Climate Adaptation Seminar
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Climate Adaptation Activities and Experience in Malaysia

by

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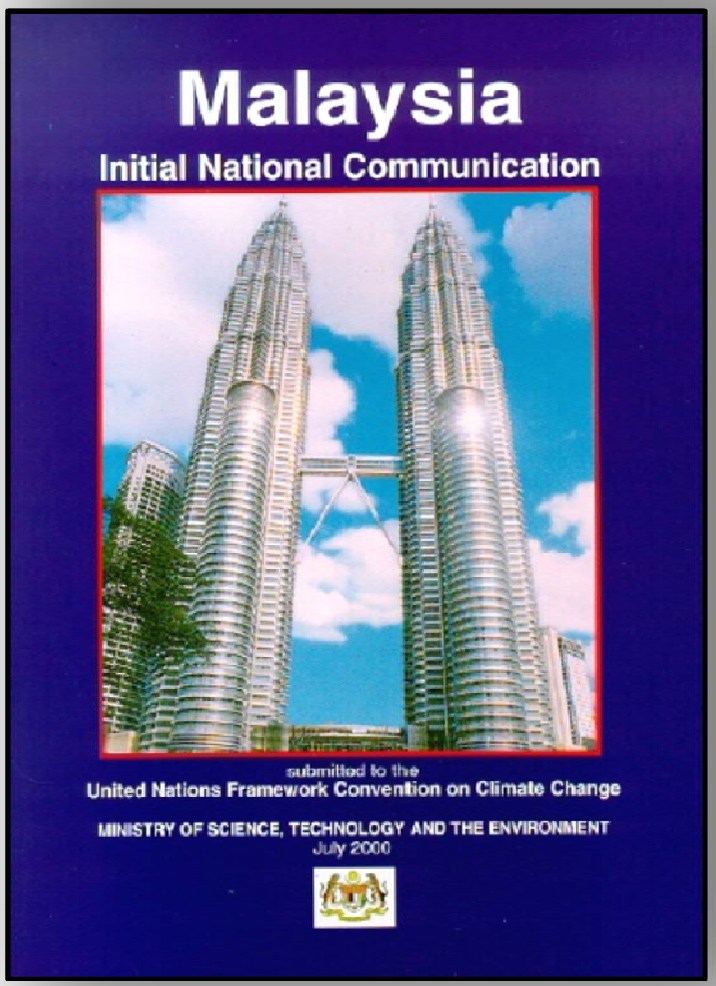
Malaysia's National Assessments: Impacts, Risk & Adaptation

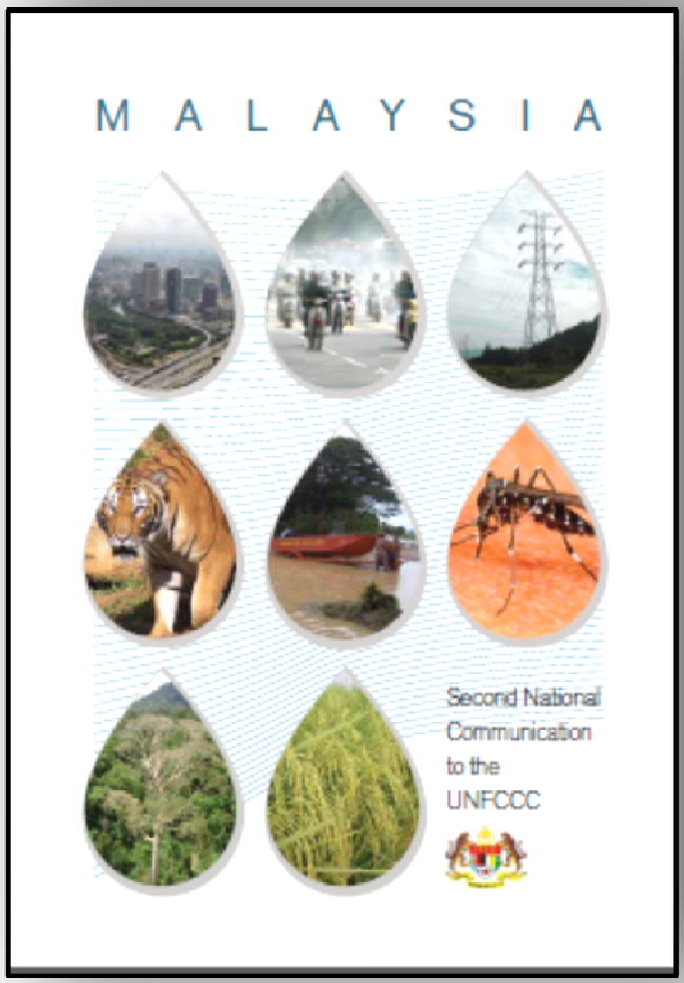
- **Initial National Communication (INC) and Second National Communication (NC2) to the UNFCCC**

Impacts of climate change on important sectors as identified in the Initial National Communication (INC) and the Second National Communication (NC2)

INC (2000)



NC2 (2010)

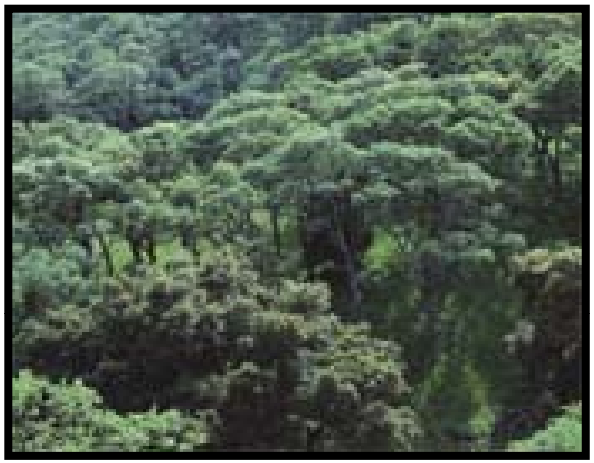


Important Sectors:

Agriculture

Water Resources

Forestry



Coastal & Marine Resources

Public Health

INC (2000) to NC2 (2010)

- **Adaptation measures** as identified under the INC are still valid and have been expanded further for NC2;
- **Research projects** have been undertaken to address problems related to climate change that were identified under INC;
- Some measures were **implemented as part of the organization's normal operation**;

INC Vulnerability Assessment: Water Resources

Impacts:

- Water supply
- Water quality

Risks:

- Flooding
- Erosion and sedimentation
- Water availability

Suggested Adaptation Measures:

- Demand side management for water resources
- Enlarging reservoir capacity
- Improving on hydrological forecasting
- Sustainable use of groundwater
- Changing land use practices
- Inter-basin water transfer
- Increase in drainage
- Buffer zones in agriculture & industries to minimise erosion and sedimentation

NC2: Adaptation Strategies on Water Resources

Water Supply:

- ✓ The per capita consumption and non-revenue water losses should be reduced as a measure to adapt to climate change, especially to prepare for extreme droughts;
- ✓ the water supply sector will have to develop good water harvesting techniques for water conservation (increase reservoir capacity and storages);
- ✓ To improve weather and flood forecasting system would support and improve water supply management

Irrigation:

- ✓ the adaptation would be to improve irrigation efficiency;
- ✓ to develop good water harvesting techniques for the projected low rainfall periods especially during main seasons (increase irrigation supply capacity and storages);
- ✓ Rainwater harvesting, soil-water management and drainage improvement should be strengthen;

NC2: Adaptation Strategies on Water Resources ...cont

Flood:

- ✓ Flood mitigation measures and drainage systems should be one of the adaptation measures;
- ✓ Flood management and design (incorporating updated historical records and future hydroclimate projections) should also be reviewed, thus, the facilities would be able to withstand the climate change especially during extreme weather;
- ✓ Structural safety and integrity should also be reviewed;
- ✓ Improved rainfall, flood forecasting, warning and response system; where action to be taken in time;
- ✓ "**No-Regret**" solution project - could reduce or absorb any negative impacts of climate change and therefore, in a way, be considered as V&A assessment and measures;
- ✓ **Water resources project** - recommended that the approach be on a regional basis and integrated with all the sectors in competition;
- ✓ **Data collection** for projection models should be continued and improved;
- ✓ Efforts to **integrate water resources management systems** should be accelerated.

INC: Vulnerability Assessment on Agriculture

How Climate Change Affects the Agriculture Sector:

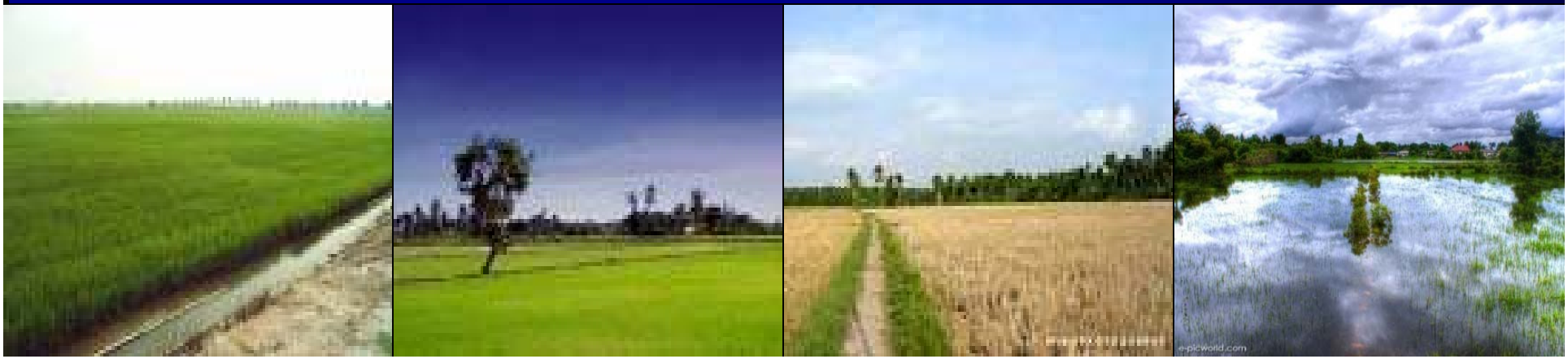
- Increase in rainfall is bad for rubber due to loss of taping days and crop washout
- Oil palm could flourish with higher rainfall, unless flooding occurs
- 273,000 ha of land or 15% of current rubber land could be affected without supporting mechanisms
- Rise in sea level could force the abandoning of low-lying planted areas




How Climate Change Affects The Agriculture Sector .....cont.

- Rice grain yields may decline by up to 10% for each 1 degree Celcius rise in temperature

- Prolonged droughts due to climate change would affect rice ecosystems, and could jeopardise security of food supply



Suggested Adaptation Measures in Agriculture

- **Develop plant varieties that are tolerant to high temperatures and high water use efficiency**
- **Maximise efficient usage of water and nutrient input**
- **Preserve permanent forest reserves (PFRs) & water catchment areas**
- **Develop appropriate management practices for post-harvest**
- **Develop appropriate responses to land use conversion**

NC2 Adaptation Strategies on Agriculture

- ✓ Policies that support research, system analysis, and extension capacity that provide information need to be strengthened to allow scaling up of knowledge.

- ✓ Technical and other options necessary to respond to the projected changes need to be available. Where existing technical options are inadequate, investment in new technical strategies such as improved crop including biotechnology may be required. In some cases old approaches can be revived that may be suited to new climate challenges.

- ✓ New infrastructure, policies and institutions could be developed to support new management.

- ✓ A range of future research priorities need to be considered for improvement of assessment that includes agricultural research, cross disciplinary research and climate modelling.

INC Vulnerability Assessment: Forestry

Impacts:

- Loss of habitat and species






Risks:

- Loss of carbon sinks
- Loss of the global biological system

Suggested Adaptation Measures:

- Enhance ecosystem services
- Forest plantation establishment
- National seed bank collection
- Promotion of sustainable use of timber
- Reduction of wastage in forest harvesting and increase efficiency in wood processing
- Strengthen and integrate conservation of protected areas

NC2 Adaptation Strategies on Forestry

- ✓ To establish more seed banks to ensure the availability of quality seeds.
- ✓ To accelerate reduction of wastage in Forest Harvesting and increase the efficiency in Wood Processing.
- ✓ To increase forest plantation.

INC Vulnerability Assessment: Coastal and Marine Resources

Impacts:

- Erosion of beaches
- Inundation of coastal lands & saline intrusion
- Increase wave action
- Acidification of ocean

Risks:

- Loss of agriculture lands
- Loss of fisheries production
- Additional costs to protect coastal communities
- Interruption of port operation

Suggested Adaptation Measures:

- Integrated coastal zone management
- Regulating building development in the coastal zone
- Creating a coastal buffer zone & reclaim the intervening areas
- Coastal land buyback – convert to natural reserve/corridor
- Building defend option such as bunds/ seawalls/ levees/ dykes

NC2 Adaptation Strategies on Coastal & Marine Resources

- ✓ The hard and soft engineering shore protection measures need to be combined. These shore protection structures can also be combined with mangrove replanting program.

- ✓ There is a need to improve and modify the drainage system.

- ✓ Natural processes within the coastal and marine sector have to be in its existing equilibrium.

- ✓ For long term, the Government should develop comprehensive management plans for areas at risk from sea level rise as part of the Integrated Shoreline Management Plan (ISMP)

INC Vulnerability Assessment: Public Health

Impacts:

- Dangerous vector-, air-, food- and water-borne diseases due to high rainfall and temperatures
- Migration of foreign diseases
- Deaths due to heat stress

Risks:

- More and new breeding grounds suitable for the malaria & dengue vectors
- Raises transmission opportunities for the vector-, air-, food- and water-borne diseases
- Re-emergence of contained diseases

Suggested Adaptation Measures:

- Strengthening of the existing programme for health surveillance and monitoring systems
- Emergency health preparedness and disaster management plan, which is periodically updated due to environmental factors and climate change

NC2 Adaptation Strategies on Public Health

Vector Borne Disease-

Malaria - the Vector-borne Disease Control Programme is in the process of revising the control program into an elimination programme; strengthening and improvement of current strategies, changing the drug regimen to a more effective artemisinin combination therapy (ACT);

Dengue - to enhance surveillance, improve vector control, develop new tools for dengue control and enhancing community participation in dengue control activities;

Food and water-borne diarrhoeal diseases - holistic and comprehensive water management system and flood mitigation strategy; **Crisis Preparedness and Response Centre** (CPRC) has been established to monitor outbreak occurrence and to initiate;

Access to health care – to improve the health services in the rural areas, generally populated by the poor and disadvantaged by means of to bring specialist care closer to the homes of the rural communities with the introduction of new technology, i.e. IT via the Teleprimary Care (TPC)

NC2 Vulnerability Assessment on Biodiversity Sector

- The impact on biodiversity is complex.
- Some species of plants and animals could be destroyed whilst others either adapt in the same location or migrate to more suitable environments.
- The projected increase by nearly 2°C is equivalent to a shift in climatic conditions of about 150 to 300m altitude levels.

NC2 Adaptation Strategies on Biodiversity

- ✓ Since most of the biological resources are the least adaptive, both **scientific and legislative measures** could be instituted for biodiversity conservation;
- ✓ **Scientific measures** – studies on biodiversity resources in coastal zones and montane forest;
- ✓ **Legislative amendment and review** - additional protection to wildlife resources and forest tree species;
- ✓ **Studies proposed**:
  - in protected areas and on plants and animals;
  - the use of ecosystem approach in the management of protected areas;
  - to carry out modeling in marine and terrestrial protected areas in Malaysia;
  - **Establishment of gene bank** for biodiversity resources in Malaysia and vitro genebanks for endangered/threatened animal
- ✓ Establishment of the **seed centre for plant diversity**, botanic gardens for ex-situ plant conservation of threatened species and animal sanctuaries, captive breeding and rehabilitation centres.

NC2 Vulnerability Assessment on Energy Sector

- The assessment of V&A for energy sector concentrates on two energy-supplier components i.e. electricity and oil and gas sectors and one energy-user component which is the transport sector. In general, the vulnerability of these sectors to the climate change will subsequently result in distortion of energy supply to the users and disruption to people and goods transportation/movement.
- Looking into depth on the vulnerability aspect of each sectors, the impact of climate change affected the operational and facilities of the sectors. Most of the major effects are resulted from extreme weather condition while several other minor effects such as reduction of technical efficiency, structural and facilities damages as well as others operational failure are expected to occur due to increase of air temperature and sea level rise.
- In the cross sectorial perspective, the impact of climate change on the energy sector is expected to have less effect to the other sectors concerned under the study. However, the effect would be much higher to the socio economic of the country as the energy sector is the main component of the country economic growth.

NC2 Adaptation Strategies on Energy

- ✓ Oil and gas and electricity sub-sectors - the recommendations were divided into short, medium and long terms projects.
- ✓ The **oil and gas sub-sectors** highlighted the need for studies to be conducted on the intensity and frequency of lightning strikes as well as measures to protect against potential lightning strikes.
- ✓ The **electricity sub-sector** highlighted the need to conduct studies on turbine efficiency, sedimentation and coastal erosion.
- ✓ The **transport sub-sector's** recommendations include regular ground stability monitoring, early flood detection mechanism and flood control infrastructure for the rail component; sustainability of aviation activities such as noise from the aircraft and CO2 emissions for the aviation component

Vulnerability Assessment

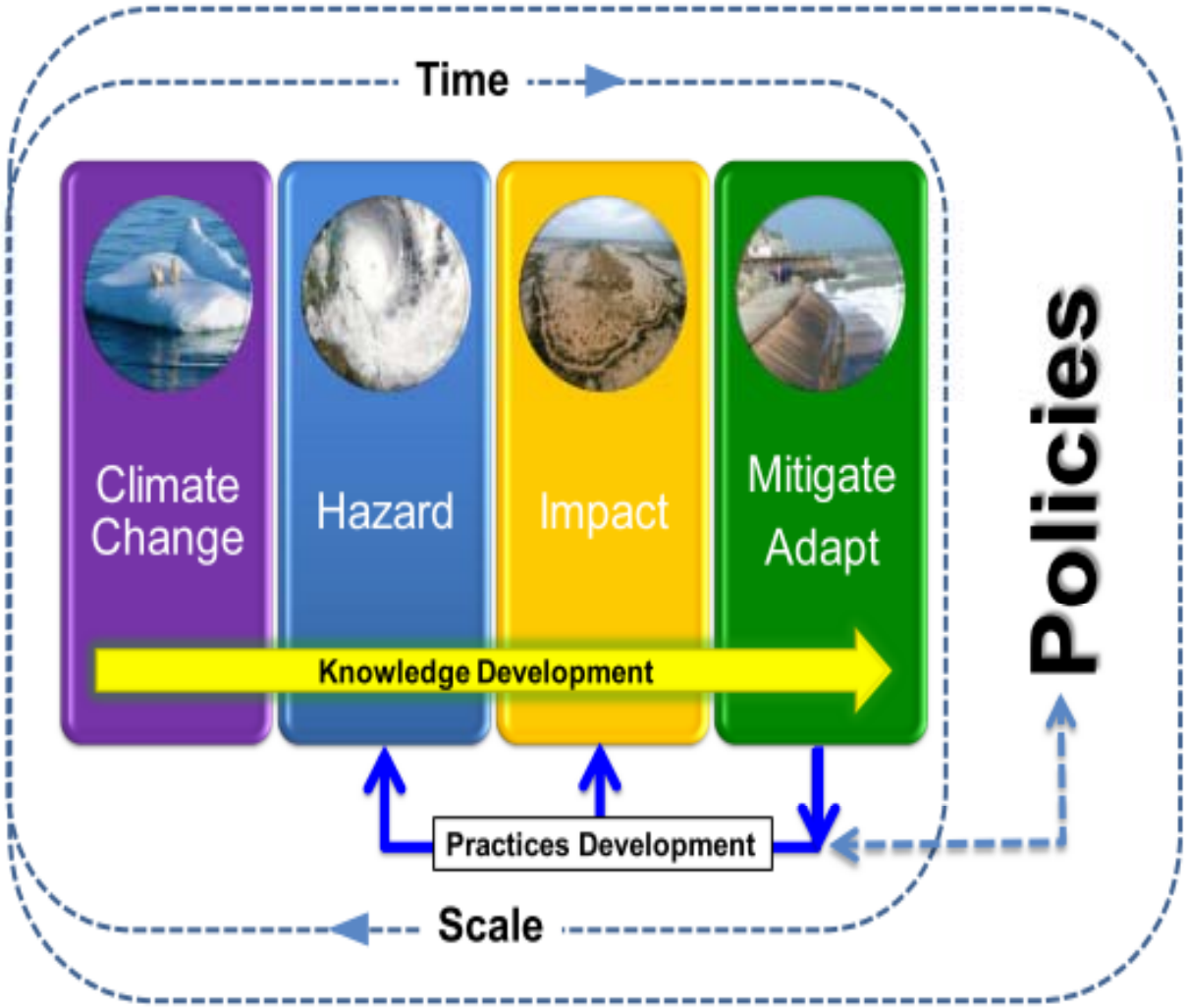
Cross-sectoral

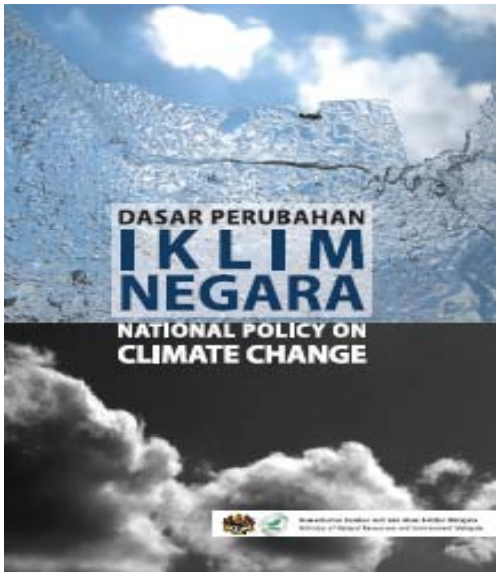
- The cross-sector analysis based on a regional approach shows a strong linkage between all the sectors and thus within sector impacts and vulnerability affects other sectors.
- The water resources sector is found to be more dominant than the other sectors but its vulnerability is dependent on all other sectors too.
- Well developed regions with high demands of water are most vulnerable to climate change. Based on the Sector Dependence approach, all sectors are found to be directly dependent on the Water Resources, Energy and Public Health Sector.
- The common impact and vulnerability of all sectors are related to flood and drainage issues such as flooding and water quality.

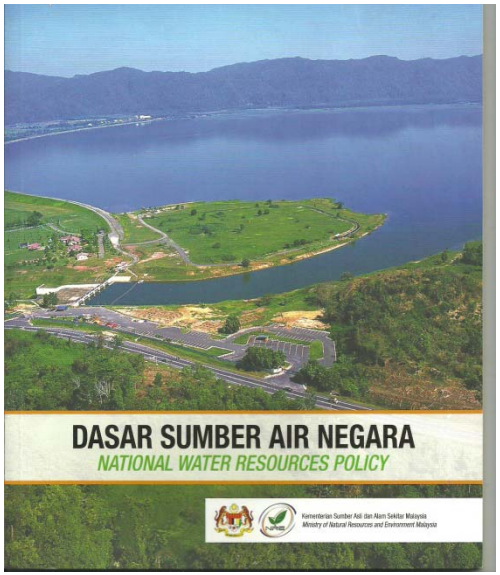
Gaps and Uncertainties

- All sectors reported critical gaps and uncertainties in efforts to assess climate change impacts and vulnerabilities as well as developing adaptation measures.
- One of the gaps is knowledge and skills in the V&A process.
- Another major gap appears to be the lack of appropriate mathematical models.
- The critical need would be those sectors involved in humans, plants and animals particularly the Agriculture, Biodiversity, Forest, Coastal and Marine and Public Health sectors.
- These models are needed because actual physical studies on the physiological responses to climate change will require considerable time.
- Adaptations proposed without adequate data and information may be erroneous and costly or even irreversible.
- There is also a lack of data and information collection system that specifically incorporate V&A requirements.

.....pathways from knowledge to adaptation policies.....







.....to strenghtening climate change related policies...

THANK YOU FOR YOUR ATTENTION