



UNITED NATIONS



Economic Commission for Latin America and the Caribbean
Subregional Headquarters for the Caribbean

First expert group meeting
Development of economic frameworks in support of an assessment of
the economic and social impacts of climate change in the Caribbean
Port-of-Spain
27-28 October 2011

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**REPORT OF THE FIRST EXPERT GROUP MEETING
DEVELOPMENT OF ECONOMIC FRAMEWORKS IN SUPPORT OF AN
ASSESSMENT OF THE ECONOMIC AND SOCIAL IMPACTS OF CLIMATE
CHANGE IN THE CARIBBEAN**

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A. DECISIONS AND RECOMMENDATIONS

1. The following decisions and recommendations were adopted:
 - (a) The data sets that were agreed at the meeting would be finalized and shared with all experts as well as the national consultants
 - (b) It was agreed that the collection of monthly time series data was the most desired, to support the assessment of the economic and social impact of climate change
 - (c) It was agreed that in cases where specific data were not available, options to collect primary, quantitative data for assessing the impact of climate change on Caribbean economies would be explored
 - (d) Given the participation of experts from the University of the West Indies (UWI), it would be appropriate if UWI could continue that work after the Economic Commission for Latin America and the Caribbean (ECLAC) projects were completed

B. ATTENDANCE AND ORGANIZATION OF WORK

1. Place and date

2. The first expert group meeting, Development of economic frameworks in support of an assessment of the economic and social impacts of climate change in the Caribbean, was convened by ECLAC subregional headquarters for the Caribbean, on 27-28 October 2011 in Port of Spain.

2. Attendance

3. Experts in the areas of agriculture, coastal and marine resources, energy, health, tourism and water attended the meeting. The Caribbean Community Climate Change Centre (CCCCC) was also represented.

3. Agenda

4. The meeting adopted the following agenda:
 1. Adoption of the agenda
 2. Data requirements for the:
 - (a) Agriculture sector
 - (b) Coastal and marine sectors
 - (c) Energy sector
 3. Econometric modelling of the economic and social impact of climate change on the agriculture, coastal and marine and energy sectors in the Caribbean
 4. Data requirements for the:
 - (a) Health sector
 - (b) Tourism sector
 - (c) Water sector

5. Econometric modelling of the economic and social impact of climate change on the health, tourism and water sectors in the Caribbean
6. Recommendations and conclusions
7. Closure

C. SUMMARY OF PROCEEDINGS

1. Opening of meeting

5. Charmaine Gomes, Coordinator of the Sustainable Development Unit, ECLAC subregional headquarters for the Caribbean, opened the meeting and provided the background to the initiative. Essentially, the project would build on the achievements of the Department for International Development (DFID)-funded initiative through the conduct of regional assessments of the economic and social impact of climate change on Caribbean economies. Additionally, the project was expected to build regional capacity in econometric modelling.

2. Adoption of the agenda

6. The provisional agenda was adopted.

3. Data requirements for the: (a) agriculture, (b) coastal and marine, (c) energy, (d) health, (e) tourism, and (f) water sectors

7. The meeting agreed that it was important to build on past studies that were conducted under the Review of the Economics of Climate Change in the Caribbean, and the Understanding the Potential Impacts of Climate Change in the Caribbean projects. The new study, however, would explore six sectors: agriculture, coastal and marine environments, energy, health, tourism and water at the regional level. The countries covered under the project included CARIFORUM¹ and Cuba (16 countries).

8. The project was expected to contract 16 national level data collectors, who would be responsible for collecting all the necessary sectoral data within their respective countries. The discussion explored the modalities of devising a regional position, especially considering that each national study would have 16 data sets and different methodologies. Further discussion focused on the anticipated gaps in time series as well as lack of crucial data. The national consultants were due to be recruited in December 2011 for a period of three months. International consultants would then be recruited to utilize those national data in assessing the economic and social impact of climate change at the regional level. Further working group sessions would be scheduled to discuss methodological issues as the project progressed.

9. It was noted that the working group session, scheduled for 17-18 November 2011, would host both international and regional experts. That forum would discuss and explore macroeconomic modelling frameworks. It was suggested that since most consultants involved in ECLAC climate change work were from UWI, that institution would be well poised to continue future work in that area across the region upon the completion of the Australian Aid for International Development (AusAID) project in 2012.

¹ Antigua and Barbuda, Bahamas, Barbados, Belize, Dominica, Dominican Republic, Grenada, Guyana, Haiti, Jamaica, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Suriname and Trinidad and Tobago.

10. There was a call for a more harmonized approach to developing data sets for the project, and the identification of gaps in the relevant research areas. During the discussion, it was noted that the region lacked the data necessary for use of general equilibrium models. However, it was suggested that consultants could work more closely to generate a more cross-sectoral analysis that could be used to develop a general equilibrium model and, thereby, translate those results into a regional policy. In that regard, there was discussion on whether or not it should be a single regional model or a number of models that would connect to each other. It was agreed that there was a need to identify the indicators which could be fed into the regional model. Another suggestion was to embed the proposed adaptation methods into the models to assess the type of impacts, leading to a more realistic reflection for policy development. It was also noted that national programmes could not be divorced from regional programmes.

11. Discussions then focused on fine-tuning the lists of data that would be presented to the national data collectors. The meeting expanded the best lists for each sector, as well as linkages among sectors, with the idea of reporting on the domino effect that climate change would have across all sectors. In all cases, the participants focused on identifying the specific information required in building the models. The final ideal data sets also included contingencies and proxies in the event sufficient data would be unavailable.

12. A set of general data requirements was identified across all sectors which was collated in a separate document.

4. Recommendations and conclusions

13. A representative of ECLAC thanked participants for the productive work accomplished in the meeting, and noted that ECLAC looked forward to continued collaboration on that initiative. The listing of required data sets that were agreed at the meeting would be finalized and shared with all experts as well as national consultants. Many of the challenges in data gathering were identified, and a rationale provided for the requirement for monthly time series of data in support of the assessment of the economic and social impact of climate change.

14. The meeting noted that ECLAC had started the initiative on assessment of the economic impact of climate change and recommended that, given the participation of experts from UWI, it would be appropriate if that institution could continue the work after the ECLAC projects were completed. It was further noted that despite the challenges, there was a spirit of willingness in the Caribbean subregion to continue economic assessments with a view to projecting the impact of climate change. Moreover, it was observed that the era of speculation with respect of the economic impact of climate change had long elapsed, and that confidence had grown in the area of climate change among experts.

5. Closing remarks

15. The representative of ECLAC thanked participants for contributing to the meeting and for the technical expertise utilized in finalizing the lists of data for each sector. Participants would look forward to the next meeting that would be convened by ECLAC under the AusAID project.

Annex I**List of participants**

Haleema Ali, Research Assistant, HEU, Centre for Health Economics, University of the West Indies. E-Mail: Haleema.Ali@sta.uwi.edu

Mark Bynoe, Senior Environmental/Resource Economist, Caribbean Community Climate Change Centre. E-Mail: m_bynoe@yahoo.co.uk / mbynoe@caribbeanclimate.bz

Sharon Hutchinson, Lecturer, Department of Agricultural Economics, Faculty of Science and Agriculture, University of the West Indies. E-Mail: Sharon.Hutchinson@sta.uwi.edu

Troy Lorde, Department of Economics, University of the West Indies. E-Mail: troy.lorde@cavehill.uwi.edu / troylorde@hotmail.com

Winston Moore, Department of Economics, University of the West Indies. E-Mail: Winston.Moore@cavehill.uwi.edu

Economic Commission for Latin America and the Caribbean (ECLAC)Subregional Headquarters for the Caribbean

Dillon Alleyne, Economic Affairs Officer. E-Mail: Dillon.Alleyne@eclac.org

Nia Cherrett, Associate Environmental Affairs Officer. E-Mail: Nia.Cherrett@eclac.org

Charmaine Gomes, Sustainable Development Officer. E-Mail: Charmaine.Gomes@eclac.org

Willard Phillips, Economic Affairs Officer, E-Mail: Willard.Phillips@eclac.org

Annex II

List of background documents

1. Data lists for the agriculture sector
2. Data lists for the coastal and marine sector
3. Data lists for the energy sector
4. Data lists for the health sector
5. Data lists for the tourism sector
6. Data lists for the water sector

Annex III

List of data requirements

(a) Agriculture sector

Monthly series between 1970-2010 (if not available quarterly)

General agricultural data:

- (a) Soil type and area per hectare of each soil type by output type
- (b) Historical monthly climatic data from the meteorological office in each country
 - Rainfall (mm)
 - Average mean temperature (°C)
 - Average high temperature (°C)
 - Average low temperature (°C)
 - Humidity
 - Incidence of extreme events – tropical cyclones (storms, hurricanes etc) – dates of occurrence, severity, and a breakdown of costs to the agricultural sector in terms of direct damage and losses which represent the future lost income associated with the event.
- (c) Consumer price index
- (d) Total import quantities and total values (including the Cost Insurance Freight price, Value Added Tax (VAT) and all duties) of farm inputs, into each country:
 - Machinery
 - Fertilizers for crops
 - Growth enhancers/medication for livestock
 - Pesticides
- (e) Changing land use (e.g. land area by sector)

It would be good if the data could be obtained at the farm level i.e. data on each farm, but if this is not available, then aggregate data will have to be used.

- (f) Farm level production data by:
 - Farm size
 - Commodity
 - Land tenure
 - Type of farming (e.g. commercial, subsistence)
 - Region
- (g) Monthly data on total area under production hectares (ha) – all crops.
- (h) New area planted (ha) – all crops. This refers to new areas planted in each month.
- (i) Area harvested (ha) – all crops.

- (j) Studies on shifts in agricultural activity to alternative crops (e.g. marijuana)
- (k) Information on the level of food storage capacity
- (l) Information on the level of food processing capacity

Crops:

- (a) Monthly data on harvest quantity (kg) and prices (US\$/kg) at various levels (farm-gate, wholesale and retail) – all crops. The most important of the prices is the farm-gate price, followed by the wholesale price.
- (b) Monthly data on total input use on all farms:
 - Fertilizer [quantity (kg) and total cost (US\$)]
 - Pesticides [quantity (kg) and total cost (US\$)]
 - Farm machinery [quantity (kg) and total cost (US\$)]. (This is sometimes provided in numbers of tractors etc, but also provided in kg, which while not intuitive, provides a standardized approach for all types of machinery and equipment)
 - Herbicides [quantity (kg) and total cost (US\$)]
 - Labour
 - ❖ Quantity (# man-days, or # full-time and # part-time employees if the hours worked by each category of worker is clear)
 - ❖ Wages (total labour cost for all employees - US\$)
 - ❖ Family labour (US\$)
- (c) Type of irrigation used per hectare area under each kind of irrigation (e.g. drip, flooding)
- (d) Type of production technology by area planted (ha):
 - Protected (e.g. greenhouses, shade houses) and open field.
 - Description of the production system (e.g. highly mechanized or labour intensive)
 - Description of number and types of conservation measures (e.g. water, energy and soil)
 - Number, type and capacity of on-farm water storage facilities
 - Number, type and capacity of on-farm by-product use (e.g. livestock manure or mulch used to fertilize crops)
 - Level of integration between crop and livestock systems
- (e) Information on research and development to support adaptation to climate change (e.g. improved crop varieties)
- (f) Pest and disease incidence in terms of damage costs (US\$)

Livestock:

- (a) Monthly data for all types of livestock:
 - Key livestock: poultry, pigs, cattle, sheep, goats, other small ruminants such as rabbits
 - Data on quantity reared (kg)
 - Quantity slaughtered (kg of live weight)

- Farm-gate, wholesale and retail prices for animals sold (US\$/kg)
- (b) Types of technology used in livestock rearing:
- Intensive and extensive systems (e.g. for poultry: open pen system or wind ventilated tunnels)
 - Description of the production system (e.g. highly mechanized or labour intensive)
- (c) Information on research and development to support adaptation to climate change (e.g. improved livestock varieties)
- (d) Quantity and cost of all inputs used in livestock production:
- Feed [quantity (kg) and total cost (US\$)]
 - Veterinary services/medications (cost in US\$)
 - Machinery [quantity (kg) and total cost (US\$)]
 - Labour
 - ❖ Quantity (# man-days, or # full-time and # part-time employees if the hours worked by each category of worker is clear)
 - ❖ Wages (total labour cost for all employees - \$)
 - ❖ Family labour (US\$)
 - Pest and disease incidence in terms of damage costs (US\$)
- (e) Monthly fisheries data for all the landing sites in each country (in aggregate) – this includes all types of seafood:
- Landings (kg/tons)
 - Ex-vessel (landed) value \$/kg (or \$/ton)
 - Number of trips taken by fishers
 - Number of vessels
 - Type/size of vessels used in the fishery
 - Sea surface temperature

(b) Coastal and marine sector

The challenge of separating human induced climate change from natural climate change was acknowledged. It was recognized that there was an intrinsic link between coastal and marine and tourism and therefore there was a natural pull to use the general equilibrium model. However, there was not a lot of data on sea surface temperature in the region, an important factor for determining impacts on coral reefs (bleaching).

Recreation and tourism profile

- (a) Number of stay-over visitors in the high season (December-April) and low season (May-November)
- (b) Number of cruise ship visitors in the high season (December-April) and low season (May-November)
- (c) Average length of stay (nights)
- (d) Number of cruise ship calls
- (e) Percentage of visitors using all coastal and marine resources for recreational purposes.

Accommodation Values

- (a) Costs, taxes and service charges
 - Average hourly hotel wage
 - Hours worked per week
 - Persons employed per room
 - Non-labour operating costs, as percentage of base revenue (e.g. electricity, water and insurance)
 - Tax rate on accommodation (%)
 - Service charge rate (%)
 - Cruise ship passenger tax
 - Berthing fees for cruise ships
- (b) Leakages
 - Percent of rooms that are foreign-owned
 - Percent of accommodations that offer all inclusive packages
- (c) Average revenues
 - Average room rate (price per night excluding taxes and service charges)
 - Average occupancy rate (%)
 - Average number of rooms
 - Number of accommodations

Marine park net revenues

- (a) Visitor fees
 - General entrance (US\$)
 - Scuba diving (US\$)
 - Snorkelling and other recreational activities (US\$)
 - Concessions (US\$) (e.g. souvenir items)
- (b) Marine vessel fees
 - Entry (US\$)
 - Mooring (US\$)
- (c) Other fees
 - Licence/research permits (US\$)
 - Fishing permits (US\$)
 - Total taxes collected from each marine protected area (US\$)
 - Collection costs (US\$) (e.g. patrolling, fines and penalties)

Dive revenue inputs

- (a) Tax rate (%)
- (b) Service charge (%)
- (c) Annual number of divers
 - Percentage of visitors who dive (US\$) or Total number of divers per year
 - Average number of dives per diver per trip
 - Number of dive certifications issued

- Percentage of dives taken at all-inclusive resorts
- (d) Dive price
- Average dive price (US\$)
 - Average price for dive certification (US\$)
- (e) Equipment price
- Average price of equipment rental per dive (excluding taxes and service charges) (US\$)
 - Percentage of all dives with equipment rentals (US\$)
- (f) Costs incurred by dive operations
- Labour costs in dive operations (as percentage of revenue)
 - Other costs (as a percentage of revenue)

Snorkel and boating revenue inputs

- (a) Tax rate (%)
- (b) Service charge (%)
- (c) Annual number of snorkelers
- Percentage of visitors snorkelling (US\$) or Total number of snorkelers per year
 - Average number of trips per snorkeler
 - Percentage of trips taken at all-inclusive resorts (%)
- (d) Price
- Average price of a snorkel trip (US\$)
 - Average price of a boat trip (US\$)
- (e) Equipment price
- Average price of equipment rental per snorkel trip (excluding taxes and service charges) (US\$)
 - Percentage of all snorkelers that require equipment (%)
 - Percentage of trips charging for equipment rental (%)
 - Number of independent snorkel rentals per year (outside of organised trips)
- (f) Costs incurred by snorkel and boating operations
- Labour costs in snorkel and boating operations (as percentage of revenue)
 - Other costs (as a percentage of revenue)

Local (non-visitor) user valuation

- (a) Average hourly wage (US\$)
- (b) Beach environment benefits
- Percentage of local population using beach environment for pleasure (%)
 - Average number of visits per year (per person)
 - Average duration of visit (hours)

- (c) Reef recreation benefits
 - Percentage of local population engaging in reef recreation (outside of organised tours)
 - Average number of visits per year (per person)
 - Average duration of visit (hours)
- (d) Coastal wetland benefits
 - Percentage of local population engaging in coastal wetland recreation (outside of organised tours)
 - Average number of visits per year (per person)
 - Average duration of visit (hours)

Other values

- (a) Consumer surplus (what consumers would be willing to pay for a resource above and beyond what they actually pay for the resource) for:
 - Diving (%)
 - Snorkelling and boating (%)
 - Use of beaches (%)

Tourism multiplier (measures indirect impacts coming from direct expenditure) (%)

Fisheries profile

- (a) Fishermen
 - Number of full-time fishermen
 - Number of part-time fishermen
- (b) Boats
 - Number of small boats (< 15 feet)
 - Number of large boats (> 15 feet)
- (c) Facilities and landing sites
 - Number of landing sites
 - Number of established fish processing facilities

Fisheries cost values

- (a) Full-time fish harvesting costs (per trip)
 - Labour costs (as a percentage of total cost)
 - Energy cost (as percentage of total cost)
 - Energy use (quantity of fuel)
 - Water/ice cost (as percentage of total cost)
 - Water/ice use (quantity)
 - All other operating costs (as a percentage of total cost)
- (b) Fish processing costs (per month)
 - Labour costs (as a percentage of total cost)

- Energy cost (as percentage of total cost)
- Energy use (quantity of fuel)
- Water/ice cost (as percentage of total cost)
- Water/ice use (quantity)
- All other operating costs (as a percentage of total cost)

Commercial fisheries data

- (a) Annual Reef Productivity
- Minimum catch (in tonnes per hectare)
 - Maximum catch (in tonnes per hectare)
- (b) Price
- Average price (US\$) of each fish species caught per pound or kg

Reef and coastal fish processing data

- (a) For each species
- (b) Weight (pounds)
- (c) Purchase price per pound
- (d) Sale price per pound
- (e) For each landing site (not at processing plant):
- (f) Number of cleaners
- (g) Average number of days per year
- (h) Average number of hours per day
- (i) Average revenue per hour

Local fishing data (this data excludes fishermen)

- (a) Number of persons fishing
- As a source of income
 - For consumption
 - For enjoyment
- (b) Sale of fish
- Average catch per trip (pounds)
 - Average sale price per unit (US\$/pound)
 - Average annual days in activity (days)
- (c) Consumption of fish
- Average catch per trip (pounds)
 - Value of average unit of catch (\$/pound)
 - Average annual days in activity (days)

- (d) Local fishing for enjoyment
- Average time spent fishing (hours per day)
 - Average annual days in activity (days)
 - Average hourly wage

Other values

Fisheries multiplier (measures indirect impacts coming from direct expenditure)

Extreme events

- (a) Damage estimates per event from hurricanes, floods, landslides, drought, storm surge etc. from 1960 onward.

GIS

- (a) GIS maps with details of the shoreline and coastline, e.g., sandy beaches, rocky beaches, mangroves, reef area and other marine substrata, coastal elevation etc.
- (b) Vulnerable infrastructure, such as government offices and buildings, police and fire stations, airports and sea ports, power generating companies, radio and TV stations, hotels, residences, within 5-10 miles of the coastline
- (c) Estimate of per unit cost of coastal land, e.g., US\$/sq. foot
- (d) Rate of erosion for different types of coastline, i.e., rate for sandy beaches vs. rocky beaches

(c) Energy

In discussing the issue of welfare it was noted that this was a whole new arena, which included how to assess GDP figures. However, if welfare implications were considered it would be necessary to reassess the calculations of indicators such as GDP.

One of the participants shared that the GE modeling would be most appropriate for the energy sector. It was also noted that annual data should be avoided as much as possible (daily, monthly or quarterly preferable).

The final list of data requirements for this sector was as follows:

Monthly series (if not available quarterly, biannually or annually series)

Official series, series from reports and any other sources

Series at current prices

There must be consistency (frequency and length of data set) between series

The series must be submitted in EXCEL (version to be determined) in the requested order with the notes in Word (version to be determined)

Each series must include the reference to its source.

Series

- (a) National consumption of energy (primary:[includes agriculture, mining], secondary: [manufacturing, construction, transportation] and total).
- (b) Consumption of energy by sectors:
 - Consumption of energy in the agricultural energy.
 - Consumption of energy in the industrial energy.
 - Consumption of energy in the transport sector.
 - Consumption of energy in the residential sector.
 - Consumption of energy in the sector that generates energy.
 - Consumption of energy in the service sector: services other than tourism and the public sector e.g. banking, insurance, health, education
 - Consumption of energy in tourism sector
 - Consumption of energy in public sector
 - Consumption of energy in other sectors (residual).

Sectoral GDP according to the classification of the consumption of energy and estimation of energy intensity by sector (Official series, series from reports and any other sources).

Consumption of alternative sources of energy e.g. biofuels, solar, wind, bagasse, hydroelectricity (Official series, series from reports and any other sources).

- (a) National consumption of alternative sources of energy and by sector (Official series, series from reports and any other sources).
- (b) Consumption of gasoline and diesel in litres (total and by grade).

Prices

- (a) Price of electricity to the consumer (the bands/tiers used) (currency per unit)
- (b) Index of electricity prices to the consumer from national statistical agency
- (c) Index of electricity prices to the producer from national statistical agency
- (d) Energy price index from the retail or consumer price index.
- (e) Prices of all fuels
- (f) Unit cost of generating each alternative source of energy

Energy generators

- (a) Sources of different types of energy e.g. diesel, fuel oil, bagasse, wind, hydro, solar

- (b) Prices of different types of energy e.g. diesel, fuel oil, bagasse, wind, hydro, solar
- (c) Type of generators used (e.g. low speed diesel generator)
- (d) Efficiency indicators
- (e) Replacement cost of generators
- (f) Location of power generating facilities relative to the coastline and height

Note: (check DFID Climate Change Risk Atlas)

Reference variables

- (a) Number of vehicles (classifying by year, engine capacity, fuel type, class of vehicle)
- (b) Number of domestic flights, and ferry/water taxis trips
- (c) Imports of new vehicles (values and quantities).
- (d) Imports of used vehicles (values and quantities).
- (e) All taxes and levies inclusive of import duties, excise taxes, environmental levy, vat, custom service charges among on new vehicles
- (f) All taxes and levies inclusive of import duties, excise taxes, environmental levy, vat, custom service charges among on used vehicles
- (g) Prices of public transport
- (h) Estimates of average vehicular efficiency or by kilometre per hour
- (i) Estimates of length of road network
- (j) Number of businesses in urban locations

Rules and regulations to encourage energy efficiency (e.g. transport, industry, tourism, building codes). These include the rules and the date of start.

Synthesis of the prospects for energy. These include development of new investments, support for alternative sources of energy, etc.

Energy security

- (a) Imports of energy by source and type
- (b) Energy intensity
- (c) Mode of transport (how is it delivered)

Social indicators

- (a) Employment in energy generation
- (b) Percentage of household budget spent on energy (by income percentile)
- (c) Percentage of households with access to electricity

Energy innovation

- (a) Data and information on innovation in the energy sector

Note: The analysis should be supported by metadata

(d) Health sectorGeneral

- (a) Income Distribution (income by percentiles)

Climate data

- (a) Temperature
- (b) Precipitation
- (c) Humidity

Morbidity/Mortality data for a range of climate-related diseases and illnesses (national, regional, by age, by health facility - primary and secondary)

- (a) Dengue fever
- (b) Malaria
- (c) Yellow fever
- (d) Typhoid fever
- (e) Leptospirosis
- (f) Food-borne/ water-borne illnesses e.g salmonellosis, *E. coli* - induced illnesses
- (g) Gastroenteritis (total and under 5)
- (h) Asthma and other chronic respiratory disorders
- (i) Heat-related mortality/morbidity
- (j) Cholera

- (k) Salmonellosis
- (l) Shigellosis
- (m) Escherichia coli
- (n) Hepatitis A

Non-climate data

- (a) Access to potable water by region within the country
 - Percentage of population having access to potable water
 - Percentage of population using rivers as their main source of water for household purposes
 - Percentage of population having access to 24 hour supply of water
 - Studies on water quality (e.g. surface water, potable water)
- (b) Access to sanitation
 - Percentage of population having access to improved sanitation facilities (urban, rural)
 - Information on the type of sanitation facilities (e.g. disposal of fecal matter), by number of households
 - Number of households connected to sewerage services
 - Vegetation cover by type (percentage cover), land use
 - Studies on air quality and air pollution
 - Fiscal allocation to:
 - ❖ vector or disease control divisions / units
 - ❖ disease prevention initiatives
 - ❖ environmental management organizations
 - ❖ institutions responsible for improving sanitation
 - ❖ water authority, in particular fiscal allocation for improving access to safe drinking water
 - Unit costs of treating diseases / illnesses identified
 - Health system capacity measured by:
 - ❖ Number of health personnel
 - ❖ Cost by category of all personnel
 - ❖ Number of beds
 - ❖ Value of resources over time
 - ❖ Buildings/infrastructure
 - ❖ Consumables (e.g. pharmaceuticals)
 - ❖ Equipment
 - Treatment protocols for diseases
 - ❖ Identification of drugs by disease (as listed above)
 - ❖ Prices of each type of pharmaceutical

- ❖ Cost per doctor's visit
- ❖ Cost per bed day (public health facility)
- ❖ Cost per bed day in Intensive Care Unit (ICU) and Intensive Dependency Unit (IDU)
- Percentage and value of total government expenditure allocated to the health system
- Health expenditure by income percentile
- Public and private sector medical and life insurance
 - ❖ Coverage (percentage of population; by age group)
 - ❖ Benefits (description of policy coverage)
 - ❖ Cost of premiums (US\$)
- Private health costs
- Plans for improving health infrastructure (e.g. water, monitoring air and water quality, improve sanitation facilities, landfills, incinerators)
- Plans for improving health system capacity over time (e.g. more health care facilities, personnel expansion, improvement in treatment and care, improve prophylactic measures)
- Information on health extension services

(e) Tourism sector

Arrivals

- (a) Long-stay by source market (e.g. Canada, Caribbean countries, United Kingdom and other European countries and the United States of America) and purpose (e.g. business, leisure, health)
- (b) Cruise by source market
- (c) Average visitor expenditure by type of tourist (long-stay or cruise), source market and purpose

Accommodation establishments

- (a) Occupancy rates by type of accommodation establishment
- (b) Number of rooms by type of accommodation (e.g. hotel, cottage, villa, guest house, or private)
 - Number of rooms by class (e.g. standard, luxury, superior)
- (c) Number of accommodations with green certification and/or policy
- (d) Average room rates by:
 - Type of accommodation
 - Class of room
- (e) Amenities offered by accommodation (e.g. pool, golf course, tennis courts, spa and other facilities)

- (f) Distance of accommodation within 10km of the coastline (GIS database)
- (g) Electricity consumption (Kwh) by type of establishments
- (h) Water consumption (m3) by type of establishments
- (i) Proportion of establishments that recycle water
- (j) Proportion of establishments with energy saving programmes
- (k) Tax revenues from establishments
 - Room tax
 - Corporate income tax revenues
 - Number of establishments receiving a tax holiday
- (l) Government subsidies to establishments by type
- (m) Number employed (managerial and non-managerial staff) in establishments in high and low seasons
- (n) Average wages of employees in establishments (managerial and non-managerial staff)
- (o) Number of all-inclusive hotels and total number of rooms
- (p) Value of purchases of agricultural commodities by
 - type of accommodation establishment
 - type of commodities bought
 - source (domestic and imported) by accommodation establishment type

Transportation

- (a) Distance of ports from the coastline
- (b) Elevation of ports from sea level
- (c) Number of cruise ship calls (monthly)
- (d) Berthing fees for cruise ships, yachts, etc. (US\$)
- (e) Value of food and other local inputs purchased by cruise ships and airlines (US\$)
- (f) Volume of waste collected from cruise ships (tonnes)
- (g) Number of planes landing at airport (monthly)
- (h) Landing fees for commercial and private planes (US\$)
- (i) Total number of registered taxis

- (j) Characteristics of taxi vehicle fleet (age, engine size and taxi vehicle class)
- (k) Average taxi fare from airport to city (US\$)
- (l) Number of inland flights
- (m) Average rates of inland flights (US\$)

Food and beverage

- (a) Number of food and beverage establishments
 - based at accommodation establishments
 - independent
- (b) Distance of food and beverage establishments from coastline
- (c) Proportion of sales (US\$) to visitors as compared with locals
- (d) Average expenditure of tourists on food and beverages (US\$)
- (e) Employment in food and beverage industry (managerial and non-managerial staff)
- (f) Average wages (managerial and non-managerial staff) in food and beverage industry (US\$)
- (g) Total water consumption (m³)
- (h) Total energy consumption (Kwh)

Recreation and Entertainment

- (a) Entrance fees for tourists at each major tourist attraction (US\$)
- (b) Average number of local and foreign visitors at each major tourist attraction
- (c) Distance of each major tourist attraction from coastline
- (d) Water consumption at each major tourist attractions (m³)
- (e) Energy consumption at each major tourist attractions (Kwh)
- (f) Employment (managerial and non-managerial staff) at major tourist attractions
- (g) Average wage (managerial and non-managerial staff) at major tourist attractions

Travel services

- (a) Return airfare between country and major international cities
- (b) Number of outbound tourists by destination

- (c) Average expenditure of outbound tourists by destination (US\$)
- (d) Number of travel agents
- (e) Employment (managerial and non-managerial staff) in travel services industry
- (f) Average wages (managerial and non-managerial staff) in travel services industry (US\$)

Environment

- (a) Number of building permits issued for new accommodation establishment
- (b) Legislation (incentives) to encourage resource use efficiency within tourism
- (c) Legislation (incentives) to support ecotourism
- (d) Value of coral reef damage due to tourist activities (US\$)
- (e) Volume of discharge of sewage into water bodies (m³)

(f) Water sector

Weekly series (if not available monthly, quarterly, biannually or annually series) [1970-2010]

Official series, series from reports and any other sources

Series at current prices

There must be consistency (frequency and length of data set) between series

All data by region within the country

National water availability in terms of:

- (a) Surface
 - Run-off rates
 - Water quality
 - Number of reservoirs and capacity
- (b) Ground
 - Water quality
- (c) Desalinated water (cubic meters per person)
 - Plant capacity
 - Type of plant
 - Supply

Rainfall

Evaporation-transpiration and filtering – average data

- (a) Recharge rates for aquifers
- (b) Studies on run-off and pollution impacts on the coastal areas

Water availability by region within the country. This should include Rainfall, Evaporation-transpiration, filtering and run-off

Water demand

- (a) National water demand
- (b) Water demand by sectors: For example: residential, agriculture, industrial, commercial and tourism
- (c) Water demand by regions within the country
- (d) Number of households connected to the main water supply

National and regional water prices by sector for all tiers/bands

- (a) Water fees e.g. abstraction fees
- (b) Water costs e.g. cost for treatment, storage and distribution.

Wastewater treatment

- (a) Cost of treatment of wastewater

Information on income and prices by regions within the country

Growth rates for water use by sector

- (a) Agriculture
 - Land availability, level of irrigation, production technology (e.g. protected agriculture, intensive/extensive livestock)
- (b) Tourism
 - Visitor arrivals/ expenditure
 - Type of visitor
 - Type of amenities (golf courses, water recreation etc)
- (c) Industrial/commercial sector
 - Projected growth rates
 - Type of future development

- (d) Residential
- Household characteristics for water amenities e.g. pools, water saving devices, number of bathrooms, dish washers, washing machines
 - Percentage of households with pipe borne and potable water by region within the country
 - Percentage of households with access to sanitation facilities by category (in-house or out-house)

Water quality

- (a) Consumption of bottled water (a shift in water use)
- (b) Water quality studies. Studies on emerging pollution issues

Social indicators

- (a) Employment in water generation
- (b) Percentage of household budget spent on water (by income percentile)
- (c) Percentage of households with access to potable water

Energy use by the water sector

- (a) Sources of different types of energy in pumping water e.g. electricity, diesel, fuel oil, bagasse, wind, hydro, solar
- (b) Prices of different types of energy e.g. electricity, diesel, fuel oil, bagasse, wind, hydro, solar
- (c) Type of generators used (e.g. low speed diesel generator)
- (d) Efficiency indicators
- (e) Replacement cost of generators
- (f) Location of water generating and distributing facilities relative to the coastline and height
- (g) (check DFID Climate Change Risk Atlas)

Quantity of river inflow and outflow at national boundaries with specific reference to Belize, Haiti, Dominican Republic, Guyana and Suriname,

Government plans for desalination, Integrated Water Resource Management (IWRM)

Proposed plans for a change in water pricing and metering

Proposed plans for reduction in water losses e.g. reducing leakage

Proposed plans for provision of more surface water (e.g. dams) or groundwater (e.g. wells) and water harvesting

General data requirements – all studies

- (a) Total Gross Domestic Product (GDP) and GDP by sector
- (b) Average annual GDP growth rate, previous 5 years
- (c) GDP per capita
- (d) Series of data from 1970-2010
- (e) Rainfall, temperature (including sea surface and air), average wind speed, sea level rise and humidity data
- (f) Population of country
 - Region
 - Age group
- (g) The series must be submitted in EXCEL (version to be determined) in the requested order with the notes in Word (version to be determined)
- (h) Each series must include the reference to its source.