procedures and modalities for the Adaptation Fund. They also agreed to improve the projects for CDM. As an aside it should also be mentioned that at this meeting, the phrase “climate tourists” was first coined by the Non-Governmental Organizations (NGO) to describe some delegates who attended the conference as mere tourist instead of working at the summit.

COP 13/ CMP 3: Bali, Indonesia (Bali Action Plan)[289]

December 2007 - COP 13 had a very high political and media profile. The COP 13/CMP 3 agreement, on a timeline and structured negotiation on the post 2012 framework, the end of the first commitment period of the Kyoto Protocol to the UNFCCC, was achieved with the adoption of the Bali Action Plan. The Ad Hoc Working Group on Long term Cooperative Action under the UNFCCC (AWG-LCA) was established as a new subsidiary body to conduct the negotiations aimed at urgently enhancing the implementation of the UNFCCC up to and beyond 2012.

COP 14/CMP 4: Poznan, Poland[290]

December 2008 - In the COP 14/CMP 4 delegates agreed on principles for the financing of a fund to help the poorest nations cope with the effects of

[288] For the list of COP 12 decisions, refer to:
http://unfccc.int/meetings/nairobi_nov_2006/session/6267/php/view/decisions.php
[289] For the list of COP 13 decisions, refer to:
http://unfccc.int/meetings/bali_dec_2007/session/6265/php/view/decisions.php
[290] For the list of COP 14 decisions, refer to:
http://unfccc.int/meetings/poznan_dec_2008/session/6264/php/view/decisions.php

climate change and they approved a mechanism

COP 16/CM 6: Cancún, México[295]

November 2010 - In the COP 16 in Cancún, the three-page “Accord” from Copenhagen became a thirty-page document[296] that reiterated and expanded on what was agreed the year before in Denmark and also gave it legal status. Nonetheless, there was no agreement on a long term emission reduction target or a peak year for global emissions. There was also little progress on a successor to the Kyoto Protocol to the UNFCCC. So, to make a long story short, if no significant progress is made in the next COP 17 in Durban, South Africa in November 2011, the result could be that the Kyoto Protocol to the UNFCCC may simply be abandoned in 2012 and the international community can simply not afford such an outcome. With so much invested, so much at stake, and so much more to do, there is no turning back.

[295] For the list of COP 16 decisions, refer to: http://unfccc.int/meetings/cancun_nov_2010/session/6254/php/view/decisions.php

[296] Decision 1/CP.16, at: http://unfccc.int/resource/docs/2010/cop16/eng/07a01.pdf#page=2