

*Issues and Challenges in generating and using information for decision-making
The experience in developing Environment and Sustainable Development Indicators
for Jamaica*

Summary Paper prepared by
Anthony McKenzie, National Environment and Planning Agency (NEPA)

Environment and Sustainable Development Indicators (ESDIs) can provide crucial guidance for decision-making in a variety of ways. They can translate physical and social science knowledge into manageable units of information that can facilitate the decision-making process. They can help to measure and calibrate progress towards sustainable development goals and provide an early warning, “sounding the alarm in time” to prevent economic, social and environmental damage.

The 1992 Earth Summit recognized the important role that indicators can play in helping countries to make informed decisions concerning sustainable development. This recognition is articulated in Chapter 40 of Agenda 21 which calls on countries at the national level, as well as international, governmental and non-governmental organizations to develop and identify indicators of sustainable development that can provide a solid basis for decision-making at all levels.

In 1987, the NRCO produced a Country Environmental Profile of Jamaica. In 1997 The NRCA published the first State of the Environment (SOE) report on Jamaica. In 2001 Jamaica’s Environment 2001- Environment Statistics and State of the Environment Report was prepared as a collaborative effort between the Statistical Institute of Jamaica (STATIN) and NEPA. These reports have served to highlight the state of Jamaica’s physical and biological environment, identifying the stresses that are likely to result in changes to the natural environment, the implications of such changes, and pointed to some of the actions/strategies that are underway to minimize the negative impacts.

In order to achieve the goals of sustainable development it is important that planners and decision-makers are provided with current and reliable information on those essential parameters and processes that drive our natural, economic and social environment. It is against this background that NEPA is proposing to develop a core set ESDIs, which will serve to measure changes and assist in defining Jamaica’s path to economic sustainability.

Implementation

The programme to develop ESDIs in Jamaica is still in its early stages. A significant amount of discussion will have to take place before consensus can be achieved around a core set of ESDIs. The discussion with various sector groups revealed that a number of sector specific indicator sets and indices are being promulgated largely driven by donor-funded programmes and the need to meet obligations under various treaties and conventions.

We propose to proceed as follows in developing ESDIs for Jamaica:

- Determine which indicators are already being used and for what purposes
- Review data already being collected for indicators.
- Match the priority indicators selected with the list of indicators already in use and assess data availability for those priority indicators for which data are not already being collected;
- Establish necessary arrangements to collect the missing data. This may include modifying current data compilation arrangements where necessary;
- Make an initial evaluation of any training and other capacity-building needs that may be required to enhance data collection capability.
- Collect and/or compile data needed for the indicators selected
- Develop a strategy for dissemination of indicator information to stakeholders (e.g., via annual reporting, headline indicators, news letters or bulletins).

To date, ESDIs have been discussed with a number of Government Agencies. These agencies are listed by Categories and outlined in Table1 (below).

CATEGORIES	FOCAL AGENCIES
Climate Natural Disasters & Environmental Accidents	ODPEM*, National Meteorological Service, Geography and Geology Dept. UWI. NEPA (EMA & Enforcement and Compliance)
Socio-Economic (population and economy) Urban Areas and Shelter Cultural & Historical Resources	PIOJ, STATIN, JNHT*, NEPA (Planning and Development)
Land and Food Agricultural Resources Watershed Forest Bio-diversity & Protected Areas Tourism and Recreational Resources	RADA, the Forestry Dept., NEPA (Biodiversity, Protected Areas, Land Use, Sustainable Watershed Branches)
Freshwater Water Pollution Marine and Coastal Areas	WRA, NWC, EHD, Fisheries Division, NEPA (EMA, CZM, BB)
Atmosphere Air pollution Solid, Liquid & Hazardous Waste	National Solid Waste Agency, EHD, NEPA (PPCD)
Land & Mineral resources Energy Resources Transportation	NLA, MME, MT, JBI, NEPA (Planning and Development Division)
Institutional Capacity and Environmental Governance Competitiveness of Environmental policy Environmental Stewardship	NEPA, MLE

TABLE 1: Information categories and Relevant Government Agencies

Indicator Methodology Sheets

Over one hundred and sixty indicators (160) have so far been discussed; these indicators are listed in APPENDIX 1. Further discussion will be required to finalized this listing but already Methodology Sheets have been prepared for each of the identified indicator.

The Methodology Sheets contain, inter alia, the following information:

- Information on the indicator, including its definition and unit of measurement.
- Purpose and usefulness of the indicator for ensuring sustainable development decision-making (i.e., policy relevance), international targets where these are available; and the relevant international conventions, if the indicator is primarily of global significance;
- Conceptual underpinnings and methodologies associated with the indicator, including the underlying definitions, measurement methods, and a summary of its limitations.
- Data availability to illustrate the importance of regular data collection and updating to support systematic reporting;
- Listing of the agencies involved in the preparation of the data (lead and cooperating)
- Other information e.g. sustainable development policies and programs.

The Methodology Sheets are stored in Microsoft Access and the data is easily converted for analysis into presentation format.

Issues and Challenges

Based on the process undertaken so far the following issues and challenges are noted:

- **Achieving Consensus**
Very often it is difficult to gain an agreement around an indicator because each sector has its own idea on priority issues.
- **Policy relevance**
Unless the indicator can be linked to critical decisions and policies, it is unlikely to motivate action. Central to defining an indicator is its importance in aiding policy decisions. Can the indicator be associated with one or several issues around which key policies are formulated?
- **Credibility of the information**
There is always the concern whether the data associated with the indicator is a true reflection of the facts? Was the data collected using scientifically defensible measurement techniques? Is the indicator verifiable and reproducible?
- **How can the information be simplified for presentation and use by stakeholders and decision makers**
Can the information be presented in an easily understandable, appealing way to the target audience and constituents? Complex issues and calculations should eventually yield clearly presentable information that the public understands.

- **Availability of data over an extended period**
Is time-series data available, reflecting the trend of the indicator over time? Our experience is that often there is an absence of data generated over time. If based on only one or two data points, it is not possible to visualize the direction the community may be going in the near future.
- **Cost of data**
Is good quality data available at a reasonable cost or is it necessary or feasible to initiate a monitoring process that will make it available in the future? Many government agencies even when they are specifically responsible for data collection find it a cost burden to collect data on a consistent basis. Information cost money, or at least time and effort. The challenge is to acquire data that has optimal utility.
- **Ability to aggregate information and to identify the preferred indicator**
The list of potential indicators is endless. For practical reasons, indicators that aggregate information on broader issues should be preferred. For example, GDP is a useful indicator of economic growth and is preferable to measuring many other potential indicators to come to the same conclusion.

Conclusion

Based on the experience to date it does appear that indicators will be of optimal value to decision makers when they are determined based on broad based consensus, having regard to local needs and capacity.

Reference

Indicators for Sustainable Development Guidelines and Methodology (2001),
Commission on Sustainable Development (CSD)

5/26/2003

APPENDIX 1

Indicators for ESD (draft list)

Socio-economic (population & economy)

Total population:

Total population by Parish

Population density by Parish (persons/Km²),

Population growth rate

Average household of population,

Percentage male/female headed households

Population of urban formal and informal settlements

Area of urban formal and informal settlements

Growth of sectors (e.g. Agriculture, Mining, Tourism, Financial, Information Technology),

Annual inflation Rate,

Average annual exchange rate to the US\$

Net International Reserves:

Debt to Gross National Product Ratio

Balance of trade in goods and services

Net foreign exchange outflows,

GDP (amount and growth rate)

Investment share in GDP,

Unemployment rate,

Percent of population living below the poverty line,

Investment in community development by Government and private sector (JSIF and other programmes),

Ratio of average female wage to male wage

Nutritional status of children

Mortality rate under 5 years old

Life expectancy at birth

Immunization against infectious childhood diseases

Children reaching grade 5 of primary education

Adult secondary education achievement level

Adult literacy rate

Total official Development Assistance (ODA)given or received as a % of GNP

Intensity of material use

Number of recorded crimes per 100,000 population

Urban Areas/Shelter

Household tenure (own, rent or lease):

Housing units provided by Private and Public Sector

Types of housing (Apartment/Townhouses, Detached and semi-detached houses),

New Low-Income Housing Solutions (Operation Pride & Others)

% of population living in urban areas,

Urban vs. Rural poverty
Floor area per person

Cultural and Historical Resources

Number of registered sites, districts, monuments and structures,
Number of Taino sites,
Number World Heritage Site.

Fresh Water

Groundwater demand by sector

- domestic
- irrigation
- industrial
- tourism

Surface water demand by sector

- Domestic
- Irrigation
- Industry
- Tourism

Groundwater availability

Surface water availability

Annual withdrawals of ground and surface water as a %of total renewable water (Water stress (%))

Concentration of Faecal Coliform in fresh water (also chlorine)

Land area impacted by pollution

- sewage
- industrial

Reach of river polluted (%)

- saline intrusion
- industrial pollution
- sewage pollution
- agricultural pollution

Land area reserved for water conservation

Water Supply and Sanitation

Sources of domestic water by volume

- rivers, streams, wells

Unaccounted for water (UFW)

% of population connected to water supply

Population with access to safe drinking water

Real cost per unit of supply of water

Number of companies providing water

Number of STPs that meet NRCA's sewage effluent standard

Volume of sewage waste generated (by plant)

% of population connected to sewerage systems

% of population with *in situ* sewage disposal systems
% of population with adequate sewerage disposal facilities

Marine and Coastal Areas

Annual catch by major species (Marine fish, Lobster, Conch, Crab, Shrimp etc.)

% of live coral cover

Algae concentration in coastal waters

Number of mariculture and aquaculture facilities,

Number of oil spills reported per year

Number of fish kills reported per year

Number of subdivision applications and approvals in the Coastal Zone

Number of Licenses granted to undertake beach modification/improvement works along the coast:

Number of rehabilitated Public Bathing Beaches,

Number of coastal erosion and beach destruction sites.

% of population living in coastal areas

Biochemical Oxygen Demand (BOD) in water bodies

Natural Disasters and Environmental Accidents

Greatest annual deviation in average sea surface temperature in last five years from long term mean

Number of months over last 5 years during which rainfall is more than 20% above 30yr average for that month (flood risk)

Number of weeks over each year that sections of the Island have experienced drought conditions

Number of category 1-5 cyclones (<994 hPa central pressure) / decade / (last decade only)

Mean number of days per year (last five years) in which the maximum temperature was >5°C above the mean monthly maximum

Mean number of days per year (over last five years) in which the minimum temperature was >5°C below the mean monthly minimum (calculated over last 30 years)

Number of earthquakes causing damage over the last year

Number tsunamis with run up 2m+ over last 50 years

Total land area affected by flooding each years

Number of families affected by flooding each year.

Environmental accidents each years. (data collected every year)

Total number of land slides per sq. km

Investments in equipment and training related to environmental accident response.

Human and economic loss due to natural disasters

Tourism and Recreational Resources

Accommodations in Tourism Sector (Number of Hotels, Rooms, Guesthouses, Apartments, Resort Villas),

Occupancy level per year

Average length of stay of visitor

Number and types of eco-tourism facilities,

Number of hotels with Green Globe certification

Biodiversity and Protected Areas

Population estimate of key species:

Endemic Flora,

Endemic Fauna,

Manatee,

Jamaican Iguana,

Sea Turtles,

Jamaican Crocodiles

Number of management, recovery, action, plans and strategies for threatened/endangered

Species effectively implemented

Declaration of closed seasons and implementation of size limits (Conch, Lobster, Game Birds, Orchids).

Number of violation of Wild Life Protection Act (court cases, arrest, warnings etc.).

Capital investment per year in Protected Areas (National Park Trust Fund) (Capital & Interest Earned)

Ratification of International Treaties and Convention Related to Biological Resources and the implementation of local action plans

of species threatened/endangered

Number of reported cases of CITES listed species imported

Protected Area as a Percent of Total Area.

Area of natural habitat disturbed by authorized or unauthorized sources

Forests

Land area of types of forest

Annual rate of decrease/increase in forest cover.

Forest area as a percent of land area.

Wood harvesting intensity

Water sheds

Forests – Disturbed & Undisturbed

Change in ranking of the 26 Watersheds Management Units:

Number of Tree Nurseries:

Number of bush fires per year

Charcoal production per year

Firewood production per year

Agriculture, Land and Food

Change in agricultural land use per parish per year

Agricultural production of all major crops

Pesticide/herbicide/fertilizer imported per year

Use of agricultural pesticide

Use of fertilizer

Value of agriculture crop loss due to soil erosion

Loans to the agricultural sector per year
Arable and permanent crop land area

Air

Number of companies with Action Plan for Air & Water Quality improvement:
Ambient concentration of air pollution in urban areas,
Mean Concentration of lead in Kingston, St. Spanish Town and Montego Bay,
Incidences of Respiratory Tract Infection caused by Air Pollution,
Emissions of green house gas?
Number of anthropogenic sources of emission.
Consumption of ozone depleting substances

Waste

Generation of industrial and municipal solid waste
Collection coverage (%)
Sweeping coverage (%)
Per capita cost of service delivery
Disposal facilities per region (region to be defined)
Tonnage of waste brought to the disposal site (broken out by type)
Per capita cost of disposal activities
Generation of hazardous waste
Rate of waste recycling and reuse

Mining

Number of mining licenses & permit issued,
Bauxite and Aluminium production and exportation per year,
Gypsum production per year,
Crushed Limestone production per year,
Lime production per year
Production of Aggregates (e.g. Marble, Silica),
Rehabilitation of mined out land (by sector),
Expenditure on community development projects

Energy

Annual energy consumption per capita
Petroleum imports per year:
Share of consumption of renewable energy resources
Amount of electricity produced by Jamaica Public Service Company & Others:
% of population with access to and type of household lighting:
Use of solar technology (e.g. Number of solar water heaters installed),
Number of hydropower generating facilities and capacities.
Number of wind power generating facilities and capacities.

Institutional Capacity and Environmental Governance

Percentage of environmental regulatory violations that are prosecuted.
Number of EIA per sector as against approved developments

Number of companies with Environmental Management Systems
Internationally accredited protected site as a percentage of total protected area
Number of ISO14001 certified companies
Level of subsidy to the fisheries sector
National sustainable development strategy
Implementation of Ratified Global Agreements.
Number of Internet subscribers per 1000 inhabitants
Main telephone lines per 1000 inhabitants
Expenditure on R&D as a Percentage of GDP
Expenditure on Environmental Management as a Percentage of GDP
Public participation Index
Environmental awareness Index

Global stewardship

Number of membership in environmental intergovernmental organizations

Competitiveness of Environmental policy

Air pollution regulation/standards and level of stringency with major trading partners.
Water pollution regulation/standards and level of stringency with major trading partners.
Toxic waste regulation/standards and level of stringency with major trading partners.
Chemical (waste) regulation/standards and level of stringency with major trading partners.
Regulation/standards related to genetically modified organisms and level of stringency with major trading partners.
Level of participation in the development of, and compliance with international agreements.

NB. Indicators in *Italics* could be considered as a core set of SD Indicators