

4th Biennial Caribbean Environmental Forum and Exhibition

Climate Change, Water and Sanitation: A shared Responsibility

PARALLEL SESSION#6
Climate change & Disaster
Management

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CLIMATE CHANGE & DISASTER MANAGEMENT

- Paradigm of disaster management changed from response to mitigation (prevention, reduction of impact).
- Most disasters in region derived from a climate signal – floods, landslides, drought, hurricanes.
- For these climate change adaptation (increase resilience, prevention, reduced impact) & disaster mitigation same.
- Need for closer collaboration, sharing of information, development of common tools(hazard maps etc.)

CLIMATE CHANGE CARICOM PERSPECTIVE

- **CARICOM countries' contribution to global GHG emissions budget negligible.**
- **However particularly vulnerable to impacts of climate change.**
- **Already region vulnerable to present day risks from climate variability.**
- **Incumbent on region to build capacity to adapt to climate change.**

CARICOM INITIATIVES

- Caribbean Governments have initiated regional action to address issue which was accorded top priority in BPOA:
 - CPACC (1997 – 2001)
 - ACCC (2001- 2004)
 - MACC (2004 – 2008)
 - CCCCC establishment (2004)
 - SPACC (2007 – 2010)







INITIATIVES IN PROGRESS

- **Suite of activities to determine:**
 - **extent of risk arising from climate change to which region will be exposed in future.**
 - **vulnerability of the region's natural and socioeconomic systems to climate change.**
 - **impacts of CC on the natural and socioeconomic systems of the region.**
 - **regional response to mitigate those impacts and costs for implementing.**
 - **implementation of mitigative actions (ADAPTATION)**
 - **building regional capacity to carry out the above actions**

Defining the risk

- **Expected to answer the following:**
 - **What is expected change in-**
 - **Temperature**
 - **Sea level**
 - **Frequency of weather extremes – El Nino, La Nina**
 - **Frequency and intensity of hurricanes**
 - **Frequency in return periods of extreme events – floods , droughts**
 - **Patterns and intensity of precipitation**

Mainstreaming Adaptation to Climate Change (MACC) Project 2004 - 2008

- (a) downscaling

- (b) regional climate change projections

- (c) regional climate change scenarios

- (d) (c) + impact models (crop, hydrology models)

- (e) impacts of extreme events under different climate scenarios


- (f) Climate impact scenarios

Water- An Essential Commodity

- Sustainable development in the Caribbean requires the provision of adequate and affordable supplies of water to maintain:
 - Agriculture
 - Health
 - Tourism
 - Ecosystem health
 - Domestic uses
 - Industry
 - Energy (hydro)

Existing Impacts on Regional Water Supply

- Water supply already impacted on by:
 - Generic shortages
 - Population growth & urbanisation
 - Pollution – waste disposal & agriculture
 - Increased sectoral demands – tourism, agriculture.
 - Wasteful practices
 - Watershed degradation
 - Bad land use practices – sedimentation
 - Management issues – sectoral approaches to resource management

All these impacts will be further exacerbated by climate change.

Global Climate Trends

Recently released Fourth Assessment Report of the IPCC concludes:

- Unequivocal evidence that the earth's temperature is rising and attributable to anthropogenic activities – **Green House Gases**
- **Rise in global temperatures** of between 2 -4.5 °C.
- Sea level rise of between 11 -77 cm.
- Changed weather patterns
- **More intense extremes –drought ,floods**
- **More intense hurricanes**

Key Messages For The Water Sector

- Summary of key messages for the water sector :
- Warmer Caribbean Temperature - thus evaporation losses will increase significantly
- Rainfall has declined by a few per cent in some parts of the region and this is expected to continue.
- Projections by 2050 for the rainy season – less by 7 – 8%
- Projections by 2050 for the dry season - up by 6 – 8%
- However, dry season increase not enough to overcome evaporation loss increase.

Key Messages For The Water Sector

- Paradoxically frequency of intense rains – up by 3% on average and this is projected to increase to 20% by 2050.
 - More erosion and contaminants to coastal areas
 - How will this affect infiltration and recharge?
- Sea level rise – increased salt water intrusion – augmented by storm surges. But regional distribution of sea level rise not well predicted.
- Strongest hurricanes more intense – increasing disaster losses

Consequences Of Climate Change.

- Change in rainfall regimes
- Increased evaporation with higher temperature
- Increased evapo-transpiration (soil moisture)
- >> SLR – salt water intrusion (estuarine, aquifers)
- Decreased precipitation
- Increase in extreme events – droughts, floods
- Increased intensity of heavy rain events – rapid run off / flash floods, >> soil erosion, >> run off of contaminants
- >> intensity of hurricanes
- Adverse effects on coastal waters

Coastal Vulnerability and Risk Assessment

- Studies (CPACC) in Barbados, Guyana, Grenada for scenarios of 0,2m SLR by 2020, 0.5 SLR by 2050, and 1m SLR by 2100:
 - **Barbados**
 - St. Michael and St. Philip aquifers which produce 75% of island water safe from saline intrusion
 - West Coast aquifers already showing signs of salt water intrusion
 - **Grenada**
 - 0.5 SLR will have severe hydrological impact in Carriacou
 - 1.0 SLR will lead to salinisation of wells in South peninsula of Grenada

Coastal Vulnerability and Risk Assessment

– Guyana

- In dry season estuarine penetration of brackish water for more than 60km. SLR will >> extent of penetration
- Coastal aquifers already experiencing salt water intrusion. Will >> with SLR

Climate Change Concerns in the Sector

- Need to Adapt
 - Increasing variability in the hydrological cycle evident over last 30 years in many parts of world
 - Chances are that this will intensify with global warming
 - Extreme weather events becoming more common and severe and bring mounting human suffering and escalating economic losses

Climate Change Concerns in the Sector

- Risk to National Development. Lost crops, lost power generation, physical damage to transportation and infrastructure can wipe out decades of development. MDGs for hunger and poverty at risk by threat of more frequent climate extremes
- Natural systems impacted on. Effects of climate extremes super-imposed on >> water demands for all uses means diminished availability of water to preserve ecosystems
- The poorest in developing countries most vulnerable

Sector Adaptation

– Adaptation

- Water resources managers previously utilised past records of rainfall and river flows (allowing for evaporation and other losses) to design water management systems
- Predictable hydrological cycle meant that reservoir storage volumes and operating rules could be used to balance effect of wet and dry season
- No longer feasible due to fluctuations caused by climate change signals
- Strategy to review existing water management operations in the light of today's hydrological circumstances – will move towards coping with future climate change

Sector Adaptation

– Adaptation Options

- Policy instruments
- Technological and structural instruments
- Risk sharing and spreading
- Change of use, activity or location

Sector Adaptation

– Policy Instruments

- **Mainstreaming climate issues into national water management policy:**
 - **Updated assessments of meteorological and hydrological data need to be integral part of water resources management**
- **New ways of planning that cut across individual sectors and areas of responsibility .**
- **Change traditional land use planning practices to give greater weight to new factors such as**
 - **Flood risk**
 - **Maintaining water supply/demand balance**
 - **Security of supply**
- **Demand side management – pricing policies to encourage**
- **Incentives for investments in technological options**

Sector Adaptation

Technological and Structural

- Access to and use of forecasting and early warning systems based on short- to medium-term weather forecasts.
- Increased storage (cope with rainfall and runoff)
 - Reservoirs – design & capacity
 - Ground water storage (less evaporation) from storm water runoff, irrigative return flows, reused waste water
 - Rainwater harvesting
- Water-saving domestic devices- domestic, tourism

Sector Adaptation

- Technical measures to increase supply e.g.
 - reservoir volumes,
 - water transfers,
 - desalinization.
- Increase efficiency of water use –
 - leakage reduction
 - use of grey water
 - more efficient irrigation
- Landscape planning to improve water balance-
change land use, reforestation.

Sector Adaptation

– Risk-sharing and spreading

- New insurance products – crop insurance and micro-insurance mechanisms. Private sector – self-insurance schemes
- Use of risk-management approach in planning adaptation options for sector
- Micro-finance schemes for rebuilding
- Use of alternative crops and planting schedules to spread risks

Sector Adaptation

– Change of use, activity or location

- Resettlement
- Prescriptive spatial and land use planning
- Prohibit development in flood plain without necessary safeguards
- Mariculture in inundated low coastal agricultural lands

Sector Adaptation

– Needs in the region

- (a) Data
 - Restoring and extending hydrological data base
 - Resource inventories
 - Long-term climate data
- (b) Downscaled climate models
 - Resolution scale of global models too small and timescale too long to encompass local climate variability
 - Coupling of climate & hydrological models
- (c) Capacity to forecast climate at basin, regional or national level over seasons or years – short-term forecasting

Sector Adaptation

- (d) Integrated Water Resources Management (IWRM)
- (e) Capacity for vulnerability assessments, hazard mapping, risk management approach to factoring climate risks in water resources planning
- (f) Public Education and Outreach
- (g) Participation of civil society in the articulation of and implementation of policies related to the prudent and sustainable management of water resources

Regional Studies

- MACC project
 - vulnerability & Impact pilot studies
 - Jamaica – aquifer salinisation
 - Belize -- Watershed
 - St Lucia - Watershed
- CCCCC – SPACC project
 - Implementation of adaptation measures
 - St Lucia –Vieux Fort watershed
 - St. Vincent & the Grenadines –Bequia
 - UNESCO aquifer pilot study –Jamaica, T&T

ENERGY

- Region economy highly Carbon intensive & not as competitive as it can be.
- Heavy outflow of foreign ex. to meet escalating energy bill.
- Endogenisation of regional energy sources coupled with effective demand and supply side management practices regarded as essential part of region's adaptive strategy.

ENERGY

- Although region emits miniscule percentage of global emissions opportunity to utilise the CDM mechanism under Kyoto to put energy sector on more sustainable footing.
- CDM projects in the areas of:
 - Energy efficiency
 - Renewable energy – solar, geothermal, wind, OTEC, biofuels, wave
 - Landfill gas (waste management)
 - Ethanol – transformation of sugar industry



For further information please contact us at:

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THANK YOU

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