STATE OF ENVIRONMENT STATISTICS IN THE GAMBIA

Environmental problems and concerns
The need for environment statistics arises from the following problems and concerns:
Problems: Coastal erosion, depletion on natural resource base, loss of soil fertility, deforestation, pollution (air, land and water), waste management, atmospheric emissions, rapid population growth, amongst others.

Concerns: Sound management of the environment to attain sustainable development, poverty reduction, and acceptable health of the population and the environment.

Initiative:
The first ever initiative to compile and collate some form of comprehensive environment and environment-related statistics originated from the World Bank support in the implementation of the Gambia Environmental Action Plan (GEAP)(1995-2000).

Framework:
The consultant that was hired to design a reporting framework for the Monitoring and Assessment (M&A) strategy of GEAP, introduced a matrix, which was designed to structure the State of the Environment Report (SOER) by a mix of economic sector and, pressure, state and response model.

Approach:
The M&A strategy introduces a multi-sectoral approach for data collection whereby a number of cooperating departments and NGOs were encouraged (payment of some form of allowance), and required to provide pure environment or environment related data for completing a comprehensive indicator matrix which the National Environment Agency (NEA) maintained.

Data collection efforts:
The National Environment Management Act, 1994,   PART X: INFORMATION, EDUCATION AND PUBLIC AWARENESS
◆49.   (1)   empowers the NEA to gather, analyse, manage and disseminate environmental information
◆   (2)   the Agency shall have access, subject to any other law, to all existing environmental information of a public nature and shall coordinate the management of environmental information
 This mandated the Agency to release the State of Environment Report (SOER) of The Gambia at suitable regular intervals. The first SOER for the Gambia was released in 1997. However, the data collection and compilation activities for the second SOER are currently experiencing difficulties with the end of the GEAP project due mainly to financial constraints.
Owing to the rising demand for statistics on the environment, at national, regional and international levels, the Central Statistics Department (CSD) established an environment statistics unit in 1997. The unit was not fully operational because of bottlenecks such as computer equipment, standardization, training, etc. Further more, collaboration between the unit and the NEA has not been close and effective enough.

Need to update and improve

Available environment data in various departments are to varying degree outdated. Concerned departments and organizations should update their data, in particular, data obtained through adhoc surveys. Existing surveys and databases can be improved and used for more information on the environment. Existing information mechanism on the environment is not on a sustainable footing.

AVAILABILITY and SOURCE OF ENVIRONMENT DATA

An important output of the M&A strategy was the first State of the Environment Report (SOER) of The Gambia prepared by the NEA under the auspices of the World Bank. The Data for the SOER were taken mainly from the completed indicator matrices. Broad indicators for monitoring and assessing progress in the implementation of the GEAP objectives have been selected after due consultations with actors and stakeholders.

The Structure of the SOER: Geophysical characteristics; People environment and Development; Agriculture, Forest and wildlife resources; Aquatic and wet land resources, Population; Health and human population; Energy; Industry; Tourism; Mining; Environmental policy, planning and quality; Environmental awareness; and Trends and scenarios. Some of the environment data revealed by the SOER are:

It was estimated that 12.5 tons/ha/year is eroded from frequently cultivated soils having 2 per cent slope. (FAO fertilizer project, 1993)

The predicted rate of forest destruction is 6 per cent per annum. There are sixty-six forest parks. Agricultural cultivated area increased from 274,100 ha in 1980 to 336,000 ha in 1988 resulting in lost of some forest area. The open and closed forests combined declined from 333,200 ha to 108,700 ha between 1972 and 1980. Between 1972 and 1980 the estimated annual decline rate was 28000 ha. The open and closed forest area of total land area was 6.5 per cent in 1988. A national forest inventory (1983) is available.

A species list for mammals was drawn up in the late 1960's, 67 species of mammals excluding some rodents and bats were recorded. A total of 507 species of birds have been recorded from The Gambia (Gore, 1990) of which 220 are known to have bred within the country. It is considered possible that a further 27 species also breed intermittently.

The Gambia has a continental self of approximately 3,855 km^2. Its fishing grounds have a potential to produce about 70,000 metric tons of pelagic and demersal fish annually. At present it is estimated that fishermen operating within the continental shelf are landing between 7,000 and 10,000 tons annually from trawling and, between 15,000 and 20,000 tons through artisanal fishery.

The estimated volume of sand extracted annually for construction and other purposes was approximately 100,000 to 160,000 m^3.

Coastal erosion in The Gambia has been estimated at a rate of 2 metres annually.

Deep aquifer is estimated to hold 80,000 Mm^3 of water. Whereas, shallow aquifer is estimated to hold 125 Mm^3 of good quality of water.

The most important energy resources in The Gambia is the fuelwood which provides more than 80 percent of the total primary energy needs of the country. More than 90 percent of the population depends on fuelwood for domestic cooking. Petroleum is the second most important source of energy in the country, which accounts for about 11 percent of total primary energy requirements.

Overall, the total energy consumption increased by 6.8 percent from 337.62 thousand tonne oil equivalent (TOE) in 1993/94 to 362.44 thousand TOE in 1995/96.

Data gaps

There are several approaches, which can be used to monitor the environment. A wide variety of indicators can be proposed depending on the specific data needs, the issues under consideration and the cost of collecting the required data. However, efforts are being made by the UNSD to develop a standardized and harmonized sets of indicators on the environment which will take into account specific data needs, the cost of collection and the need for international comparison by developing a somewhat flexible framework for environment statistics.

The data gaps, which are stated in this paper, are gaps in terms of the specific data needs of institutions in the Gambia and, in terms of a foresight on comprehensive environment statistics, which may be suitable for national policy issues and international comparison.

Gaps reported in the SOER:

No statistics are available on the annual rate of soil lost through water erosion in The Gambia. No statistics on soil fertility and forest resource accounts. No detail study of the country's fauna.

Reptiles and amphibians have received limited study in the past (Lenz, 1992 and Gruschwitz et al, 1991). Details on the distribution and abundance are lacking.

There remain gaps in knowledge of the available fauna regarding status and distribution, and in the case of migratory species, their origin and dependence on The Gambia for over-wintering or passage purposes. There are plans to prepare a new national forest inventory.

The Water Quality Division of the Department of Water Resources has been involved in the monitoring of both surface and groundwater quality using WHO guidelines to determine the level of pollution and the suitability of water for drinking purposes. However the available data on water quality is not presented in the SOER.

The fish catch potential for the inland fishery is not known because no research works to estimate fish stock biomass densities has been undertaken in and along the river Gambia.

Measurements of ambient air quality have never been undertaken in The Gambia. However, efforts are underway to start monitoring air quality through the Environmental Quality Monitoring and Enforcement Strategy.

Estimates of gaseous emissions have been obtained from the Greenhouse Gas (GHG) Emission Study of 1993, carried out by The Gambia National Climate Committee.

The Soil Quality Laboratory under the National Agricultural Research Institute (NARI) carries out monitoring of soil quality for agricultural purposes. Parameters measured are

those relevant to the nutrient quality of the soil to determine its suitability for crop production. Routine soil quality monitoring for pollution control purposes is not within the mandate of the institution.

Gaps in terms of data needs to address agri-environment policy issues:
Indicators on **driving forces** used by primary agriculture, the impact of primary agriculture on the **State** of the environment and, the **responses** by individuals, communities, organizations and government to changes in the state of the agri-environment, the sustainability of agriculture and market signals: -

Other data gaps on State of The Environment
Agriculture:
Change in area under crop (in Km^2); change in annual crop biomass in numbers; change in the livestock population.

Forests:
Change in age and species of trees/plants by forest types; net change in forest biomass (in ton) by geographical area; net change in the volume of commercial timber stand (in m^3, Km^3) by type of wood.

Fish:
Change in marine, freshwater, invertebrate and cultivated fish population (numbers).

Fauna and flora:
Change in selected flora habitats (in Km^2) and populations by type of species; net change in selected habitats (in Km^2) and populations of large and small mammals, birds and fish.

Water resources:
Change in the average level of surface and groundwater (in metres) by type of storage and drainage basin; change in water storage capacity (in m^3) by type of storage and drainage basin.

Soil and land:
Productive soil loss due to land use conversion in (Km^2) by soil type; loss due to urbanization and environmental restructuring e.g. dams, etc.

Mineral (including energy) resources:
Construction of energy balance sheet.

Environmental quality:
Concentration of selected pollutants by type of pollutant; atmospheric radiation by type of radiation.

Water quality:
Physical and chemical properties, (including turbidity, salinity, acidity and conductivity) of water by source - inland water, groundwater, lakes, etc. concentrations of selected contaminants/nutrients by source.

Soil and land quality:
Desertification (in km^2) by type of land use; areas (in Km^2) of soil erosion, soil toxicity, acid deposition and irrigation by type of soil.

Quality of biota and ecosystem:
Loss of cultivated biota due to disease, insects, natural disasters (in % affected, Km^2) by type of biota; change in average size of biota (in Kg, m) by type of species.

State of ecosystem:
Primary productivity (t/Km^2, $cal./m^2$) by type of ecosystem; list with numbers of rare and endangered species by type of ecosystem and species.

Human health and contamination:
Chemical residues in food and water by type of contaminant; mortality and morbidity from environmental vector disease and malnutrition by type of disease/cause of malnutrition.

Impacts of environmental disasters:
Loss of cultivated biological resources, fauna and flora (in numbers, Km^2, $) by type of event, resources or species; impacts on land, soil, air and water (in Km^2, ppm, $) by type of impact.

Data gaps on responses to the State of The Environment:
Protection and conservation of nature; management and conservation of natural resources; rehabilitation of degraded environments; pollution monitoring and control; standards, control and enforcement; public pollution control facilities; and prevention and hazard mitigation of natural disasters.

The Need for Environment Statistics Units in the CSD and NEA:
Since the CSD and NEA's Environmental Information Systems (EIS) Unit covers almost all sources of data, be it economic, social, or environmental in its routine work, an environment statistics unit in the above can ensure at least a minimum availability of regular environment statistics.

An environment statistics unit in the CSD and NEA's EIS unit can ensure timely recording of pressure, state and response (PSR) events as they occur. Hence the unit minimizes omissions resulting from late request.

An environment statistics unit will be instrumental in bringing about and implementing the standardization and harmony required in the collection and analysis of environmental data.

The data required for a green GDP can be more readily obtained from a well-established environment statistics unit in the CSD and NEA.

SOURCES OF ENVIRONMENT DATA:

Environmental data are obtained from administrative records, special surveys, censuses, reports, aerial maps, and satellite images.

The Central Statistics Department has the largest stock of social, economic and environment related data in the country. But since the NEA serves as the custodian of all environmental information, and serves as the coordinating Agency for all the Core Data Centres (i.e. Central Statistics Department, Department of Water Resources, Department of Lands and Survey, Soil and water Management Unit under the Department of Agriculture and Department of Planning), the Agency amongst others, made use of information from these government institutions. The first SOER made use of these sources to a large extent. Pure environment information were obtained from departments and organizations that specialized in the environmental issues concerned.

Maps:

Traditionally, maps have been an important source of environmental information. Maps are either topographic (showing physical features and their location) or thematic (depicting specific application such as soils and based on a topographic base). In The Gambia, the Department of Lands and Surveys is the agency mandated to produce and maintain topographic maps.

In addition to this, different agencies do produce thematic maps in their respective areas of application. This is because such institutions are mandated to collect the data depicted in such maps. The Soil and Water Management Unit of The State Department for Agriculture, for instance, produces soil maps as the institution mandated to collect and manage soil data.

Documents and Reports:

These are non-graphics data produced to highlight a particular subject or phenomena. Almost all institutions in The Gambia produce some form of document or report for different thematic analyses for planning and management.

Aerial photographs:

A large collection of aerial photographs exists on the Gambia dating back to 1945. In fact since this date a new photography of national coverage has been produced at least once every decade. This forms a good source of spatial data on which change analyses over time can be made. In particular, the photographs, flown in late 1994, serve as a good basis for national mapping exercises or the revision of existing maps. A most recent completed project funded by the Japanese International Corporation Agency (JICA) in 2000, under the focal point of the Department of State for Lands and Survey has produced aerial photographs of the whole country.

Satellite imagery:

Satellite imagery is not currently widely used in the Gambia for environmental management and monitoring of natural resources. This is probably due to the high cost of satellite images, the relevant equipment and the technology it employs. For this reason, the collection of satellite data in the Gambia is currently very small. However, it is understood that the Department of Water resources does have the capacity to receive METEOSAT data.

Data Themes:
The type of environmental data collected and managed in the Gambia is very wide. These can however be broadly categorized into the following themes and sources:

DATA THEME	DATA DESCRIPTION	FORMAT	INSTITUTION
Soil	Soil association	Maps	DL&S, DF, USAID, SWMU
Geology	Geological data	Maps and reports	Geology Unit
Landuse	Different landuse maps and Documents	Maps and photomaps	DF, DL&S, USAID DPPH
Vegetation	Forests, range lands and parks	Maps	DF, DL&S, USAID
Water Resources	Hydrology	Reports and documents (computerized)	DWR
Agriculture	Statistical data	Documents (computerized)	DAS
Livestock	Animal population, distribution prices & health	Reports	DL&S
Fisheries	Frame survey	Reports	Dept. of Fisheries
Wildlife	Wildlife species	Reports	DP&WL
Energy	Use of firewood	Reports	GREC
Meteorology	Rainfall, temperature, humidity and wind	Documents and reports	DWR
Health	Health statistics	Reports	DOSH
Population	Topographic maps	Reports	Dept. of Central Stat.
Topography	Aerial photos	Maps, photomaps and orthophotos	DL&S
Aerial Photography	Aerial photos	Aerial photos	DL&S
Industries	Industries and their locations	Reports	DOSTIE
National Economy	National accounts, prices & statistics	Report	Dept. of Central Stats.

While some of these data are freely available, others are provided at a cost. These include maps and aerial photographs.

SIGNIFICANT CONSTRAINTS TO EFFECTIVE DATA COLLECTION AND SHARING:

➢ Lack of appropriate and adequate equipment to measure loadings in the environment and preparation of ecological maps.

➢ Lack of skilled personnel, in particular, at the GIS Unit of CSD and NEA; financial and technical resources (limited computerization), to collect, interpret and report environmental data.

➢ Lack of funds to conduct surveys at regular intervals for updates.

➢ Low level of standardized and compatibility of data sets, and systems interoperability.

➢ Lack of coordination in data collection, especially between line departments and specialized institutions.

➢ Low awareness level among communities and institutions concerning environmental issues.

➢ Inadequate training of field workers (enumerators and supervisors).

FUTURE PLANS FOR ENVIRONMENT STATISTICS

➢ NEA plans to mobilize funds in order to prepare, publish and disseminate the second State of The Environment Report of The Gambia.

➢ The CSD plans to mobilize funds to build the capacity of its Environment Statistics Unit. The unit will use the framework that would be prepared by this workshop. Some modifications will be made in the framework to incorporate national and sub-regional concerns and data needs.

➢ Develop and implement a Memorandum of Understanding (MOU) between the CSD and the NEA in order to link the environment unit to the NEA's inter-sectoral network coordination.

➢ Develop and implement strategies to put the CSD Environment Statistics Unit and NEA EIS Programme on a sound sustainable footing.

➢ The Environment Statistics Unit of CSD and NEA EIS Programme should use existing databases and surveys to obtain further relevant and temporal information on the environment.

➢ NEA EIS Programme Centre needs to update existing Environmental Information data sets such as the Landuse / Landcover, Soils, Administrative maps and Aerial Photographs.