

2022 PNG UPDATE: PATHWAYS TO DEVELOPMENT AMID COVID-19 AND BEYOND PNG'S 10TH ELECTION

PNG UPDATE CONFERENCE 20TH TO 21ST OCTOBER, 2022

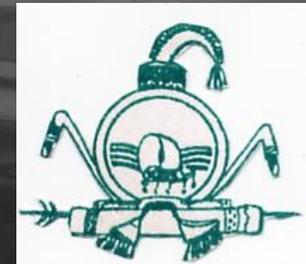
Organised by the University of Papua New Guinea's School of Business and Public Policy and the Australian National University's Development Policy Centre.

THE IMPACTS OF CLIMATE CHANGE AND ENVIRONMENTAL SUSTAINABILITY AND ITS IMPEDIMENTS ON MARITIME PROVINCES OF PNG

Presenters



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PRESENTATION OUTLINE

1. Objectives
 2. Introduction
 3. Impacts of climate change and environmental sustainability
 - Biodiversity
 - Agro Ecosystems
 - Marine Ecosystem
 4. Impediments of Climate Change on Maritime Provinces of PNG
 5. **Climate-resilient Green Growth Strategy for Milne Bay province validated**
 6. Way Forward
 7. Conclusion
- References

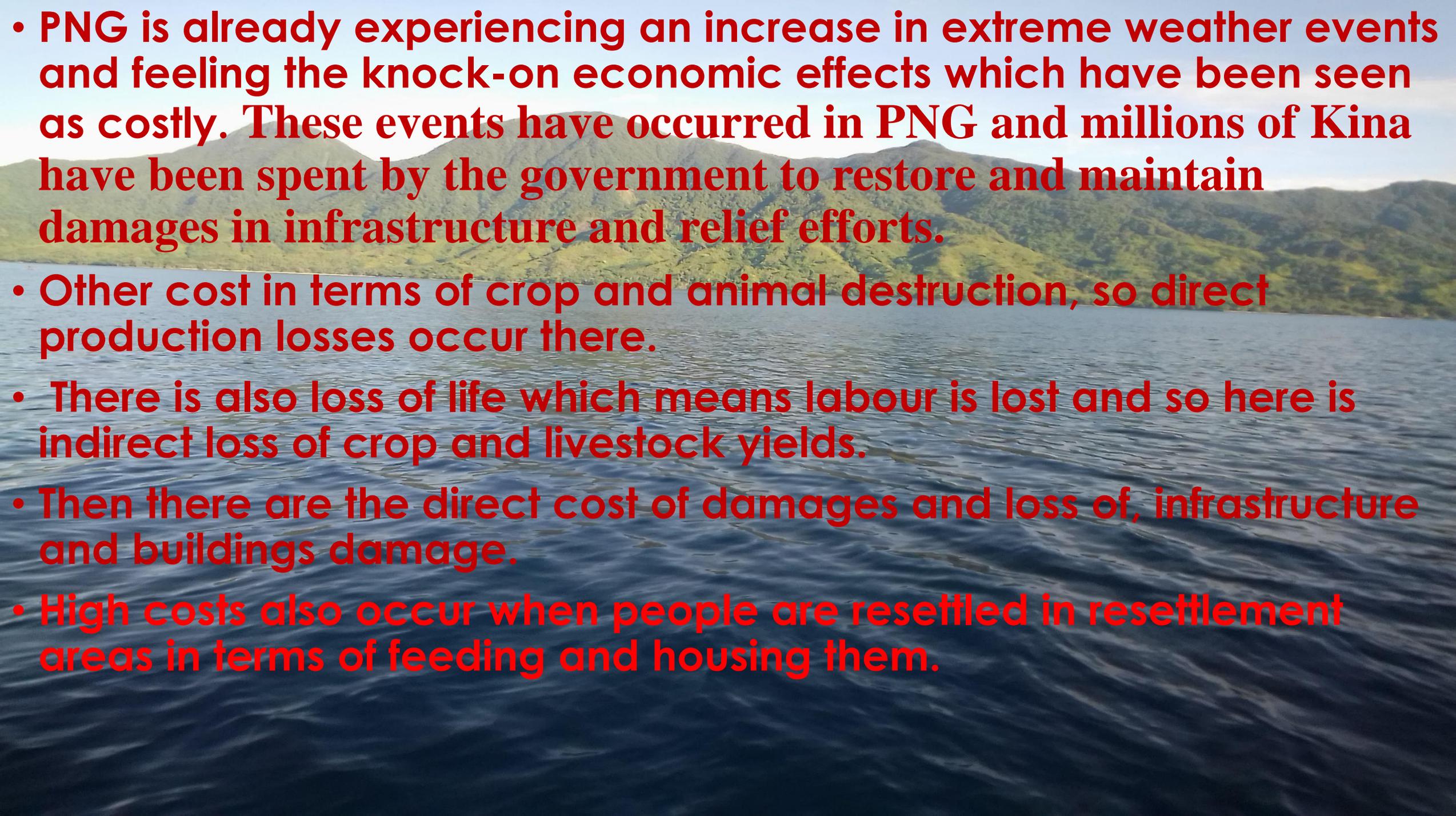
OBJECTIVES

TO DISCUSS THE IMPACTS OF CLIMATE CHANGE AND ENVIRONMENTAL SUSTAINABILITY AND ITS IMPEDIMENTS ON MARITIME PROVINCES OF PNG

INTRODUCTION

Climate change will change normal structures of the natural systems. For example, rising sea levels will alter the salinity of low lying coastal islands, drought will affect the habitat of many plant and animal species, and rising temperatures will extend the ranges of some species while contracting those of others. These changes will affect agro and marine ecosystems and many other important components of the human relationship to the natural world.

- According to PNG OCCD, forestry and agriculture are found to contribute more than 90% of greenhouse gas emission. This is mainly through large scale logging and the conversion of forests into agriculture production. If PNG continues as it is now, greenhouse emissions are expected to rise as much as 32% by 2030. This increase would be contrary to the country's commitment to reduce emissions by 50%..

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- PNG is already experiencing an increase in extreme weather events and feeling the knock-on economic effects which have been seen as costly. These events have occurred in PNG and millions of Kina have been spent by the government to restore and maintain damages in infrastructure and relief efforts.
 - Other cost in terms of crop and animal destruction, so direct production losses occur there.
 - There is also loss of life which means labour is lost and so here is indirect loss of crop and livestock yields.
 - Then there are the direct cost of damages and loss of, infrastructure and buildings damage.
 - High costs also occur when people are resettled in resettlement areas in terms of feeding and housing them.

The listed events below have occurred in PNG and millions of Kina have been spent by the government in trying to restore and maintain damages infrastructure and in establishing resettlements.

- The king tides in 2008 and 2021 which affected coastal provinces of Sandaun, East Sepik, Kavieng, Manus and Milne Bay**
- Sea level rise in Caterets Island resulting in the relocation of people (climate change refugees) to Tinputz, in the Autonomous Region of Bougainville**
- Cyclone Guba which devastated parts of Oro Province**
- Coastal erosion in coastal provinces and sinking of islands.**
- Food and water security as droughts and floods hit both the Coastal and Highlands regions**

IMPACTS OF CLIMATE CHANGE AND ENVIRONMENTAL SUSTAINABILITY: IMPEDIMENTS ON BIODIVERSITY

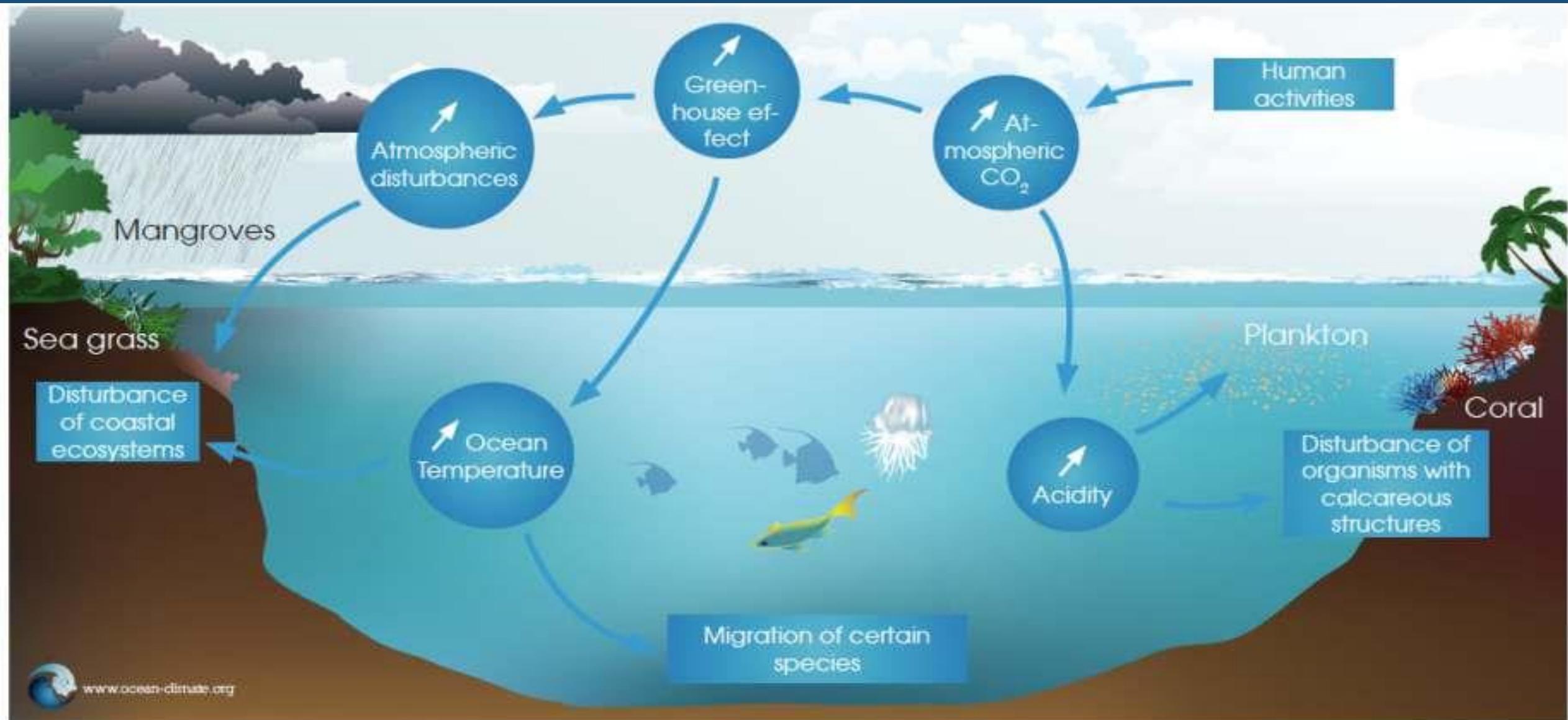
- **The sun actually radiates many different types of energy. Some of the types of energy are very strong but do not reach earth through the protection by the upper atmosphere. Other forms of energy including light and heat do reach the surface of the earth. Some of the radiated heat energy is reflected by, or absorbed by the clouds. Some of the heat energy can be trapped inside the earth's atmosphere and this is what warms up the air, and everything on the surface of the earth including small rocks on the ground and the oceans.**
- **In the oceans, most added heat from climate warming is still near the surface and will take centuries to work down into deeper waters. But as it happens, it will change ocean circulation patterns and make the ocean food chains less productive. The warming in shallow waters causes coral bleaching phenomena.**

HOW IT AFFECTS BIOLOGICAL DIVERSITY ON EARTH?

Warmer waters cause coral bleaching, which in turn negatively impacts the entire coral ecosystem.

- Many species will be forced to migrate so they can maintain the temperature conditions they need for feeding and reproduction.
- Alteration to water temperature can directly impact development, age of sexual maturity, timing of spawning, growth, and survival of most shrimps and cephalopods.
- Decreased upwelling due to warmer waters means that fewer important nutrients from lower in the water column will make it to the surface of the water.
- Many important marine ecosystems almost completely depend on nutrients from such upwelling areas for example, marine habitats around the Galapagos Islands and along the U.S. coast of California and the Coral Triangle between Philippines, Indonesia and PNG.

CONSEQUENCES OF CO2 INCREASE ON THE ECOSYSTEMS Source: ocean-climate.org



Impacts of climate change and environmental sustainability: Impediments on the Agro Ecosystems

Climate change is destroying and changing agro ecosystems which are reducing the amounts of food available for food security. Agricultural production and post-harvest is also affected therefore affecting food security and nutrition, agricultural livelihoods and other livelihoods

Climate change is rapidly warming the earth and altering ecosystems on land and at sea that produce our food and natural resources. The changes in the processes of earth's climate change is related to human activities. While it is known that human activity is speeding climate change process, we really need to find out the different elements involved in causing climate change in the first place

IMPEDIMENTS OF TEMPERATURE RISE ON FOOD PRODUCTION IN MARITIME PROVINCES OF PNG

- Warming temperature is causing different climatic patterns. PNG is now experiencing extreme weather patterns. Many regions are getting warmer and food that could not be grown there before is now grown there.
- However, pests and diseases have increased and is causing reductions in food productions.
- Warming climates causes long term dry seasons that turn into droughts. Warmer oceans means more water vapour is evaporated and during monsoons the rain is more torrential and heavier causing destruction to food crops and other infrastructure and even loss to human lives.
- Droughts and flooding will cause more damage out of all the climate change effects.
- Another case of concern is the migration of tuna to the South and North poles as the waters of the Pacific Ocean gets warmer, thus PNG is in danger of losing its fisheries industry and manufacturing resource.

Impacts of climate change and environmental sustainability: Impediments on the Marine Ecosystem.

- Climate change due to human activity has a direct impact on marine species. It alters their abundance, diversity and distribution. Their feeding, development and breeding, as well as the relationships between species are affected. Rising temperatures lead to different behaviour patterns according to species.
- The loss of marine biodiversity is weakening the ocean ecosystem and its ability to withstand disturbances, to adapt to climate change and to play its role as a global ecological and climate regulator.
- The ocean is home to millions of species. The health of the oceans is strongly dependent upon this marine biodiversity. Life in the ocean is an essential component of climate regulation.

- **Rising temperatures lead to different behaviour patterns according to species. Some adapt to temperature changes, while others migrate toward the poles or to new areas. Other species disappear, as has been observed for certain corals that can rapidly bleach and die when their symbiosis with the unicellular algae, that they shelter and feed on, is interrupted.**
- **The ocean acidification, caused by an increasing absorption of atmospheric carbon dioxide (CO₂), has a direct impact on the marine organisms with calcareous skeletons or shells such as crustaceans and molluscs.**

- Extreme climatic events deplete natural environments, for example by erosion and flooding. They disturb marine life in coastal areas, particularly in certain coastal habitats such as mangroves and seagrass beds, which are vital breeding grounds as well as potential CO₂ capture zones or carbon sequestration.
- Fish is a primary source of animal protein for at least one billion people in the world. Apart from overfishing or pollution, climate change alone heavily affects the food resources for human populations, in developing countries essentially. Losses in biodiversity also imply a loss of genes and molecules that are potentially valuable for medical research and industry.
- Due to these multiple changes that cumulate on marine ecosystems, the ocean is becoming, in turn, very sensitive to climate change. Indeed, the more ocean ecosystems become depleted, the less they are able to adapt to climate change. The severity of this situation has been considered too lightly.



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HUMAN IMPACTS ON MARINE ENVIRONMENTS

- **Fisheries**

Humans living near the coast have probably always used the ocean as a source of food.

- **Pollution** – Chemical, plastic products

- **Eutrophication**

Harmful algal blooms, dead zones, and fish kills are the results of a process called eutrophication—which begins with the increased load of nutrients to estuaries and coastal waters.

- **Introduced species** – Example ballast water from logging ship

- **Ocean acidification**

The ocean absorbs about 30% of the carbon dioxide (CO₂) that is released in the atmosphere. As levels of atmospheric CO₂ increase from human activity such as burning fossil fuels (e.g., car emissions) and changing land use (e.g., deforestation), the amount of carbon dioxide absorbed by the ocean also increases. When CO₂ is absorbed by seawater, a series of chemical reactions occur resulting in the increased concentration of hydrogen ions. This process has far reaching implications for the ocean and the creatures that live there..

CARBON DIOXIDE AND SEAWATER

- Carbon dioxide, which is naturally in the atmosphere, dissolves into seawater. Water and carbon dioxide combine to form carbonic acid (H_2CO_3), a weak acid that breaks (or “dissociates”) into hydrogen ions (H^+) and bicarbonate ions (HCO_3^-).
- Because of human-driven increased levels of carbon dioxide in the atmosphere, there is more CO_2 dissolving into the ocean. The ocean’s average pH is now around 8.1 which is basic (or alkaline), but as the ocean continues to absorb more CO_2 , the pH decreases and the ocean becomes more acidic.

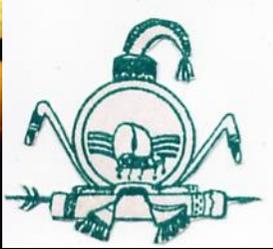
CORAL REEF BLEACHING – PROBLEM FOR MARINE LIFE

- Coral reefs are more than just pretty underwater landscapes that scuba divers go exploring in.
- The important fact about these reefs is that 500 million people in the world have some level of dependence on these reefs.
- The reefs provide food resources, building materials and income from tourism.
- It is estimated that about 30 million people are totally dependent on coral reefs to live.
- Hence, coral reefs are very important. Coral reefs have been identified as an endangered ecosystem because they are subject to multiple natural, man-made and man mediated stresses.

- **In 1998 the worldwide effect of El Nino Southern Oscillation (ENSO) caused widespread coral bleaching and death, which led to indiscriminate damage in protected and unprotected systems.**
- **Global climate change is potentially threatening to every single coral, and its associated fauna worldwide.**
- **Coral reefs have existed for approximately 215 million years. They have survived the extinction of the dinosaurs and the climate changes of the ice ages.**
- **This would suggest that coral has remarkable evolutionary resilience and would survive.**
- **To understand actions needed to conserve coral reefs and understand what will be lost if stresses continue unabated, we need to know how or what makes them change and the threats facing them.**

CLIMATE-RESILIENT GREEN GROWTH STRATEGY FOR MILNE BAY PROVINCE VALIDATED – 17TH MARCH, 2022.





The Milne Bay Province has successfully validated its Climate Resilient Green Growth Strategy (CRGG) for the province in a two-day workshop. The CRGG Strategy captures how different sectors under the Milne Bay Provincial Administration (MBPA) have mainstreamed climate resilient green growth into their provincial plans and budget. After significant consultations with provincial stakeholders in 2021, the CRGG project implemented by the Global Green Growth Institute in Partnership with the Climate Change and Development Authority (CCDA), have drafted the CRGG Strategy for the province. The Strategy reflects the province's climate change priorities to be implemented under Milne Bay's new integrated provincial development plan from 2022-2026.

- As a roadmap for the province to identify, commence and upscale its climate adaptation and mitigation efforts.
- “Though Milne Bay Province does not have funds at its disposal for implementing climate resilient projects, the impacts of climate change will be continually felt in different sectors of the province”.
- “The CRGG strategy is a way forward for the province to ensure realistic climate adaptation and mitigation measures are implemented and also a document which can be used to source funding to implement the strategy” (Asha Numa Provincial Administrator 2021)
- In the strategy, key sectors under the Milne Bay Provincial Administration under which climate resilience green growth have been mainstreamed includes agriculture, health, transport and infrastructure sectors.
- The scope of work under the CRGG Project which led to the development of the strategy was funded by Papua New Guinea-Australia Partnership, implemented by GGGI with guidance from CCDA, Department of National Planning and Monitoring (DNPM), Department of Provincial and Local Government Affairs (DPLGA).

WAY FORWARD - MITIGATION

Responding to climate Change Mitigation

- The agriculture and forestry sectors can substantially contribute to balancing the global carbon cycle through effective resource use programs and using soil regeneration methods of cultivation.
- While in forestry the world should be reducing deforestation and by adopting a sustained yield management program
- **Agriculture**
Resource use efficiency + Soil regeneration = can bind large amounts of atmospheric CO_2 , and lower the emissions of N_2O and CH_4
- **Forestry**
Reducing deforestation + Adopting sustained-yield management = can help mitigate the rise of atmospheric CO_2 .

Reducing Food Loss and Waste improves the efficiency of the food system, reduces both pressure on natural resources and the emission of greenhouse gases (GHGs)

Rebalancing Diets towards less Animal-Sourced Foods

Could help reduce GHGs and pressure on natural resources with co-benefits for human health

Challenges

Smallholder producers face major barriers when adopting practices that can make their production systems more resilient and efficient. However, they are faced with the following problems:

Labour availability – there is a shortage of labour as agriculture work is always hard work and is most often back breaking and tiring. Agriculture based work is also the most labour intensive but lowly paid job.

Risks and shocks – Many smallholder farmers are not prepared to take risks and they also find it difficult to adapt to risks and shocks.

- Tenure security – Land is scarce and many farmers do not have access to land tenures because most are poor any where
- Credit access and resource endowments – Farmers are not able to get financial help because most financial institutions and others regard agriculture work as risky investment because of climate change and insecure market out lets.
- Groups/social capital – People or groups or farmers need to get together and support each other and sometimes group financing and work is more efficient than individuals working on their own.
- Information – Many farmers are illiterate and lack the information required to adapt to new technologies in farming.
- Note: Things are likely to change due to COVID 19 pandemic and the government's heavy involvement on SME and Agriculture.

THE WAY FORWARD: STRATEGIC USE OF CLIMATE FINANCE

- Addressing the capacity challenge
- Support the enabling environment for climate-smart agriculture
- Mainstreaming climate change in domestic budgets
- Unlocking private capital for climate-smart agricultural investment

SOME EXAMPLES MITIGATION STRATEGIES

Using scientific and Traditional Knowledge

SEAWEED FARMING



CORAL FARMING



USE OF TRADITIONAL TREE BUFFERS



TRADITIONAL BUFFER PLANT- PANDANUS PALM



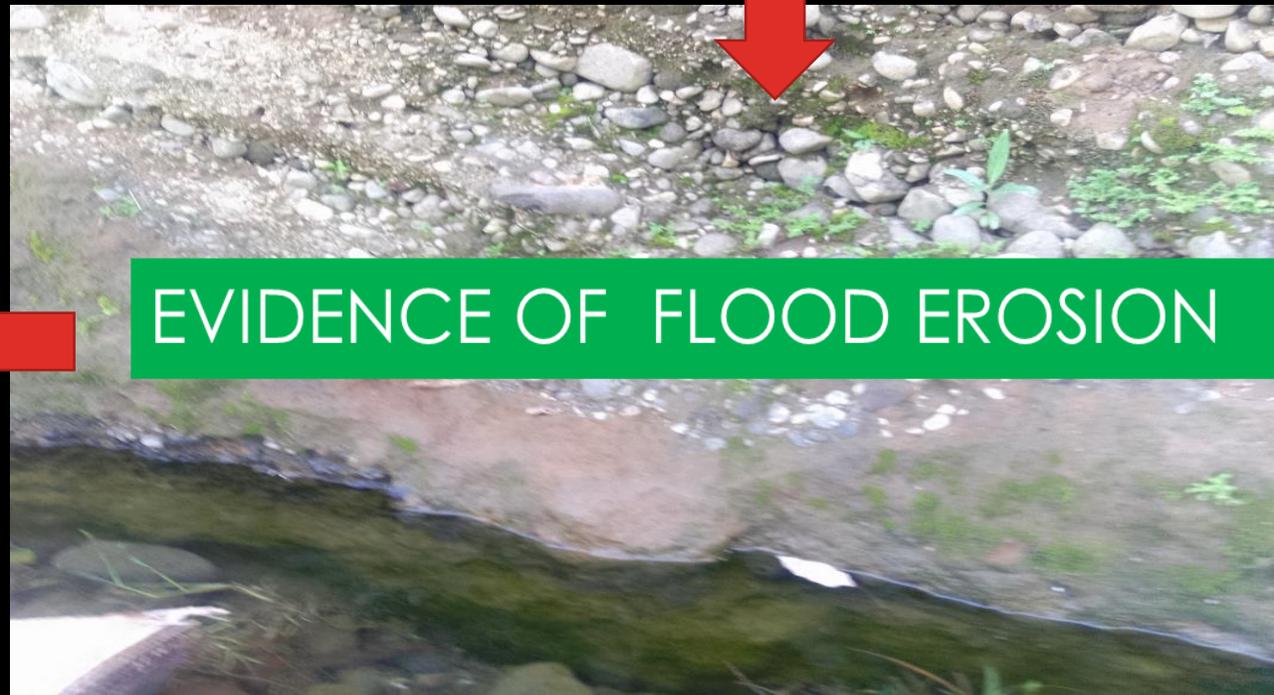
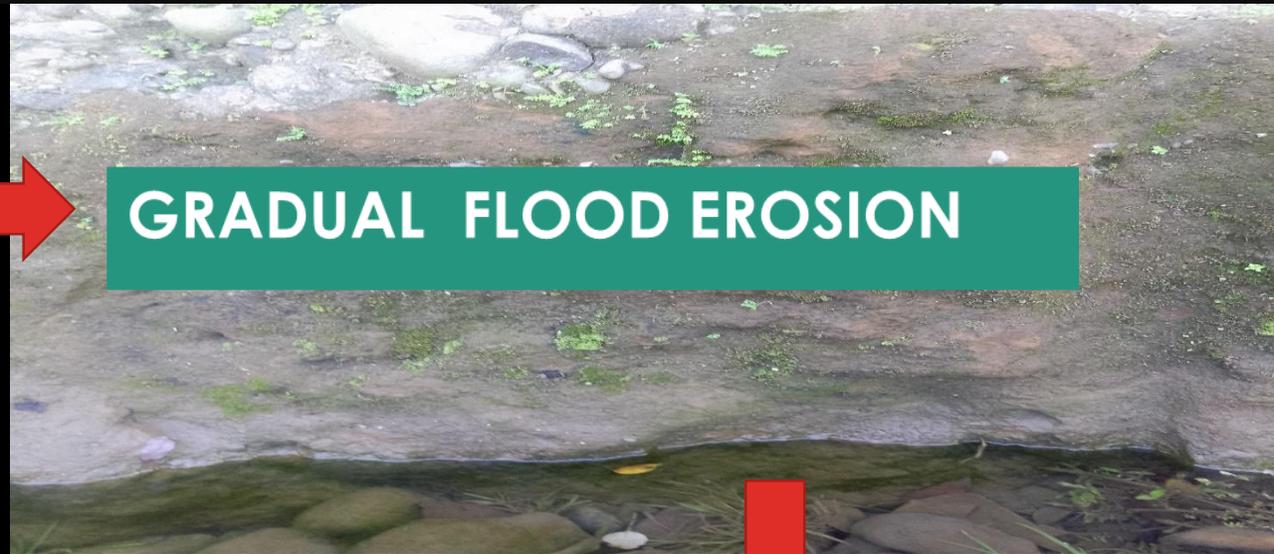
GRAVEL BEACH FRONT



CORAL BEACH FRONT



Calcareous sand stone-floodwater buffer



CONCLUSION



ADDRESSING THE CHALLENGES: ALIGNING CLIMATE AND DEVELOPMENT GOALS

- As a mitigation of climate change, the majority of Papua New Guinea's emissions are derived from land-use, with most of this a result from the forestry sector and clearance for extensive agriculture. The shift to sustainable forestry with processing into products in Papua New Guinea, and judicious use of international carbon credits to raise incomes and promote development, better forest practices should greatly increase the contribution of forestry to the national economy.
- The Climate change policy as formulated by the Office of Climate Change and Development (OCCD) has been passed by an act of parliament and it is a policy that the Government including institutions, companies and individuals can work under to achieve climate change mitigation.

Different countries and regions should try to manage and mitigate effects of climate change by;

- Managing natural resources
- Building institutions and policies for more resilient systems with lower emissions
- Addressing trans boundary issues between different countries so that they share water, and address the common problems of pest and disease control, do trade and help one another in mitigation of climate change effects because what one country does has an overall effect on the world climate change.
- Supporting and facilitating collective action and managing risks especially in more loss of small islands in the maritime provinces such as AROB, Manus and Milne Bay.

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THE END



Thank You for Listening

ANY QUESTIONS?

