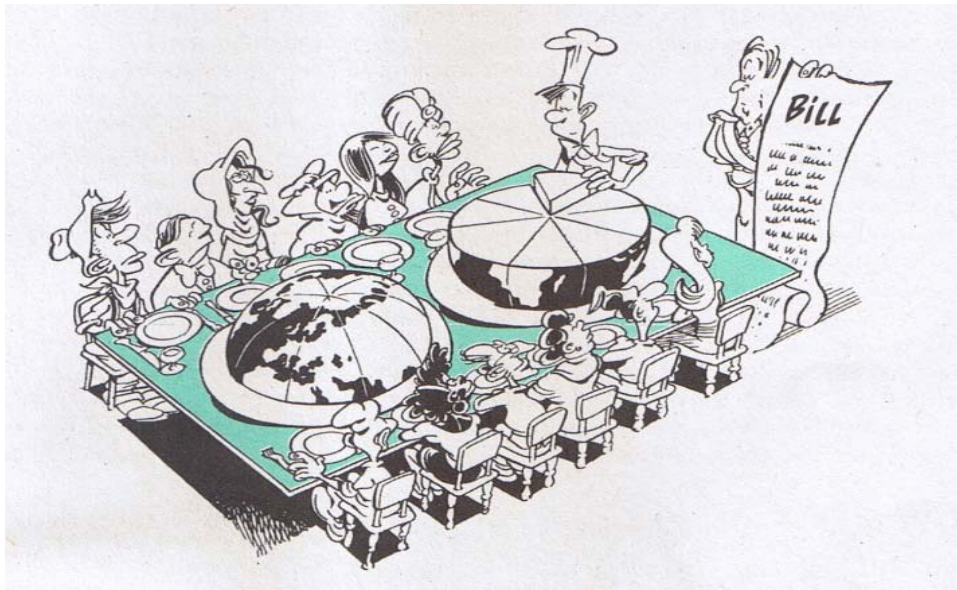


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UNDERSTANDING CLIMATE CHANGE

Developing a Policy for Papua New Guinea



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Developing a Policy for Papua New Guinea

by

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ACRONYMS

AOSIS	Alliance of Small Island States
BOM	Bureau of Meteorology
CBD	Convention on Biological Diversity
CDM	Clean Development Mechanism
CFC	Chloro-Fluoro-Carbon
COP	Conference of the Parties
CSIRO	Commonwealth Scientific Industrial Research Organization
DNA	Designated National Authority
EU	European Union
FAR	Fourth Assessment Reports
GHG	Greenhouse Gas
IET	International Emissions Trading
INC	Intergovernmental Negotiations Committee
IPCC	Intergovernmental Panel on Climate Change
JI	Joint Implementation
KP	Kyoto Protocol
NAS	National Academy of Sciences
NEF	New Economics Foundation
NGO	Non-Government Organization
OECD	Organization for Economic Cooperation and Development
PC	Productivity Commission
PNG	Papua New Guinea
RCEP	Royal Commission on Environmental Pollution
REDD	Reduced Emission on Deforestation and Degradation
SAR	Second Assessment Reports
SLR	Sea Level Rise
SPREP	Secretariat of the Pacific Regional Environment Programme
TAR	Third Assessment Reports
UNCCD	United Nations Convention to Combat Desertification
UNCED	United Nations Conference on Environment and Development
UNDP	United Nations Development Program
UNEP	United Nations Environment Program
UNFCCC	United Nations Framework for Climate Change Convention
USA	United States of America
WMO	World Meteorological Organization

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Thanks are also due to Professor Chalapan Kaluwin and Associate Professor Simon Saulei for preparing this background paper to provide a basic platform for understanding climate change issues and suggesting a comprehensive approach policy, as a way forward for Papua New Guinea.

SUMMARY

This paper provides the background information that will help in understanding of the complexities of climate change issues, as a global problem, and how governments and international groups can attempt to find solutions to this challenge. It especially discusses ways in which Papua New Guinea can develop its own specific policies.

The report looks at the root cause of the climate change problems and asks the following five (5) considered important questions:

- As scientists and their governments foresee a real risk that the climate will change rapidly and drastically over the forthcoming decades and centuries, can we handle it?
- If the consequences of a problem are uncertain, do we ignore the problem or do we do something about it?
- It's not fair! If we say that when a giant asteroid hits the Earth, it's nobody's fault, can the same be said about global warming?
- If the whole world starts consuming more and living the good life, can the planet stand the strain?
- Who has the energy, time, or money left to deal with climate change, when we have so many other problems?

In responding to these challenges, the development of the United Nations Framework on Climate Change Convention (UNFCCC) and the Kyoto Protocol, as international laws and policies, which are linked with other treaties, are used to address these challenges at the national level.

At the national level, the government is exploring ways to deal with this issue and continues to take the lead in annual international forums, through the UNFCCC. For example, taking the lead in exploring ways in using our natural forest and its resources for economic incentives (known as Reduced Emission on Deforestation and Degradation-REDD), adaptation issues, and doing scientific research and inventory.

As there is no national climate change policy which should provide a way forward in managing the challenges and resources in Papua New Guinea, this paper suggests a comprehensive approach policy, as a way forward.

CHAPTER 1: INTRODUCTION

Climate change is a very complex issue that cuts across many boundaries. It includes the involvement of human beings and population growth in the exploitation of natural resources, which, in turn, has impacted on sustainable development measures in the social, environmental, and economic sectors. This has caused an imbalance in energy distribution in the world, which has led to atmospheric pollution and a resultant increase in temperature, as a measure of energy balance.

Before one can understand the context of climate change and policy development for Papua New Guinea, it is necessary to briefly explain the background to the expressions and terminology of the greenhouse gases and global warming.

What Is the Greenhouse Effect?

To maintain a long-term balance, the Earth must shed energy into space at the same rate at which it absorbs energy from the sun. Solar energy arrives on the Earth in the form of short-wavelength radiation. Some of this radiation is reflected away by the Earth's surface and atmosphere. However, most of it passes through the atmosphere to warm the earth's surface. The Earth gets rid of this energy; that is, sends it back into space, in the form of long-wavelength, infra-red radiation.

Most of the infra-red radiation that is emitted upwards by the earth's surface is absorbed in the atmosphere by water vapor, carbon dioxide, and the other naturally occurring 'greenhouse gases'. These gases prevent energy from passing directly from the surface out into space. Instead, many interacting processes, including radiation, air currents, evaporation, cloud formation, and rainfall, transport the energy high into the atmosphere. From there, it can radiate into space. This slower, natural, more indirect process is fortunate for us because, if the surface of the Earth could radiate energy directly into space, unhindered, the Earth would be a cold, lifeless place — a bleak and barren planet, rather like Mars. Temperatures would be approximately minus 14°C.

Increasing the atmosphere's ability to absorb infra-red energy, by increasing our greenhouse gas emissions, especially through energy and forestry activities, means that we are disturbing the way that the climate maintains this balance between incoming and outgoing energy. A doubling of the concentration of long-lived greenhouse gases (which is projected to occur early in the next century) would, if nothing else changed, reduce the rate at which the planet can shed energy into space by some two percent. Energy cannot simply accumulate. The climate will somehow have to adjust to get rid of the extra energy. While two percent may not sound very much, over the entire Earth that amounts to trapping the energy content of some three million tonnes of oil every minute.

Scientists point out that we are altering the energy 'engine' that drives the climate system. Something has to change to absorb the shock. Global warming is a journalist's explanation of the greenhouse effect, meaning 'the sharp increase of the greenhouse gas concentration in a short period leading to the temperature increase throughout the entire planet'.

CHAPTER 2: THE GLOBAL PERSPECTIVE

Science Explains

In early 1987, numerous international scientific conferences had issued urgent calls to address the serious problems of climate change. The United Nations Environment Program (UNEP) and the World Meteorological Organization (WMO) sponsored and set scientific groups, such as the Intergovernmental Panel on Climate Change (IPCC), to start the process of preparing reports and a treaty.

Every five years, the IPCC scientists meet and produce technical reports on the climate change issues and advise the governments on the future trends and consequences. The Second Assessment Reports (SAR, 1995), Third Assessment Reports (TAR, 2001), and Fourth Assessment Reports (FAR, 2007) concluded that global warming has taken place over the past 100 years. However, there is new, convincing evidence that most of the warming over the last 50 years can be attributed to human activities. It was noted that the 1990s was the warmest decade in the last 1000 years, at least in the Northern Hemisphere. Other observations consistent with global warming included increases in global average sea level and ocean heat content, and decreases in snow cover and ice in the mountain glaciers and sea ice.

The FAR (2007) reaffirm that global warming has taken place over the 100 years, as a result of high confidence (> 90%) in that new data and information, and attributes the strong warming to human (anthropogenic) activities. This is supported by model projections using very reliable data and information in regions, and from individual countries, including Papua New Guinea.

The following important summaries have been extracted from the Intergovernmental Panel on Climate Change Report 2007. This report elaborates further through the discussions and potential impacts on Papua New Guinea (PNG).

Human and Natural Influences of Climate Change

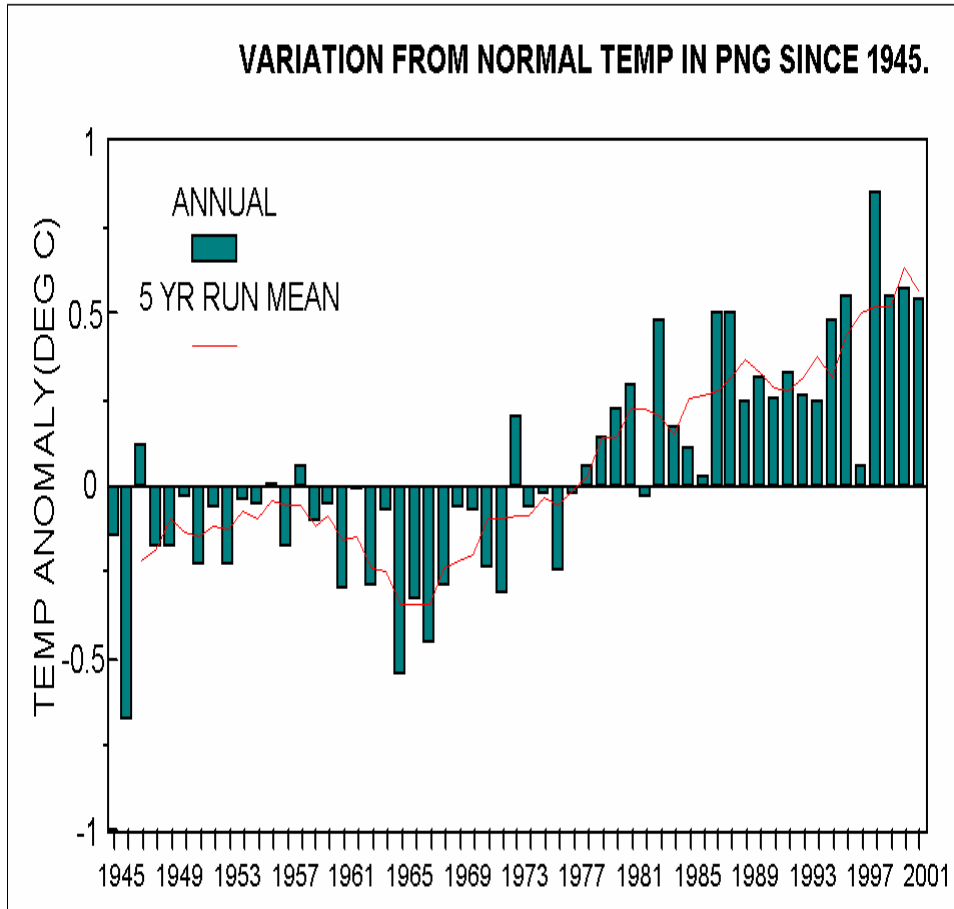
There is sufficient evidence to show that human and natural activities, separately or collectively, continue to influence climate change. The following are important observations:

- human and natural activities continue to change climate systems, and the abundance of greenhouse gases (carbon dioxide, methane, water vapor, and nitrous oxide) and aerosols (volcanic dusts, etc.) in the atmosphere has altered the energy balance of the climate systems;
- the measure of incoming and outgoing energy in the earth's atmosphere strongly indicates that the earth's surface is steadily warming up;

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- the global carbon dioxide, methane, and nitrous oxide levels have increased since 2005;
- the primary source of the increased carbon dioxide concentration, since pre-industrial periods, is from the use of fossil fuels, followed by land use, which has made a smaller contribution; and
- the understanding of the anthropogenic warming and cooling influence on climate has improved since the TAR (2001) dealing to very high confidence.

Figure 1: PNG Temperature Changes Showing Similar Trends for All Parts of the Region and Globally, 1945–2001



Source: PNG National Weather Service

Potential Impacts for Papua New Guinea

The scientific summary and conclusions of FAR (2007) provide, and reaffirm, strong evidence that global, regional, and national changes result from climate change, variability, and sea level rise, and are caused by human and natural activities. The research that has been conducted, and the scientific data and information that have been collected in Papua New Guinea and the Pacific, on land and oceans and in the atmosphere over the past ten years have contributed to the improved scientific understanding of climate change and variability and sea level changes.

These scientific assessments point to climate change and natural variability in the short term (5–10 years) to long term (20–100 years), that will have greater impacts on the country's economic, social, environmental, and traditional and cultural sectors, especially in the following areas:

- energy, petroleum and mining;
- ecosystems and conservation — wetlands, coastal and marine, forests, woodlands, and grasslands;
- forestry, fisheries, and agriculture;
- land use;
- ocean and land biodiversity;
- water supply and hydrology;
- settlements and industry;
- people, population, and health in different parts of the country; and
- atoll islands, and coastal and river areas will be severely impacted as a long-term issue.

Observations of Recent Climate Change

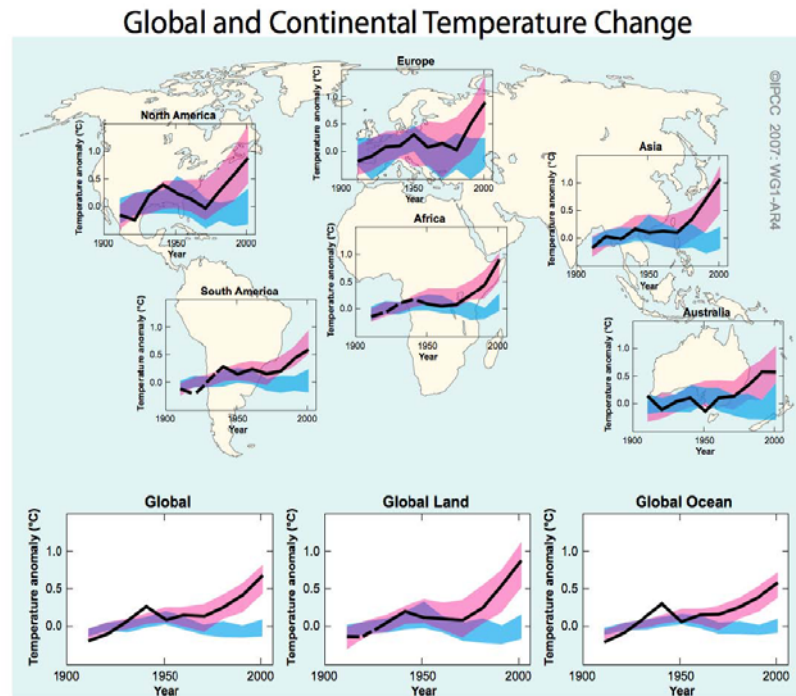
Recent scientific observations and research on climate change over the past 10 to 15 years provide the following data:

- the warming of the climate system is unequivocal, as is now evident from observations of the increase in global average air and ocean temperatures, widespread melting of snow and ice, and the rising sea level;
- eleven of the twelve years from 1995 to 2006 rank the warmest years on record, since 1850;
- glaciers and snow cover have declined and now contribute to sea level rise (SLR);
- the global average sea level rose to an average of 1.8mm/year. However, the rate was approximately 3.1mm/year between 1993 and 2006. Thermal expansion and glacier and ice caps are major contributors to sea level rise;
- at the continental, regional, and ocean basins, a number of long-term changes in climate have been observed, including intensity of cyclones, heat waves, droughts, and extreme weather; and

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- more intense and longer droughts have been observed over a wide area, particularly in the tropical and subtropical regions.

Figure 2: Global and Continental Temperature Changes



Source: IPCC, FAR (2007).

These temperature changes in the world closely match those in Papua New Guinea and other Pacific countries in the region.

Potential Impacts for Papua New Guinea and Its Neighbors

The following impacts are assessments from the recent climate change and include:

- over the past 10 to 15 years, there is strong evidence of increases in temperature of the atmosphere and oceans, and sea level rise in Papua New Guinea's provinces and the Pacific;
- the major contributors to sea level change will be the thermal expansion of oceans and ice caps melting, which will adversely impact on the atoll islands in the New Guinea Islands, Milne Bay, Western, and Gulf Provinces, the Momase region, and other coastal areas of the country;
- El Niño and La Nina signals will continue to increase their frequency, intensity and impacts on the entire country, especially on food security;

- there will be major climatic influences in the country and region which will impact on the economic, social, and environmental sectors of the densely populated parts of the country;
- more intense and longer droughts in Papua New Guinea and Pacific countries;
- the frequency and intensity of cyclones, heat waves, flooding, and extreme climatic conditions will be experienced; and
- provinces in the Highlands Region will be impacted severely in light of long-term and short-term droughts, especially for populated areas, and malaria and health issues will be a challenge.

Understanding and Attributing Climate Change

The improved scientific understanding of climate change and natural variability has challenged everyone to appreciate the contribution and impact of climate change, as global, regional and national issues:

- the observed increase in global average temperature since the mid-20th Century is likely the result of the increase in anthropogenic GHG concentrations. This information is more advanced than that in the IPCC Third Assessment Reports (2001);
- discernible human influence now extends to other aspects of climate, ocean warming, extreme temperatures, and wind patterns;
- it has been concluded that increases in GHG concentrations, alone, could cause more warming than the observed because volcanic and anthropogenic aerosols have offset some warming;
- further, the FAR (2007) estimate that approximately 5.8 Gt CO₂ is released annually into the atmosphere from global deforestation. Therefore, unless there is action to reduce emissions from deforestation, some 30 Gt CO₂ may be released into the atmosphere between 2008 and 2012;
- warming of the climate system has been detected in the changes in surface and atmospheric temperatures, and temperatures in the upper several hundred metres of the oceans, and this has contributed to sea level rise;
- it is understood that anthropogenic forcing is likely to have contributed to changes in wind patterns, and this has affected extra-tropical storm tracks and temperature patterns in both hemispheres; and
- climate models, coupled with observations and research, have enabled one to assess the likely range for climate sensitivity for the first time and provide increased confidence in the understanding of the climate system response to radiative forcing.

Impacts on Papua New Guinea

It is now a challenge for Papua New Guinea and the rest of the world who have increased the carbon dioxide, methane, nitrous oxides, and other greenhouse gas concentrations to seriously reduce the levels by developing and applying climate change and mitigation policies at national levels:

8 *Understanding Climate Change*

- the impacts of climate change are extended to oceans, extreme temperatures, and wind patterns;
- volcanoes and their aerosols continually contribute to offsetting some warming in the country;
- GHG levels and concentrations continue to increase as a result of petroleum, gas, and mining activities, forestry, waste, energy, and technology, and ocean contributions;
- very little has been done in the area of climate models in Papua New Guinea and the region to improve our understanding of climate change, variability, and sea level rise;
- risk assessment and monitoring on climate change, variability, and extreme events in Papua New Guinea are priorities; and
- the need for climate change, variability, and sea level rise policies is important for the country.

Projections of Future Changes in Climate

Models depend on quality data and information. The models used in the FAR (2007) have suggested that, in the next two decades, a warming of approximately 0.2°C per decade is projected for the emission scenarios. If the concentrations of all greenhouse gases and aerosols had been kept constant, at year 2000 levels, a further warming of about 0.1°C per decade could have been expected:

- advancement in models for GHG emission, at or above current rates, will cause further warming and induce many changes in global climate system during the 21st Century that could likely be larger than those observed;
- the models for temperature changes compare very well with the sea level rise measurements on a global level;
- most models do not include uncertainties in climate-carbon cycle feedback, nor do they include the full effects of changes in ice sheet flow, because of lack of data;
- an increase in atmospheric CO₂ concentrations will lead to increasing acidification of the oceans. The average global pH in oceans will be between 0.14 and 0.35 units during the 21st Century;
- past and future anthropogenic carbon dioxide emissions will continue to contribute to warming and sea level rise for more than a millennium, because of the time required to remove this gas from the atmosphere;
- there is now higher confidence in projected patterns of warming and other regional-scale features, including changes in wind patterns, precipitation, and some aspects of extremes and ice. Warming is expected to be greatest over land—highest in northern latitudes and least over the southern oceans;
- the range of models indicates that future tropical cyclones will most likely become more intense, with high wind speed, more heavy precipitation, and ongoing increases of tropical sea surface temperature;
- with confidence in modeling, temperatures are likely to increase by approximately 5°C by 2100; and

- anthropogenic warming and sea level rise will continue for centuries because of the timescales associated with climate processes and feedback, even if the GHG concentrations were to be stabilized in 2100.

Potential Impacts on Papua New Guinea

The following impacts are important potential projections for climate change, variability, and sea level rise in the Papua New Guinea, including:

- the GHG level in the atmosphere will continue to increase during the next 100 years as countries like Papua New Guinea will also contribute, being an oil and gas, forest, and land use change producing country;
- the melting of the ice caps and the thermal expansion of the oceans are the main contributors to sea level rise in Papua New Guinea and the Pacific Region. Provinces such as Bougainville, Manus, East Sepik, Milne Bay, Central, Gulf, Western, East New Britain, and others are now being impacted;
- climatic data for Papua New Guinea and the Pacific Region are still scant and the need for better modeling for future projections is essential;
- the range of models indicates that future tropical cyclones will most likely become more intense, with high wind speed, more heavy precipitation, and ongoing increases of tropical sea surface temperature in Papua New Guinea and neighboring countries;
- the climate change and variability will impact the whole country, but will be heavily felt by the New Guinea Islands, Milne Bay, Gulf, Central, East Sepik, Sandaun, and Western Provinces; and
- the occurrence of drought and frost in the Highlands provinces will be more frequent and impact will be difficult to forecast.

Summary

Climate change, variability, and sea level rise are global issues that pose a real challenge to Papua New Guinea and its provinces, for the short term and long term, as stated by the IPCC-FAR conclusions and supported by Papua New Guinean studies.

The El Niño and La Nina phenomena and climate variability are still the most serious signals in Papua New Guinea and the Pacific Region and will continue to have adverse impacts on economic, environmental, and social sectors, in the short term and long term, especially on the population of the country.

Climate change and variability issues must be streamlined to address Papua New Guinea's economic, environmental, and social sectors. If these issues are not managed accordingly, it will be a potential disaster in the long term for the country. Mitigation plans must be promoted through all stakeholders. Government institutions such as the Ministries of Works, Transport and Civil Aviation, Inter-Government Relations, Mining, Petroleum and Energy, Forest, Agriculture and Livestock, Education, Treasury and

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Finance, and National Planning, Monitoring, and District Planning, and the Department of Environment and Conservation must incorporate climate change and variability in all their policies.

There is an urgent need for a national climate change policy framework and programme of actions to be developed and implemented by all.

CHAPTER 3: THE GLOBAL RESPONSE

To overcome these major problems, what type of responses do we need to address this global challenge?

Scientific Assessment and Response

Given the scientific and government assessments and debate on climate change and variability over the years, it has become very clear that the world is now facing a great challenge from climate change and its impacts. The summary conclusions are:

- greenhouse gas concentrations are still rising;
- climate has changed over the past century;
- changes point towards a human influence on climate; and
- further climate change can be expected in the future.

The following priority problems need a global response, but individual governments will need to act locally to mitigate the impacts of climate change:

1. As scientists and their governments foresee a real risk that the climate will change rapidly and drastically over the forthcoming decades and centuries, can we handle it?
2. If the consequences of a problem are uncertain, do we ignore the problem, or do we do something about it?
3. It's not fair! If we say that when a giant asteroid hits the Earth, it's nobody's fault, can the same be said about global warming?
4. If the whole world starts consuming more and living the good life, can the planet stand the strain?
5. Who has the energy, time, or money left to deal with climate change, when we have so many other problems?

Political and Governance Response

By 1990, in Geneva, an important political group — the Alliance of Small Island States (AOSIS), including Papua New Guinea — was formed during the Second World Climate Conference to address the five major problems, and especially deal with sea level rise. Other important leaders from the United Kingdom, Australia, New Zealand, France, USA, Brazil, and China, through international conferences, had issued urgent calls for a binding global treaty to address the five problems of climate change. AOSIS had membership of 43 states and observers drawn from all oceans, and regions of the world — Africa, Caribbean, Indian Ocean, Mediterranean, Pacific, and South China Sea. All of the independent states in the Pacific Region were members of AOSIS.

International Policy and Politics

United Nations Framework Convention on Climate Change (UNFCCC) Treaty

The United Nations Environment Program (UNEP) and the World Meteorological Organization (WMO) responded by establishing an intergovernmental working group to prepare for the treaty negotiations. Subsequently, the United Nations General Assembly established an Intergovernmental Negotiations Committee (INC). More than 150 states and numerous intergovernmental and non-government organizations participated in five negotiating sessions held between 1990 and 1992.

Papua New Guinea and its AOSIS group was a very influential political bloc during the INC sessions, which included other UN agreements (Biodiversity and Montreal Protocol). The major concerns of climate change and feared impacts — especially sea level rise — were the motivating forces which brought the small island states together. In addressing the five major problems, the AOSIS group was seriously negotiating ways to establish the UNFCCC treaty.

The AOSIS bloc was guided by the following principles:

- the principle of preventive action;
- the precautionary principle;
- the polluters pay principle and state responsibility;
- duty to cooperate;
- equity;
- principle of common but differentiated responsibility; and
- commitment to binding energy conservation and renewable energy sources.

In May 1992, the INC adopted the United Nations Framework Convention on Climate Change (UNFCCC). A month later it was signed by 180 states and the European Community at the UNCED Earth Summit in Brazil.

The UNFCCC is one of a series of recent agreements through which countries around the world have banded together to face this challenge. Other treaties deal with such matters as pollution of the oceans, desertification, and damage to the ozone layer, and the rapid extinction of plant and animal species. The UNFCCC focuses on something that is particularly disturbing. We are changing the way that energy from the sun interacts with, and escapes from, our planet's atmosphere. By doing that, we risk altering the global climate. Among the expected consequences are an increase in the average temperature of the earth's surface and shifts in worldwide weather patterns. Other unforeseen effects and impacts cannot be ruled out.

In 1994, the UNFCCC treaty came into force. Parties that had ratified the convention became legally bound by its term. The treaty sets out a broad framework for developing a set of targets and measures to address climate change.

The UNFCCC's Responses

In order to tackle the five main problems that had been identified, the UNFCCC prepared responses to each:

Problem 1: As scientists and their governments foresee a real risk that climate will change rapidly and dramatically over the forthcoming decades and centuries, can we handle it?

UNFCCC Response

- *The UNFCCC recognizes that there is a problem, which is a significant step forward. It is not easy for the nations of the world to agree on a common course of action, especially one that tackles a problem whose consequences are uncertain and which will be more important for our grandchildren than the present generation. The UNFCCC was negotiated and signed in a little over two years, and more than 140 states have already ratified it, and so are legally bound by it. The treaty took effect on 21 March 1994.*
- *It sets an ultimate objective of 'stabilizing greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic (human-induced) interference with the climate system'. The objective does not specify what these concentrations should be, only that they be at a level which is not dangerous. This acknowledges that there is currently no scientific certainty about what a dangerous level would be. Scientists believe it will take possibly another decade (and the next generation of supercomputers) before today's uncertainties (or many of them) are significantly reduced. The convention's objective remains meaningful, no matter how the science evolves.*
- *It directs that, 'such a level should be achieved within a timeframe sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner'. This highlights the main concerns about food production — which is probably the most climate-sensitive human activity — and economic development. It also suggests (as most climatologists believe) that some change is inevitable and that adaptive, as well as preventive, measures are called for.*

Again, this leaves room for interpretation in light of scientific findings, trade-offs, and risks that the global community is willing to accept.

Problem 2: If the consequences of a problem are uncertain, do we ignore the problem, or do we do something about it?

UNFCCC Response

- *It establishes a framework and a process for agreeing to specific actions at a later time. The officials who drafted the UNFCCC saw it as a launching pad for further*

action in the future. They recognized that it would not be possible in 1992 for the world's governments to agree on a detailed blueprint for tackling climate change. However, by establishing a framework of general principles and institutions, and by setting up a process through which governments can meet regularly, they got things started.

A key benefit of this approach is that it allows countries to begin discussing an issue even before they all fully agree that it is a problem. Even sceptical countries feel that participation is worthwhile; that is, put another way, they'd feel uneasy about being left out. This creates legitimacy for the issue, and a form of international peer pressure to take the matter seriously.

The Convention is designed to allow countries to weaken, or strengthen, the treaty in response to new scientific developments. For example, they can agree to take more specific actions, such as reducing emissions of greenhouse gases by a specified amount, through the adoption of 'amendments' or 'protocols' to the Convention.

The treaty promotes action in spite of uncertainty on the basis of a recent development in international law and diplomacy called the 'precautionary principle'. Under traditional international law, an activity generally has not been restricted or prohibited unless a direct causal link between the activity and some particular damage can be shown. However, many environmental problems, such as damage to the ozone layer and pollution of the oceans, cannot be confronted, if final proof of cause and effect is required. In response, the international community has gradually come to accept the precautionary principle, under which activities that threaten serious or irreversible damage can be restricted, or even prohibited, before there is absolute scientific certainty about their effects.

- *The Convention takes preliminary steps that clearly make sense for the time being.* Countries that ratify the Convention — called "Parties to the Convention" in diplomatic expression — agree to take climate change into account in such matters as agriculture, energy, natural resources, and activities involving sea-coasts. They agree to develop national programs to slow climate change. The Convention encourages them to share technology and to cooperate in other ways to reduce greenhouse gas emissions, especially from energy, transport, industry, agriculture, forestry, and waste management, which together, produce nearly all greenhouse gas emissions attributable to human activity.
- *The Convention encourages scientific research on climate change.* It calls for data gathering, research, and climate observation, and creates a 'subsidiary body' for 'scientific and technological advice' to help governments decide what to do next. Each country that is a party to the Convention must also develop a greenhouse gas 'inventory', which lists its national sources (such as factories and transport), and 'sinks' (forests and other natural ecosystems that absorb greenhouse gases from the atmosphere). These inventories will have to be updated regularly and made public. The information that they provide on various activities and how much of

each gas they emit will be essential for monitoring changes in emissions and determining the effects of measures taken to control emissions.

Problem 3: It's not fair! If we say that when a giant asteroid hits the earth, it's nobody's fault, can the same be said about global warming?

UNFCCC Response

- *It puts the lion's share of the responsibility for battling climate change – and the lion's share of the bill – on the rich countries.* The Convention notes that the largest share of historical and current emissions originates in developed countries. Its first basic principle is that these countries should take the lead in combating climate change and its adverse impacts. Specific commitments in the treaty relating to financial and technological transfers apply only to the 24 developed countries belonging to the Organization for Economic Cooperation and Development (OECD). The exception is *Mexico, which joined the OECD in 1994.* They agree to support climate change activities in developing countries by providing financial support above and beyond any financial assistance which they already provide to these countries.

Specific commitments concerning efforts to limit greenhouse gas emissions and enhance natural sinks apply to the OECD countries as well as to 12 economies in transition (Central and Eastern Europe and the former Soviet Union). Although negotiations left the treaty language less than clear, it is generally accepted that the OECD and transition countries should, as a minimum, seek to return, by 2000 (date agreed in 1991-2 during the INC negotiations), to the greenhouse gas emission levels which they had in 1990.

- *The Convention recognizes that poorer nations have a right to economic development.* It notes that the share of global emissions of greenhouse gases originating in developing countries will grow as the countries expand their industries to improve social and economic conditions for their citizens.
- *It acknowledges the vulnerability of poorer countries to the effects of climate change.* One of the Convention's basic principle is that the special needs and circumstances of developing countries should be given 'full consideration' in any actions taken. In particular, this applies to those countries whose fragile ecosystems are highly vulnerable to the impacts of climate change. The Convention also recognizes that states which depend on income from coal and other fossil fuels would face difficulties, if energy demands changes. Papua New Guinea and AOSIS were instrumental in negotiating this very concern as a long-term and a survival issue.

Problem 4: If the whole world starts consuming more and living the good life, can the planet stand the strain?

UNFCCC Response

- *UNFCCC supports the concept of 'sustainable development'.* Somehow, mankind must learn how to alleviate poverty for huge and growing numbers of people without destroying the natural environment on which all human life depends. Somehow, a way has to be found to develop economically in a fashion that is sustainable over a long period of time. The buzzword for this challenge among environmentalists and international bureaucrats is 'sustainable development'. The way forward will be to find methods for living well, while using critical, natural resources at a rate no faster than that at which they are replaced. Unfortunately, the international community is a lot further along in defining the problems posed by sustainable development than it is in figuring out how to solve them.
- *The Convention calls for developing and sharing environmentally sound technologies and know-how.* Technology will clearly play a major role in dealing with climate change. If we can find practical ways to use cleaner sources of energy, such as solar power, we can reduce the consumption of coal and oil. Technology can make industrial processes more efficient, water purification more viable, and agriculture more productive, using the same amount of resources. Such technology must be made widely available. It must somehow be shared by the richer and more scientifically advanced countries with poorer countries that have great need of it.
- *The Convention emphasises the need to educate people about climate change.* Today's children and future generations must learn to look at the world in a different way than it has been looked at by most people during the 20th Century. This is both an old and a new idea. Many (but not all!) pre-industrial cultures lived in balance with nature. Now, scientific research is telling us to do much the same thing. Economic development is no longer a case of 'bigger is better' — bigger cars, bigger houses, bigger harvests of fish, bigger reserves of oil and coal. We must no longer think of human progress as a matter of imposing ourselves on the natural environment. The world — the climate and all living things — is a closed system. What we do has consequences that eventually come back to affect us. Tomorrow's children — and today's adults, for that matter — will have to learn to think about the effects of their actions on the climate. When they make decisions as members of governments and businesses, and as they go about their private lives, they will have to take the climate into account.

In other words, human behavior will have to change — probably the sooner the better. But such changes are difficult to prescribe and predict. For example, there is the matter of what sacrifices might have to be made by everyone for the good of

the global climate. That leads to prioritizing individual climate change issues while pursuing sustainable development.

Problem 5: Who has the energy, time, or money left to deal with climate change, when we have so many other problems?

UNFCCC Response

- *It starts slowly. It doesn't make too many demands, or requests, for the time being. But stay tuned.* The Convention's general treaty has just a few specific requirements. **More and bigger requirements may come later, in the form of amendments and protocols.** This will happen as scientific understanding of climate change becomes clearer and as the countries that are already suffering from 'disaster fatigue', adjust to the idea they have yet another crisis to face and pay for. Cyclones, droughts, war, famine, AIDS, the ozone 'hole', acid rain, the loss of ecosystems and species ... just think about these problems, people could be forgiven for wondering whether they should 'throw in the towel'.

We can't give up, of course. Although the Convention cannot claim to have the issues all sorted out, it does make a start. Things are beginning to happen. Developed countries are making national plans with the aim of returning their greenhouse gas emissions to 1990 levels, by 2000 (this level was agreed during the 1991-2 INC Negotiations), thereby reversing the historical trend of ever-increasing emissions. Countries that have ratified the treaty are beginning to gather data on their emissions and on the present climate. More and more people and governments are talking and thinking about climate change.

What happens next? Step by step, national governments that are committed to controlling emissions must begin tightening emission standards and requiring more replanting of trees. Some countries are already working on such standards. Local and urban governments — which often have direct responsibility for transport, housing, waste management, and other greenhouse gas-emitting sectors of the economy — have a role, too. For example, they can start designing and building better, more efficient public transport systems, and creating incentives for people to use those facilities rather than private automobiles. They should tighten construction codes so that new houses and office buildings can be heated, or cooled, with less fuel. Also, industrial companies need to shift to new technologies that use fossil fuels and raw materials more efficiently. Wherever possible, they should switch to renewable energy sources such as wind and solar power. They should also redesign products such as refrigerators, automobiles, cement mixes, and fertilizers so that they produce lower greenhouse gas emissions. Farmers should look to new technologies and methods that reduce the methane emitted by livestock, wetland areas and from rice fields. Individual citizens must also reduce their use of fossil fuels — take public transport more often, switch off the lights in empty rooms — and be less wasteful of all natural resources.

It may seem naive to expect behavioral changes of this magnitude. However, the potential for more responsible behavior on behalf of the climate is nevertheless

there. It is possible that, as time passes and more is known about the threats posed by climate change, such responses will seem a lot less naive and a lot more vital to humanity's well-being.

- *The Convention is based on sharing burdens of coping with climate change.* This is important, as the atmosphere is a shared resource — part of the 'global commons'. The treaty tries to ensure that any sacrifices which are made in protecting this resource will be shared fairly among countries, in accordance with their 'common but differentiated responsibilities, respective capabilities, and social and economic conditions'. The participating countries hope, that whatever ultimately has to be done will be done by enough participants to make the benefits worth the sacrifice. It is easier to sacrifice towards the common good, when you are sure everyone else is pitching in.

Summary

Changes in climate will have long term consequences as they face up to and attempt to counter manmade climate change, governments will need to think in terms of decades and centuries. The job is just beginning. Many of the effects of climate shift will not be apparent for two or three generations. In the future, everyone may be hearing about — and living with — this problem.

The UNFCCC takes this into account. It is aimed at the next century as much as at the present. It establishes institutions to support efforts to implement long-term commitments and monitor long-term efforts to minimize — as well as adjust to — climate change. The Conference of the Parties (COP), in which all states that have ratified the treaty are represented, is the Convention's supreme body. It met for the first time in March 1995, and has continued to meet on a yearly basis. The COP will promote and review the implementation of the Convention, and if appropriate, strengthen it. It will be assisted by two subsidiary bodies — one for scientific and technological advice, and the other for implementation. The COP may also make additional arrangements in the future to help support the needs of the Convention.

The UNFCCC treaty also reflects a reasonable view about how the world will function politically in the future, and makes assumptions about how problems can best be overcome during the next century. It is based on a cooperative rather than a confrontational approach, and assumes that countries can successfully tackle problems such as climate change, only if they work together as a team. It is also designed to work well in a multi-polar world in which many countries have the influence and power to apply peer pressure to persuade others to uphold their obligations.

How can we strike a balance with the environmental conditions that allow us to exist in the first place? This is a question that humankind has largely ignored up to now, at its peril. From here on, it is a challenge that we probably will have to face, as long as our species exists.

Kyoto Protocol

The UNFCCC started slowly, and doesn't make too many demands — or requests — for the time being. But stay tuned. The UNFCCC general treaty has just a few specific requirements. **More and bigger requirements may come later, in the form of amendments and protocols.**

This will happen as scientific understanding of climate change becomes clearer (IPCC Reports, 1995, 2001, and 2007) becomes clearer and as the countries which are already suffering from 'disaster fatigue' adjust to the idea that they have yet another crisis to face and pay for. Cyclones, drought, war, famine, AIDS, the ozone 'hole', acid rain, the loss of ecosystems and species... just thinking about these problems, people could be forgiven for wondering whether they should 'throw in the towel'.

The Kyoto Protocol (KP) became an international law as a result of the IPCC Reports (1995, 2001, 2005, and 2007). However, other related disasters reinforced opinion that the UNFCCC was inadequate and that it needed a specific technical treaty or law to continue to address the ultimate objectives of the Convention.

The Papua New Guinean Government's participation at all the forum leaders meetings between 2000 and 2005, and its AOSIS group have continued to raise the profile on climate change and its real impacts at international conferences — United Nations General Assemblies; World Summit on Sustainable Development 2000; and Millennium Development Goals 2001.

Overview of the Kyoto Protocol

A protocol to the Convention was adopted in Kyoto, Japan, in 1997, and signed by more than 150 countries, including Papua New Guinea. This was considered to be a breakthrough, because it set firm targets for national levels of emissions and identified key strategies to enable countries to achieve those targets. These strategies include an agreement on trading in emission credits and the use of planted forests as carbon sink and energy sectors. Papua New Guinea signed the Kyoto Protocol on 2 March 1999, and ratified the treaty in 2003. The treaty came into force after Russia ratified it in 2005.

The following key international aims were incorporated into the Kyoto Protocol:

- a reduction in greenhouse emissions from developed countries, by 5.2 percent below their 1990 levels, by a target period between 2008 and 2012;
- the protocol to take effect when ratified by nations, including those developed countries responsible for at least 55 percent of carbon dioxide emissions;
- the protocol to be legally binding on individual nations, especially the developed countries, after their respective governments complete the ratification formalities;
- the protocol is the first international treaty to impose potentially legally binding restrictions on greenhouse gas emissions;

- emissions of six greenhouse gases are affected —carbon dioxide, methane, and nitrous oxide, and three classes of synthetic gases: halocarbons, perfluorocarbons, and sulphur hexafluoride (CFCs); and
- the only carbon credits that can be traded to meet emission reduction requirements are those arising from carbon sequestration between 2008 and 2012 (the first commitment period under the Kyoto Protocol), plus any subsequent, agreed commitment periods. This means that carbon sequestered up to 2008 is not available for sale as carbon credits to meet the Kyoto emission reduction target.

Basically, the Kyoto Protocol contains two main outcomes:

1. Sets greenhouse gas (GHG) emission targets relating to six GHGs for 38 developed countries (Annex B countries); and
2. Adopts three Kyoto mechanisms:
 - (a) Joint Implementation (JI);
 - (b) Clean Development Mechanism (CDM); and
 - (c) International Emissions Trading (IET).

The key dates for governments to be made aware of under the Kyoto Protocol are:

- 1997-2008 (transition period); and
- 2008-2012 (GHG limits period).

The main focus for developing countries would be on the adoption of Kyoto Protocol mechanisms. In developing an appropriate regulatory framework, Papua New Guinea should consider which of the three Kyoto mechanisms is most relevant.

Current Work and Post-Kyoto

The five challenges identified for all countries and the Government are to address the main objectives of the UNFCCC, and especially the fifth problem ... *It starts slowly. It doesn't make too many demands — or requests — for the time being. But stay tuned.* The UNFCCC general treaty has just a few specific requirements. More and bigger requirements may come later, in the form of amendments and protocols.

Since the signing and ratification of the Kyoto Protocol in 2005, governments and international organizations have been implementing their programs and activities, including updating their databases and inventories of GHGs, as part of their requirements and commitment.

Within the spirit of implementing the KP, government and other parties can now see the constraints and gaps in the Protocol and are challenged to come up with new ideas, concepts, and amendments to improve the delivery of the treaty.

In the Conference of the Parties meetings that are held each year (for example, Bali in 2007), there are several proposals and recommendations for considerations:

- the development of new post-KP protocol after 2012, including adaptation approaches;
- improve understanding of the science of climate change in regions, especially the impacts of El Niño in the Pacific Ocean; and
- the development of Reduced Emission from Deforestation and Forest Degradation (REDD) methodology by developing countries, which was initiated by Papua New Guinea in Canada, during COP 11, in 2005.

Bali and the REDD Initiative

In reference to the outcome from COP 13, in Bali, Indonesia in 2007, the Bali Action Plan Decision, along with the ultimate objective of the Convention, a system of policy approaches and positive incentives to reduce emissions from deforestation and forest degradation (REDD), and the role of conservation, sustainable management of forests, and enhancement of forest carbon stocks should complement national efforts to raise living standards within rural populations. It should also consider indigenous communities and traditional knowledge and be designed to support significant social, environmental, and economic objectives associated with development. Further, such a system should not lead to perverse incentives.

Two important decisions from Bali called for:

- encouragement for the parties to explore a range of actions, identify options, and undertake efforts, including demonstration activities, to address the drivers of deforestation that are relevant to their national circumstances, with a view to reducing emissions from deforestation and forest degradation, Further, these activities should be considered within the context of the Bali Action Plan; and
- decisions to enable the full, effective, and sustained implementation of the Convention through long-term cooperative action, now, up to, and beyond 2012.

The Government is currently developing a framework to detail all the current initiatives and activities on carbon trading with a dual aim of:

- meeting its international commitments on sustainable development through the UNCED-based international treaties of UNFCCC (1992), the Convention on Biological Diversity (CBD, 1992), and the United Nations Convention to Combat Desertification (UNCCD, 994); and
- domestication of these treaties into Papua New Guinea's national policies, legislation, programs, and projects.

The Government is envisaging applying the World Bank (Forestry Initiative) process to make the necessary required adjustments, prior to the UNFCCC COP 14 in October 2008.

The World Bank's Forest Carbon Partnership Facility-REDD Initiative, and the Australian Government's Climate Change Program will contribute to the REDD methodology, and assist in the development of a climate change policy.

However, the current thinking and discussions on the REDD approach are still being worked on — particularly on developing the principles and an acceptable methodology that is agreeable to all, but especially for the eight developing rainforest countries.

CHAPTER 4: THE PAPUA NEW GUINEAN PERSPECTIVE

The Papua New Guinean Government is committed to assisting in the implementation of this global issue of climate change, by ratifying these two international laws — UNFCCC and KP — and other related legislation, such as the Convention on Biological Diversity, the United Nations Convention to Combat Desertification, the Barbados Program of Action, and the Montreal Protocol, starting at the country level, with international partnership. The thinking and approach supports the country's fourth National Goal and Directive Principal:

'For PNG's resources and environment to be consumed and used for the collective benefit of us all and are replenished for the benefit of future generations'.

At the regional policy level, Papua New Guinea has agreed and endorsed policies, such as the Pacific Islands Framework on Climate Change, Climate Variability, and Sea Level Rise, the Pacific Islands Framework for Action on Conservation (2000, 2003), the Pacific Islands Ocean Policy (2005), and the SPREP Agreement, which contribute to the national programs and activities.

Papua New Guinea does not have its own policy to address this global issue at the national level. However, some ministries like Forestry and Environment and Conservations have been proactive in ensuring the climate change issues and opportunities are streamlined into their work programmes and policies. For example, Department of Environment and Conservation has set up a Designated National Authority (DNA) in response to the UNFCCC obligations to manage projects under the Clean Development Mechanism (CDM) mainly through voluntary approaches. This function will eventually be transferred to the Office of Climate Change and Environmental Sustainability. The CDM provides a platform for the private sector non-government organizations, and business communities to launch into investments.

The recent setting up the Office of Climate Change and Environmental Sustainability recently under the Department of Prime Minister and National Executive Council will indeed provide an overall policy development and coordination role and manage all climate change programmes and activities.

Scientific Programs and Activities

The majority of global climate models and Papua New Guinea's research institutions suggest that, in the future, the Papua New Guinean Region will be warmer than it currently is and consequently more vulnerable to climate change with the increased intensity and frequency of events, such as cyclones, El ninos and La ninas and droughts. The projected warming may result in higher maximum temperatures, more hot days, and

more intense precipitation events. The peak wind intensities associated with tropical cyclones are expected to increase, leading to larger waves and stronger storm surges, and precipitation intensities are also likely to be enhanced.

The challenge of improving our scientific understanding and knowledge of the rather complex issue of climate change makes it our business to develop national programs and activities, in the forestry, agriculture, petroleum and gas, and renewable energy sectors, as well as for friendly technologies, and dealing with oceans and disasters.

Some of the important activities and programs that are being undertaken in the country include a GHG inventory, research on climate change and variability, and the REDD initiative.

National Communications: GHG Inventory and Data

A GHG inventory for Papua New Guinea was used to support training and capacity building through research. The data will assist the country to understand and plan for this issue.

Figure 3 shows that the largest sources and sinks of GHGs in the country are in the area of energy, which includes fossil fuels (such as oil and gas), renewable energy (waste, forests, and biofuel), and land use change and forestry.

Figure 3: Papua New Guinea's Greenhouse Gas Inventory Summary, 1994

Greenhouse Gas Source/Sink Categories	CO₂ Carbon Dioxide	CH₄ Methane	N₂O Nitrous Oxide
All Energy	3 018	–	–
Industrial Processes	193	–	–
Agriculture		4.27	12.20
Land Use Change and Forestry	413	–	–
Total	3 624	4.27	12.20

Note: All data are presented in gigagrams (Gg).

Research on Climate Change and Variability

The impacts and adaptation research on El Niño and sea level changes on coastal and island provinces is a challenge and needs support. The monitoring of sea level changes and ocean currents and tides has been continuing for more than 20 years, through

partnership with international organizations such as the WMO, and countries such as USA, Australia, and Japan.

REDD Initiative

The Prime Minister of Papua New Guinea has laid down the challenge to national and international technical groups to develop the REDD strategy, and its methodology at the international level, and expects Papua New Guinea's institutions and other countries to pursue it.

Political and Governance Involvement and Response

REDD and Post-Kyoto Plans

The Papua New Guinean Government has always taken a keen interest and participated actively in the majority of United Nations sanctioned meetings and multilateral environmental agreements, and has been supportive of Pacific regional forums. This includes meeting its international commitments on sustainable development through the 1992 UNCED-based international treaties of Montreal Protocol, the Convention on Biological Diversity (CBD, 1992), and the United Nations Convention to Combat Desertification (UNCCD, 1994).

In most cases, the Government has been able to forge partnerships through AOSIS, or using regional and geographical alliances, such as the Rainforest Coalition and G77, to contribute to multilateral agreements such as the KP and UNFCCC.

Climate Change Policy Framework

Climate change is one of the greatest sustainable development challenges for the country and the world socially, economically, and environmentally. The Intergovernmental Panel on Climate Change (IPCC) scientists confirm that human activity has been responsible for altering the climate systems since 1750, and is likely to lead to impacts on food security, fisheries and marine resources, rainfall, water availability, temperatures, El Niño frequency, health, forestry, biodiversity, culture, and heritage for this and its prosperity (Third and Fourth Assessment Reports, 2007).

The Government should consider the following commitment to ensure that Papua New Guinea meets its responsibilities in dealing with this global challenge as an important policy directive. This could include the establishment of an integrative and comprehensive approach to:

- develop adaptation and risk management measures to address the inevitable impacts of climate change and variability;
- develop a national climate change policy;
- reduce GHG emissions in Papua New Guinea in the short term to long term; and

- work with international communities, regional partners, and multilateral and bilateral agencies to agree on, and implement, a global response that is effective and fair.

Actions in Papua New Guinea

The Government should embrace an integrative and comprehensive plan of action to address our national mitigative measures for reducing GHG emissions and adapting to the impacts of climate change. Key elements of this plan could include:

- *A commitment to reduce PNG greenhouse gas emissions*

Urgently conduct a major study on how to reduce GHG emissions (cf. see Stern (2007) and Garnaut (2008)). This report should provide a key analysis to support short-term and medium-term targets to enable Papua New Guinea to reach this goal, while ensuring continued prosperity for the people.

- *Implementing a comprehensive emissions trading scheme by 2015*

This will ensure that greenhouse gases will have a price, and so harness the power of the market in finding cost-effective solutions. A number of bilateral and multilateral partners have started consultations and implementing such a scheme. This includes Japan, the European Union, the World Bank, and Australia. This will lead to the formulation of a law on carbon trade for the country.

The implementation of Clean Development Mechanism (CDM) and setting up of the Designated National Authority (DNA), and the Office of Climate Change and Environmental Sustainability, as well our leadership in the issue of Reduced Emission Deforestation and Forest Degradation (REDD) in the country is an indication of our commitment.

The petroleum and gas sectors are important priority areas under the CDM to plan for sustainable development for communities in the provinces, the nation, and the region.

- *Increasing the proportion of renewable energy to PNG Power by 2015*

Renewable energy, such as wind, biofuel, hydropower, waste, forestry, biomass, oceans, and solar, will be a key part of sustaining our Medium Term Development Strategy, Millennium Development Goals, and global solution. The development of the National Energy Policy should address this issue as a 'no regrets' approach.

- *Investing in research and development on low emission technologies*

The challenge of climate change is enormous and we need to make sure that we have a wide range of appropriate technologies, including clean fossil fuels (oil,

gas, and coal), geothermal, biofuels (wood, coconut, cassava, and sugarcane), hydropower, wind, solar, oceans, and energy efficiency.

The Government and the private sector have already invested in renewable energy projects such as hydropower, geothermal, and biofuel, but need to do more in this area, and especially in clean and efficient energy research.

- *Supporting rural communities and businesses to use energy more wisely*

Create opportunities for rural and business communities to use energy more wisely. Major public and educational awareness should be implemented urgently.

- *Managing our land and oceans to reduce emissions*

The Government with its new 10-year plan for the agriculture and forestry sectors will work with farmers, foresters, and landowners to develop sustainable farming and forestry practices that reduce emissions. This will enhance carbon sinks in these areas and the oceans.

International Cooperation

Climate change is a global concern which requires all countries to make a significant commitment, at their national level, to formulate and institute a global solution.

The Somare government ratified the Kyoto Protocol in 2003 and is committed to implementing programs and activities in partnership with its multilateral and bilateral partners and the private sector to address this global challenge.

The Government and its eight rainforest partners have introduced the REDD strategy as a global commitment, ensuring that the Kyoto Protocol achieves its overall objectives. In the UNFCCC/KP negotiations, Papua New Guinea is working to find international approaches that are:

- economically sensible and allow for continued global and domestic prosperity; and
- fair, by recognizing the legitimate development needs of all countries.

Papua New Guinea is working with many countries to implement practical initiatives to reduce GHG emissions. Engagement with partners, including the European Union, Australia, the World Bank, and Japan, will be a major focus to develop them as key trading partners.

Responding to the Impacts of Climate Change

Even a strong and comprehensive approach to GHG emissions will not avoid some degree of climate change. However, a national climate change policy that facilitates the

implementation of the comprehensive approach to emission, impacts, and adaptation measures needs to be developed urgently.

- *Development of a National Climate Change Policy*

The establishment of Papua New Guinea's new Office of Climate Change and Environmental Sustainability, of which may be housed in the Office of the Prime Minister, should develop a national climate change policy and coordinate and facilitate all the mitigation, impacts, and adaptation measures and programs. Adaptation plans and programs will support enhanced research into climate change science and potential impacts.

The Government is working with the environment, mining, agriculture, and forestry sectors to identify, respond to, and reduce the risk of potential impacts of climate change on resources, infrastructure, and people, especially in vulnerable and remote island communities.

The Way Forward

The current state of information and knowledge on climate change heralds a doomsday for Papua New Guinea and the world in possibly 100 years time. The current state of international cooperation and multilateralism on climate change through treaties and protocols such as UNFCCC and KP is not fit for the purpose. As a priority, the world needs a binding agreement to drastically reduce GHG emissions for short-term, medium, and long-term targets. Facing up to this threat will create challenges at many levels, especially for the large, vulnerable communities in the rural areas, coastal areas and the fragile remote and atoll islands of the country.

Climate change will adversely impact across all social, economic, and environmental sectors. While the Government is addressing one sector only, from an economic position, it needs to work extremely hard at the international governance level. However, in its policy on this issue, it needs to look at a 'no-regrets' option — with or without climate change.

The Papua New Guinea Government acted with a sense of urgency in setting up the Office of Climate Change and Environmental Sustainability, in May 2008. However, it needs to develop an integrated and comprehensive climate change policy that facilitates and coordinates with national, provincial, and international partners, and non-government organizations, in implementing its national programs. This integrated comprehensive climate change policy would contain the following principles:

Principle 1: Implementing adaptation measures

This could include building resilience through adaptation to climate change including climate variability and climate extremes has been identified as the key priority for all

provinces and communities. The government has agreed with the Fourth Assessment Report of the IPCC that they are already witnessing the [adverse] effects of climate change. New Guinea Islands and coastal areas of the country, in particular believe that their very survival is now threatened.

The ecological fragility, economic vulnerability and the remoteness of Papua New Guinea makes recovery from extreme weather and climatic events very difficult.

National adaptation policies and measures reflecting the whole of country approach need to integrate into national sustainable development strategies and plans.

Papua New Guinea will encourage adaptation measures based on [the precautionary approach] and principles of risk management, with a focus on improving the livelihoods of its people. Such an approach will recommend the implementation of resilience building measures that have multiple benefits, including disaster risk reduction

Principle 2: Contributing to the mitigation of greenhouse gas emissions

PNG contributions to the total global emission of greenhouse gases are insignificant compared to the rest of the international community. Nonetheless, PNG wish to contribute to the global effort to reduce emissions. As part of its national policies, it must promote and coordinate cost effective measures to reduce greenhouse gas emissions, including increased energy efficiency and increased use of appropriate low carbon and renewable energy technologies.

There may be the opportunity to work with developed countries on the Kyoto Protocol Clean Development Mechanism projects to support these efforts. In addition, work with all countries to include forestry and especially REDD negotiated and accepted in post Kyoto. These efforts will also promote sustainable development

Principle 3: Improving decision making and good governance

PNG, Office of Climate Change and Environmental Sustainability and all recognizes that they have a national responsibility for addressing the risks and effects of climate change on its resources, such as energy, forestry and ocean resources in the context of their national sustainable development strategies and reflecting principles of sustainable development and good governance.

All stakeholders have a role to play in developing individual and collective resilience through adaptation, prevention and/or mitigating the adverse effects of climate change. Climate change and its effects is a shared responsibility, which also requires effective partnership with all relevant stakeholders in decision-making and implementation of strategies and actions at all levels.

Principle 4: Improving our understanding of climate change

Better understanding of climate change, variability and extreme weather events is needed to inform local communities, national and international responses. This will mean enhancing human resource capacity for generating, analyzing and managing climate and energy, forestry and natural disaster related data sets; sustaining and upgrading existing observation and application systems; developing and strengthening technical data sets and tools for climate observations; establishing baseline data in all natural resource sectors and maintaining the collection of the latest information on sea level rise, and REDD.

Translating climate change science into applicable information products through user friendly materials and tools is necessary to inform the our national and provincial decision making process at all levels.

Principle 5: Education and awareness

Strengthened human capacity in all national and provincial sectors to monitor, assess and predict environmental, social and economic risks and effects of climate change is critical for developing and implementing a viable and sustainable national programme on cost effective adaptation and mitigation response measures that incorporates both scientific and traditional knowledge.

Contribute to international and regional agreements, especially in the UNFCCC/Kyoto Protocol and post KP.

Concerted efforts need to be undertaken to enhance capacity of appropriately trained personnel in the assessment of the risks and impacts of climate change, climate variability and extreme weather events in the all sectors. A pool of informed resource persons conversant with development and application of practical steps in adaptation tools and methods is critical, especially in the REDD, and energy initiatives. Increased awareness and understanding of risks and effects of climate change is particularly important at the community level to increase their resilience.

Principle 6: Partnerships and cooperation

Partnerships and cooperation provide an enabling environment and are an essential part of the Office of the Climate Change and Environmental Sustainability efforts to coordinate and build resilience to the adverse effects of climate change on all sectors. Papua New Guinean people will continue to advocate for the reduction of greenhouse gas emissions internationally and to promote assistance for adaptation and mitigation regionally and nationally through demonstrated projects of REDD. Networks and partnerships to inform policy development for harmonized regional, national and local responses to climate change is necessary.

Additional resources will need to be accessed through multilateral and bilateral funding. The focus of PNG government and its new Office is to support national efforts to access this assistance and with the implementation of existing and new innovative projects and programmes, including the *Avoided Deforestation initiatives (RED) by the world Bank and Australian government (Emission Trading) for PNG.*

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