

IMPACT OF GLOBAL WARMING AND CLIMATE CHANGE ON NATIONAL DEVELOPMENT: THE CLIMATE CHANGE PHENOMENA AND ITS CURRENT IMPACTS IN PAPUA NEW GUINEA

What is Global Warming?

- Global warming is an increase in the global average surface temperature
- Caused by an increase in the amount of green house gases in the atmosphere
- These gases contribute to the warming of the earth’s surface and the lower atmosphere
- This is done by trapping and greater absorption of the solar radiation.
- These can also affect local, regional and even global climate patterns
- Scientists have used models that predicts increase in global average surface temperature as a result of green house gas emissions
- There will be an increase and changes in the climate patterns in the next few years
- Additional warming, changes in precipitation amounts, sea level rise, and changes in the frequency and intensity of some extreme events.
- This include cyclones, hurricanes, droughts and famines

What is Climate Change?

- Climate change is a large scale fluctuations on the conditions of atmospheric elements at a particular location
- Climate is now thought of as a part of a larger system
- This includes the hydrosphere, lithosphere, biosphere and extraterrestrial features such as the sun
- So climate change involves these systems which leads to a new and lasting conditions

Causes of climate change – the carbon cycle

- Carbon exists in the atmosphere, soil and bodies of water
- Involves building of tissues by plants through photosynthesis
- Influenced by exchanges of CO2 between the atmosphere and the oceans
- Influenced by complex chemical processes in the ocean
- CO2 affects the atmospheric heat balance by absorbing the infrared radiation

Causes of Climate Change – The Green House Effect

- Trapping of heat in the lower levels of the atmosphere
- CO2 is the most important gas in the process
- Since the industrial revolutions, CO2 in the atmosphere is increased by man from 20 to 30 %
- Using these estimates, the global mean surface temperature could rise by approx. 1 Degree Celsius
- 5 Degree Celsius by the end of the 21st century
- It is vital to remember that climate determines the vegetation that can grow in a particular location
- The rate at which nutrients are cycled through life and the environment are affected
- There is an important fact that life affects the earth’s fraction of the reflection of sunlight and the composition of its atmosphere
- Both of these regulate the earth’s energy balance, which in turn determines climate

Causes of climate change – Reduction in rainforest cover

- Tropical rainforests play an important role in the exchanges of gases between atmosphere and the biosphere
- Significant amount of gases are released into the atmosphere from these forests
- This is done by clearing and burning
- Drought and famine would follow, thus affecting the entire global energy balance if this rainforest disappear in the near future
- As the population increases, deforestation has become a survival response
- Unfortunately, soil in some parts can not sustain agricultural use

Impacts of human activities on climate conditions

- There are three distinct atmospheric problems that have been intensely debated since the mid 1970s
 1. Reduction of stratospheric ozone
 2. Generation of acid rain
 3. Climate change stemming from green house effect
- For the purpose of this discussion, I will focus on only one of the above problems because it affects PNG a lot..
 - Climate change stemming from green house effect

Impacts of human activities of climate – Green House Effect

- Is the least reversible and long-lasting problem
- Caused by CO2, chlorofluorocarbons, methane and more than a dozen other gases in the atmosphere
- CO2 played the most significant role in this problem
- The amount of CO2 has increased steadily since the mid 1900
- Largely because of combustion of coals, oil and natural gas on an ever – widening scale
- Climatic changes larger than any ever experienced before
- This alters natural and agricultural ecosystems, human and animal health, and the distributions of climatic resources

Impacts of Global warming and Climate Change

1. Changes in ocean temperature
 - Marine plant life such as planktons and animals suffers. This affects the routine movement of sea animals.
2. Changes in ocean acidity
 - Death of coral reef and land downs
 - Death of certain marine life such as planktons
 - Reduction in coral growth rates, and their skeleton becomes weaker
3. Threat to human survival
 - More frequent natural disasters and disease outbreaks
4. Impact on the economy
 - A sick society results in poor work output

Evidences and Examples of the impacts of global warming and climate change

1. Rising sea level
 - Sinking atolls – Cataretts (AROB) and Duke of York Islands (ENBP)
 - Morobe Patrol Post (MP)
2. Natural Disasters
 - Frequent floods, landslides, droughts, famines
3. Hunger and drought
 - Arable land on smaller islands affected, including source of drinking water
4. Infection increases in higher altitude
 - Malaria infection increase in frequency in the highlands
5. Molecular and genetic make up of plants and animals alters
 - Plants adopting to warmer climate
 - Animals die out if they cannot adopt
6. Threat to health
 - Rise of waterborne infections
7. Threat to economy
 - Poor production of cash crops (due to drought) leading to less revenue
8. Changes to natural ecosystems
 - Plants normally found in warmer climate are now growing in cooler and high altitudes. Others migrate further up to more cooler regions

Examples:

Sea level rise in Morobe Patrol Post – MP



Drought and famine in the highlands (PNG)

