



The Abu Dhabi Environmental Data Initiative (AGEDI)

GLOBAL LESSONS LEARNED FOR THE DESIGN OF ENVIRONMENTAL INFORMATION SYSTEMS Final Draft

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1. Introduction

The Abu Dhabi Environmental Data Initiative (AGEDI) originated as a proposal from the Emirate of Abu Dhabi and the United Arab Emirates to improve the quality of environmental data and information within the global sustainable development process. AGEDI was formally launched with the United Nations Environment Programme (UNEP) as a partnership initiative at the World Summit on Sustainable Development in August 2002. As part of the implementation process it was agreed that the Environment Agency Abu Dhabi (EAD), formerly known as Environment and Wildlife Development Agency (ERWDA) of the Emirate of Abu Dhabi would be responsible for the development of AGEDI within the United Arab Emirates and UNEP would lead the implementation of the regional and global components of AGEDI.

This report presents an analysis of lessons learned in the development of national, regional and global environmental information systems through UNEP's experience over the last ten years. It is complemented by the following: the AGEDI Conceptual Design document, the Global Study, and a CD-based environmental information systems knowledge base.

2. Driving Forces

The development of environmental data and information systems are significantly affected or driven by a variety of forces. These direct and indirect drivers (see Box 1) need to be both analysed and considered in the design of the environmental information system.

Box 1. Description of direct and indirect drivers used in the Millennium Ecosystem Assessment¹

A driver is any natural or human-induced factor that directly or indirectly causes a change in an ecosystem. A direct driver unequivocally influences ecosystem processes and can therefore be identified and measured to differing degrees of accuracy. An indirect driver operates more diffusely, often by altering one or more direct drivers, and its influence is established by understanding its effect on direct drivers.

The indirect drivers of change are primarily demographic, economic, socio-political, scientific and technological, cultural and religious. The interaction of several of these drivers in turn affects the overall level of resource consumption and disparities in consumption within and between countries. Clearly these drivers are changing: population and the global economy are growing, there are major advances in information technology and biotechnology, and the world is becoming more interconnected.

Important drivers affecting the development of environmental information systems are briefly summarized below²:

- 2.1** The global environmental agenda: Agenda 21 and Principle 10 of the Rio Declaration evolved into the Johannesburg Plan of Implementation from the World Summit on Sustainable Development to provide the principle driving force for the development of environmental data and information systems from global to local levels. The multilateral environmental and trade agreements require countries to provide

¹ Ecosystems and Human Well Being. A Report of the Conceptual Framework Working Group of the Millennium Ecosystem Assessment. Island Press. 2004.

² This is not a comprehensive list, but a selection of drives that were judged to be important elements of the AGEDI design process.

information in specific formats and significant donor and GEF funding has been mobilized to help implement o these agreements including support for the development of capacity and information systems.

- 2.2** The global development agenda: The United Nations has adopted the Millennium Development Goals as the core of its global development agenda and as a reform process, which includes the coordinated development of United Nations system processes at national level.
- 2.3** Global institutions, their policies and programmes: Global institutions have a major impact on the development of environmental information systems. UNEP has been a consistent and major role player in the development of environmental information systems in developing regions since the mid-nineties. The World Bank, the United Nations Development Programme (UNDP) and other United Nations agencies such as the United Nations Educational, Scientific and Cultural Organization (UNESCO) have been actively involved in promoting and supporting the development of environmental information systems in certain developing countries and regions. However, their influence has varied due to the range of programmes and policies they have established over time.
- 2.4** The development of information technology during the nineties has provided significant opportunities for the development of more effective environmental data and information systems including:
- a) The expansion of the Internet to most developing countries, despite remaining cost and regulations obstacles.
 - b) Geographic Information Systems (GIS) and remote sensing technology have now become affordable and practical tools on personal computers for environmental management.
 - c) Open source software has provided the option to acquire computers and software at low cost for environmental management.
- 2.5** External influence and impact: The thinking and the power behind the development of environmental information systems in developing countries in the 1990's largely came from the developed world through donor agencies, the World Bank and the United Nations agencies. The extent of funding available, the continuity of financial flows and the conditions of granting funds have a significant impact on the viability, effectiveness and sustainability of environmental information systems. The donors have provided the biggest market for the development of environmental information systems and are the biggest controllers of the approaches and technologies used.
- 2.6** Information society: The global community has recognized the importance of information and communication technologies to ensure sustainable development and poverty alleviation. The global and regional information society initiatives, including the World Summit on the Information Society provide a framework and process for supporting developing countries.
- 2.7** Sectoral initiatives: Sectoral initiatives have made significant progress in the development of national, regional and global sectoral information systems. Noteworthy areas include biodiversity, forest management, coral reefs, wetlands, water resources, meteorology, soils, land cover and water quality.

- 2.8** Global statistical development processes: National statistics are required for national, regional and global development; statistical processes are increasingly incorporating environmental statistics and are being strengthened at both national and regional level through the United Nations processes.
- 2.9** Private sector: The private sector is increasingly using environmental information for its business purposes. Examples include telecommunications, mining, agriculture and forestry, fishing, real estate and tourism. This has led to the development of niche information systems to support these demands as well as private companies that invest in public agencies for the use of their data. These investments are not yet sufficient to fund the development or maintenance of public environmental information systems.
- 2.10** Environmental information system market: The nature of the environmental information system market provides the basis for the design of the environmental information system. This market is primarily determined by the funds available for various purposes in a country or region. In many areas, the market has been dominated by the donors through grants and projects largely controlled by external parties, as regional markets are not sufficient to support the development of a viable environmental information system. In this respect, it is important to determine the real client for the development of the environmental information system when external parties are providing the funds. The distortion of markets by donors and United Nations agency programmes can easily result in a significant opportunity cost for national governments and the destruction of institutional capacity. Global environmental funding agencies, such as the Global Environment Fund (GEF) and donors interested in funding environmental management activities are not prepared to fund long term information gathering and management initiatives and the United Nations agencies themselves struggle to find regular funding for the development and maintenance of global information systems. Regular programmes such as GEMS water are significantly under-funded and information gathering for the environment is being generated through global environmental assessments such as the Global Environmental Outlook (GEO), the Intergovernmental Panel on Climate Change (IPCC), the Millennium Ecosystem Assessment (MEA), the Global Agricultural Assessment, the World Water Assessment and the proposed Global Marine Assessment. However each global assessment is constrained by the lack of suitable globally harmonized data.
- 2.11** The role of national and regional development process: The national and regional development process in a country or a region determines the nature of the environmental management process as well as the priority and funding allocated for environmental information system development. Many developing country governments and regional development processes do not regard the acquisition and management of core environmental data as a priority in the face of widespread poverty. Therefore insufficient funds are available in many countries to support environmental data acquisition and management. As a result, the deterioration of environmental data quality is well documented.
- 2.12** Regional development initiatives such as New Partnership for Africa's Development (NEPAD) in Africa are including environmental dimensions. They can provide a key market and sometimes contain programmes for environmental information systems.

- 2.13** Government culture: Most governments operate on a sectoral basis and the culture of collaboration and sharing of resources is often not sufficient to provide the basis for the development of a common national environmental information system, even if the technology and financial resources are available.
- 2.14** Global and national security concerns: The global war on terror as well as national government security strategies result in the production of certain types of environmental data, restricted or public, in certain countries. Security concerns can greatly affect the production of and access to environmental data and information systems.
- 2.15** Legal and policy frameworks: Increasingly governments are adopting laws, policies and procedures for the management of and access to information, which provide country specific conditions that apply to environmental information systems. This includes issues such as charging for nationally funded data, which can significantly affect access to information.
- 2.16** Governance and management of EIS institutions: In many countries and regions, several institutions are used as the providers of environmental information services. The nature of the management of these institutions, their effectiveness and culture shape the environmental information systems process and determine their future success.

3. Key Lessons Learned for the Design on EIS

3.1 Introduction

This section provides a brief summary of key global lessons learned in the development of environmental information systems. These insights underpin the design of the various components of the AGEDI programme. The West Asia component of the AGEDI programme will provide lessons learned in West Asia to complement the global analysis and offer further input into the design of the West Asia component of AGEDI.

3.2 Lessons Learned

- 3.2.1** Developing professional environmental information systems approach: environmental information systems (EIS) should be developed using a professional systems development approach. National environmental information systems are complex programmes with a high risk of failure and a professional systems development approach is essential (see Section 4). Information systems can only succeed if they meet user needs. Information systems strong in technology and poor in data are of limited value. Strong leadership and high level political support is necessary for successful information systems.
- 3.2.2** People are important: People develop and run an EIS. People create successful institutions. Leadership – the ability of a person to inspire and motivate those involved in the process – is an important requirement for the success of a system, particularly in an environment that is rapidly changing. Environmental information systems require participation by many role players in both government and the private sector; a command-and-control approach of system development based on policies and edicts issued from government mostly do not

work. The skills of facilitation and sound communications through all media are very effective for promoting the collaborative work required for the development of an EIS.

- 3.2.3 EIS Development as organizational learning:** EIS development is an organizational learning process. Knowledge management and capacity development should be a key component of the systems development. The EIS system development process needs to incorporate an organizational learning, knowledge management and capacity building approach at its core, rather than the slavish implementation of an accepted model. Partnerships with universities, research and training institutes are therefore important. Fundamentally EIS development is a collaborative enterprise.
- 3.2.4 EIS Development to focus on its key requirements:** The development of EIS should only be undertaken if certain key requirements are in place. These include:
- a) A legitimate strategic environmental management process with related institutional roles, responsibilities and budgets.
 - b) An effective and legitimate plan and governance process for the environmental information initiative.
 - c) An institution with the necessary mandated responsibility and accountability to lead the development and management of the EIS.
 - d) An environmental information network or committee involving all key role players, which discuss and resolve key operational issues in the implementation, evaluation and monitoring of the system.
 - e) A budget sufficient to cover the costs of system development and maintenance.
 - f) A feasibility study showing the clear need for and feasibility of developing a system.
- 3.2.5 Comprehensive and feasible EIS:** If a comprehensive EIS is not feasible due to the nature of the environmental management process, then an environmental information infrastructure should be considered. There is always a *de facto* process of environmental management within a country, even if it is not clearly articulated and strategically managed. Improving the quality of, and access to, environmental information is of value for sustainable development. Under these conditions an environmental information infrastructure (i.e. a set of policies, procedures and standards adopted nationally to facilitate the management, sharing and dissemination of environmental data) should be developed.
- 3.2.6 Funding model – vital for sustainability:** Sufficient funding on a regular basis is required to ensure the sustainability of an EIS. The most appropriate model is one where the provider of funds is the agency that requires the information to fulfill its mandate, and therefore the EIS becomes part of its regular budget. This is true for the GEO Data work required for the GEO process, the Forest Resource Assessment (FRA) data management work required for the FRA, and the information management work required for global environmental assessments such as the Millennium Ecosystem Assessment and the Intergovernmental Panel on Climate Change. The Global Biodiversity Information Facility also provides a viable model for system development based on regular contributions from key partners.
- 3.2.7 Understand the nature and dynamics of the market for EIS:** A sound market analysis (i.e. who wants environmental information and who is prepared to pay for what and when) provides the basic understanding needed for the development of an EIS. EIS markets are complex, particularly in areas where donors are the major market actors. Creative thinking is required in the financing and development of information systems: in many cases classic systems development processes will not be financed by governments or donors; project

based incremental development is often more viable. Information systems are expensive tools if not put to use in a cost benefit fashion. Better results produced when there is good working relationship between data producers and data users. Collaboration with the private sector is important as they hold significant portion of environmental data. Recognition of data ownership and enforcement of copyright laws and regulations are essential ingredients for promoting data sharing and exchange. Host organizations (and national governments) must commit sufficient human and financial resources to sustain the systems.

- 3.2.8 Plan, develop and transfer EIS technology carefully:** The development and transfer of EIS technology should be carefully planned. There are significant economies of scale in the development of common approaches and technologies at the regional and national level. The development of an EIS from the ground is very expensive and time consuming. It carries a high probability of failure, unless the technology provider is very experienced and the budget is sound. National and regional technology partnerships with good linkages to global developments, using common approaches and tools at the regional level, are most likely to succeed.
- 3.2.9 Organizational leverage is required in the EIS development process:** All environmental information systems will run into a variety of obstacles in the course of their development. Therefore the EIS development team requires the support of an individual or institution that has significant leverage with key role players in the country. In developing regions the World Bank, regional development banks and United Nations agencies have been able to apply leverage required to facilitate environment information system development. It is critical to involve/consult with decision and lawmakers in the process of establishing any information system, as they are the source of actions and financing. In general, involving end users in the design phase is essential to the success of any system.
- 3.2.10 Organizational or thematic information systems form the basis for the development of an environmental information system:** Environmental information systems are built from organizational or sectoral information systems, which often represent the true structure of the environmental management process within a country. In many countries there is no formal national environmental management process, but environmental policies and laws are implemented through a variety of agencies. In these cases it would be better to build capacity of effective environmental information management. Using environmental information systems to support decision-making is not easy. This requires sound judgment, science, coordination and authority. Environmental information systems are never perfect. All systems, old and new, can be improved through proper support and networking. Evaluation, monitoring (including independent audits) can help identify and remedy data errors and/or deficiencies. Continuous capacity building is essential for the sustainability for environmental information systems and its use for decision support.
- 3.2.11 Future scenarios and outlook:** Most systems take a number of years to fully develop and as such are mostly designed to meet future needs. Therefore, a vital component of the systems development approach is a scenario and futures analysis to look at possible institutional and technological changes that the system will need to accommodate.
- 3.2.12 Focus the development of the EIS:** Designing a system to digitize and mobilize all of the environmental data and information available is often costly and ineffective. Therefore a careful analysis of the requirements for environmental information and the likely changes

over time need to be conducted as part of the EIS design process to ensure focus on the core information required.

- 3.2.13 Use appropriate technology:** The technology proposed for the EIS should match the realities of the budget and long term partnerships that will be used for system implementation. Open source solutions should be seriously considered as well as using the EIS process to develop national and regional technology partnerships and capacity.
- 3.2.14 Mobilize donor funds to support the EIS programme:** With a comprehensive and professionally developed EIS programme, donors interested in supporting EIS initiatives can be encouraged to provide funding for work within the overall EIS programme as opposed to separate and often competing initiatives. Donor-financed information systems cannot generate sustainable results if the national government or counterpart organization is not committed to follow-up and maintain the system after the “formal” project ends.
- 3.2.15 Work with existing global initiatives that have promise:** Initiatives are considered to have promise when they have scientific credibility, have institutional legitimacy, have a track record and have the ability to sustain themselves until they meet their objectives. Regional environmental reporting requires intimate partnerships and technical coordination; data systems should be compatible and discrepancies must be addressed. Box 2 provides some examples of initiatives that are worthwhile taking into account when designing an environmental information system.

Box 2. Some Examples of promising Global Environmental Data and Information Initiatives

The GEMS Water Programme aims to develop a global water quality information system through a comprehensive programme. It involves developing standardized methods of data collection and quality control through laboratory training and capacity building at local levels, quality control at the global level and through the development of effective means of managing and disseminating the global data.

The Global Land Cover Network (GLCN) has developed a standardized global land cover classification and methodology and is working with the International Standards Organization (ISO) to have it formally accepted as a global standard. The Food and Agriculture Organization (FAO) and UNEP are leading the global process and working with global, regional and national role players to market the value of the GLCN methodology, develop partnerships for capacity building and implementation and to mobilize funding through the United Nations system to support the process.

The FAO led Forest Resource Assessment represents an important global governmental initiative to gather and manage forestry data and information.

The Global Biodiversity Information Facility (GBIF) intends to make the world's primary data on biodiversity freely and universally available via the Internet. It is funded by governments and supported by donors and works to develop and implement a global system of biodiversity information management.

The United Nations statistics programme works directly with governments to develop the global statistical system. In the last five years efforts have been made to improve environmental statistics.

The global Soil and Terrain Database (SOTER) is led by the International Soil and Reference Information Centre (ISRIC), which aims to establish a World Soils and Terrain Database, containing digitized map units and their attribute data. This data handling system will provide the necessary data for improved mapping and monitoring of changes of world soil and terrain resources.

ReefBase is an online information system on coral reefs, and provides information services to coral reef professionals involved in management, research, monitoring, conservation and education. ReefBase is the official database of the Global Coral Reef Monitoring Network (GCRMN), as well as the International Coral Reef Action Network (ICRAN).

GCRMN is tasked by national governments, United Nations agencies, international NGOs and marine institutes to promote monitoring of the coral reefs of the world. The GCRMN functions through independent Nodes, which are networks of countries and states, assisted by those with additional capacity. These Nodes also include existing coral reef monitoring programs and activities. The Node coordinates participant training, monitoring, problem resolution, data analysis and reporting among the participants in a collaborative manner and seeks to obtain funding to support these activities. The Nodes are coordinated through the Global Coordinator of the GCRMN, whose tasks involve: assisting all Nodes with funding applications; representing these Nodes on international forums; and producing the Status of Coral Reefs of the World reports every two years.

The World Database on Protected Areas (WDPA) provides the authoritative dataset on protected areas worldwide. The WDPA Consortium was established in 2002 to expand participation and leadership on the development of the protected areas database. The Consortium brings together a growing number of international conservation organizations that have agreed to ensure that information on protected areas is maintained on a cooperative basis and used to monitor the effectiveness of global conservation agendas.

UNEP's global satellite data access initiative works with a number of key role players including NASA to provide free access to global, regional and national rectified and harmonized satellite imagery for use in environmental monitoring and information system.

Global Spatial Data Initiative (GSDI) and its regional components provide an important base for the development of effective environmental information systems. In the past few years GSDI has provided valuable work in facilitating the development of spatial data initiatives globally and in regions such as Africa and Asia.

The Global Invasive Species Information Network (GISIN) will address the need for a central portal system that will link all existing Invasive Alien Species (IAS) databases, while retaining the independence of the databases that are linked. Ideally this will provide a one-stop shop for IAS information exchange around the globe, speeding up the delivery of information on IAS identification, prevention and management. GISIN is not a new model intended as a repository for data. Data repositories already exist and should continue to be populated with new data. In those regions where they do not exist, efforts should continue to build them for ultimate linkage to the GISIN.

ECOLEX is an information service on environmental law, operated jointly by FAO, the World Conservation Union (IUCN) and UNEP. Its purpose is to build capacity worldwide by providing the most comprehensive global source of information on environmental law. This unique resource, which combines the environmental law information holdings of FAO, IUCN and UNEP, seeks to put this information at the disposal of users world-wide, in an easily accessible service.

UNEP's GEO Data Portal is the authoritative source for data sets used by UNEP and its partners in the Global Environment Outlook (GEO) report and other integrated environment assessments. Its online database holds more than 400 different variables, as national, sub-regional, regional and global statistics or as geospatial data sets (maps), covering themes like freshwater, population, forests, emissions, climate, disasters, health and GDP.

Global environmental assessments, including the Millennium Ecosystem Assessment (MEA), the Intergovernmental Panel on Climate Change (IPCC), the World Water Assessment Programme, the Global Environment Outlook (GEO) and the International Assessment of Agricultural Science and Technology for Development provide policy relevant, scientifically and governmentally accepted synthesis and information as well as useful data from modeling and scenario exercises.

4. Steps in the Development of an Environmental Information System

- 4.1** Establish legitimate EIS process: Establish the mandate, legitimacy, authority and process for the development of the environmental information system in terms of the relevant laws, policies and regulations through a participatory process involving all key stakeholders. Each country has a unique national culture, policy, regulatory and institutional environment. Yet the buy-in of the key role players is essential for the success of the system.
- 4.2** Effective governance mechanisms: Initiate an effective governance mechanism for the overall strategic direction of the environmental information systems process at the highest appropriate level of government. This could take the form of a sub-committee of the national environmental management or national development process. In theory, the strategic management of the environment is an integral part of the national

sustainable development process run from the highest level of government and the environmental information system should be part of that process. In practice, a suitable mechanism will have to be found in each country with a key facilitating role being played by the United Nations system. This mechanism needs to provide clear guidance in terms of the strategy, including vision, goals, objectives, outcomes, deliverables and timeframes to provide the foundation for the implementation of the system.

- 4.3** Establish the network: Establish an environmental information network consisting of all key role players involved in the development and use of environmental information (government, academia, civil society, the private sector and the media) to provide a forum for collaborative development of the environmental information system programme, where learning and capacity building can take place.
- 4.4** Needs analysis (capacity building and learning plan): Provide a comprehensive needs analysis of the strategic environmental management process that will be supported by the environmental information system. People, institutions and their culture, dynamics and behavior are at the core of the development of an environmental information system and need to be well understood. The analysis will include:
- d) Legal and policy frameworks for environmental management and environmental information management in relation to national development.
 - e) Institutional frameworks and dynamics in terms of organizational mandate, outputs, roles and culture, the history of and current situation regarding information management processes (including an inventory of key information and knowledge resources), information technology and financial aspects of information management.
 - f) The information currently required in terms of specific users, content, format, regularity together with an indication of future needs and an identification of gaps.
 - g) Financial analysis of monies currently spent and potential future funding for the various aspects of the sustainable management of environmental information.
- 4.5** Scenario-based EIS Outlook: Provide a scenario based EIS outlook study addressing possible future institutional, technical, legal and policy developments that the information system will need to accommodate. The EIS takes a number of years to develop and needs to be designed to meet future requirements. Scenario studies have proved to be an effective means of assisting in the design of such systems.
- 4.6** Options report: Compile an options report with at least three alternative models for the development of the system that details the overall benefits and costs of each alternative. The options need to be chosen in a manner that facilitates critical thinking, offers core benefits that the system can provide and a realistic financial model. This allows the decision-maker to compare options and find the solution that provides the highest overall benefit. If necessary, limited feasibility studies can be undertaken to develop realistic options.
- 4.7** Conceptual design: Articulate a conceptual design for the system outlining:
- a) The rationale for the development of the system indicating what benefits will be provided and why the system is feasible.
 - b) The overall vision and objectives.
 - c) The key assumptions used in the design, including the minimum core resources required for the development of the system.

- d) A description of the various components of the system, together with the roles and responsibilities for the development of the system.
- e) The sustainability model indicating how financial and human resources and institutional commitment will be maintained to ensure the success of the system over its design life.
- f) Overall timetable for the implementation, monitoring and evaluation of the system.

4.8 Functional specification (information system): Develop a functional specification outlining the details of how the system will work and consult with key stakeholders to ensure that the system will meet their requirements. The information system cannot operate as a stand alone system. It will be a network server based system to serve as a platform for shared resources. Its requirements should be based on a network and shared transaction basis to function effectively and on a sustainable function. It is necessary that any such information system operates on particular a specified network protocol agreement to be defined in collaboration with all stakeholders involved. To do so a complete survey of stakeholder analysis needs to determine the fundamental information system operating network modalities of the environmental information system. It is also strongly suggested to that a management protocol be established by a dedicated manager to oversee the information system from conception, design, execution and operation.

4.9 Technical specifications: Develop a technical specification providing the technical specifications for the system. The specifications determine the details elements and characteristics of the information system. They also identify in details all the technical components of the information systems and its essential functioning parts and how they relate to each other and fit together as a whole in order to accomplish efficiently the numerous networking or stand alone tasks assigned to the information system. The specifications should clearly layout the architecture, capacity, the size, the speed, the robustness, performance, hardware and software requirements and the operating modalities of the server.

4.10 Implementation plan: Develop a detailed project implementation plan. The plan will serve as an operating management instrument to sustain the effectiveness of the strategy that underpins the sustainability of the EIS. The plan should include a specified calendar of action, events and delivery over time horizons agreed upon by the beneficiary stakeholders. The implementation plan should span from a short term - two (2) to three (3) year minimum; medium term - four (4) to five (5) years; and long term six (6) to ten (10) years. All selected time horizons within the management strategy of the implementation plan should be reviewed and strengthened on a quarterly monitoring and evaluation sub action plan in order to assess the robustness of the EIS. The plan should be peer reviewed by the members of the beneficiaries and members of the board of the EIS project. In preparing so this approach will determine the reliability and efficiency of the EIS.

4.11 Communications plan: Develop a communications plan. Communications are the heart of any EIS. They provide the glue that keeps the EIS network to succeed. It should be considered as a strategic function of the EIS management, and not as an after-thought. Therefore a carefully designed, crafted, executed and operated communications plan is essential for a successful EIS. The communications plan helps to provide a regular information exchange, shared lessons learned in EIS, the establishment of a community of expert users, the strengthening of new skills in environmental

information management, the creation of a potential EIS market where the trading in environmental information knowledge flourishes and mostly the maximisation of investments and economic values of EIS.

- 4.12** Monitoring and evaluation plan: Develop a monitoring and review plan. This is a critical function of the EIS development strategy. It serves as useful tool to assess the success of the EIS over specific time horizons determined in the EIS business strategy. Monitoring and evaluation remains a supporting component to the implementation plan. More so it should be designed on economic principles and executed with the maximum efficiency.
- 4.13** Budget: An appropriate and proportional budget should be allocated to cover the cost of the design of the EIS. Designing an EIS requires the use of funds and a cost estimate should be tabled. The budget will cover all the design phases and should be augmented whenever necessary as costs of design might escalate. Yet the budget should be tightly managed so that overrun costs don't derail the EIS design project.