Environmental assessment:

Environmental impact assessment is the formal process used to predict the environmental consequences (positive or negative) of a plan, policy, program, or project prior to the decision to move forward with the proposed action. Formal impact assessments may be governed by rules of administrative procedure regarding public participation and documentation of decision making, and may be subject to judicial review. An impact assessment may propose measures to adjust impacts to acceptable levels or to investigate new technological solutions.

The purpose of the assessment is to ensure that decision makers consider the environmental impacts when deciding whether or not to proceed with a project. The International Association for Impact Assessment (IAIA) defines an environmental impact assessment as "the process of identifying, predicting, evaluating and mitigating the biophysical, social, and other relevant effects of development proposals prior to major decisions being taken and commitments made."[1] EIAs are unique in that they do not require adherence to a predetermined environmental outcome, but rather they require decision makers to account for environmental values in their decisions and to justify those decisions in light of detailed environmental studies and public comments on the potential environmental impacts.

Environmental Impact Assessment (EIA) EIA is implemented in Egypt under the umbrella of the Ministry of state for environmental affairs. The Egyptian Environmental Affairs Agency (EEAA) is responsible for the EIA services.

In June 1997, the responsibility of Egypt's first full-time Minister of State for Environmental Affairs was assigned as stated in the Presidential Decree no.275/1997. From thereon, the new ministry has focused, in close collaboration with the national and international development partners, on defining environmental policies, setting priorities and implementing initiatives within a context of sustainable development.

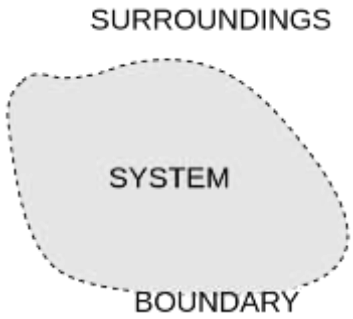
According to the Law 4/1994 for the Protection of the Environment, the Egyptian Environmental Affairs Agency (EEAA) was restructured with the new mandate to substitute the institution initially established in 1982. At the central level, EEAA represents the executive arm of the Ministry.

The purpose of EIA is to ensure the protection and conservation of the environment and natural resources including human health aspects against uncontrolled development. The long-term objective is to ensure a sustainable economic development that meets present needs without compromising future generations ability to meet their own needs. EIA is an important tool in the integrated environmental management approach.

EIA must be performed for new establishments or projects and for expansions or renovations of existing establishments according to the Law for the Environment. [

System: A system is a set of interacting or interdependent components forming an integrated whole.

Every system is delineated by its spatial and temporal boundaries, surrounded and influenced by its environment, described by its structure and purpose and expressed in its functioning.



Complex system: system boundaries are often fuzzy and changes in core aspects of a system may be more a question of degree than an absolute (Cumming 2011).

System components and environmental indicators

Environmental indicators provide an important source of information for policy makers and help to guide decision-making as well as ecological indicators 8 (2008) 14–25 article info Article history: Received 23 December 2004 Received in revised form 7 November 2006 Accepted 13 November 2006 Keywords: Indicator selection Ecological indicators Environmental indicators Environmental assessment Causal chain abstract In recent years, environmental indicators have become a vital component of environmental impact assessments and ‘‘state of the environment’’ reporting. This has increased the influence of environmental indicators on environmental management and policy making at all scales of decision making. However, the scientific basis of the selection process of the indicators used in environmental reporting can be significantly improved. In many studies no formal selection criteria are mentioned and when selection criteria are used they are typically applied to indicators individually.

Often, no formal criteria are applied regarding an indicator's analytical utility within the total constellation of a selected set of indicators. As a result, the indicator selection process is subject to more or less arbitrary decisions, and reports dealing with a similar subject matter or similar geographical entities may use widely different indicators and consequently paint different pictures of the environment. In this paper, a conceptual framework for environmental indicator selection is proposed that puts the indicator set at the heart of the selection process and not the individual indicators. To achieve this objective, the framework applies the concept of the causal network that focuses on the inter-relation of indicators. The concept of causal networks can facilitate the identification of the most relevant indicators for a specific domain, problem and location, leading to an indicator set that is at once transparent, efficient and powerful in its ability to assess the state of the environment.

Environmental indicators provide an important source of information for policy makers and help to guide decision-making as well as monitoring and evaluation (OECD, 1999), because they can provide valuable information on complex issues in a relatively accessible way. However, it is a major challenge to determine ''which of the numerous measures of ecological systems characterize the entire system yet are simple enough to be effectively and efficiently monitored and modeled'' (Dale and Beyeler, 2001, p. 4).

Component: Environmental Systems

Component: Reducing Environmental Stresses

Component: Reducing Human Vulnerability

Component: Social and Institutional Capacity

Component: Global Stewardship

Indicator: Air Quality

Indicator: Water Quantity

Indicator: Water Quality

Indicator: Biodiversity

Indicator: Land

Indicator: Reducing Air Pollution

Indicator: Reducing Water Stress

Indicator: Natural Resource Management

Indicator: Reducing Ecosystem Stresses

Indicator: Reducing Waste and Consumption Pressures

Indicator: Reducing Population Growth

Indicator: Basic Human Sustenance

Indicator: Reducing Environment-Related Natural Disaster Vulnerability

Indicator: Environmental Health

Indicator: Science and Technology

Indicator: Environmental Governance

Indicator: Private Sector Responsiveness

Indicator: Eco-Efficiency

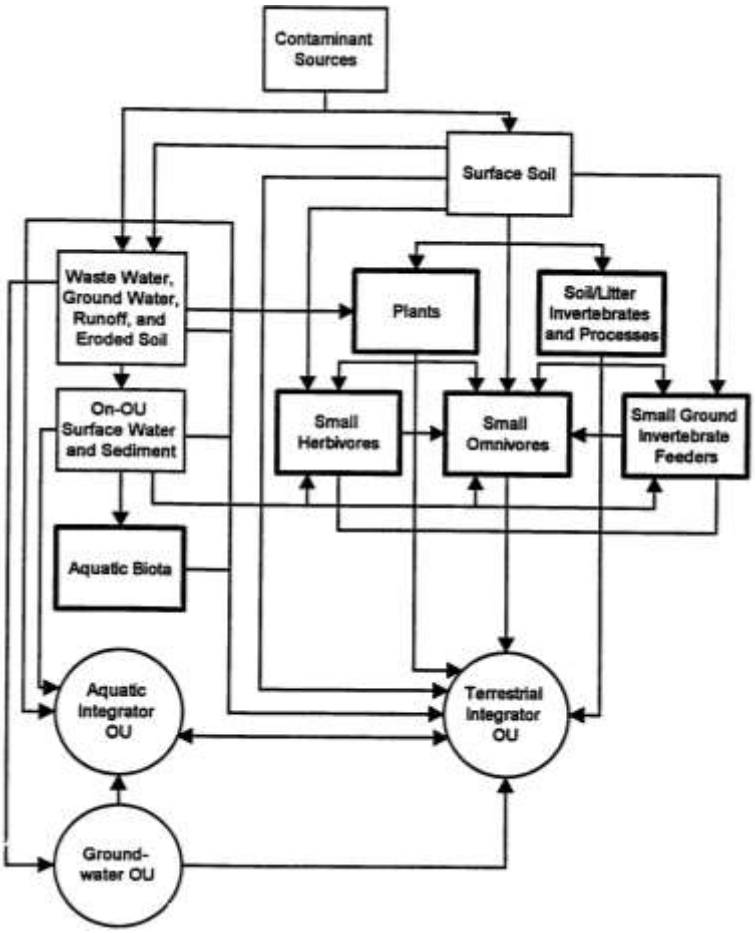
Indicator: Participation in International Collaborative Efforts

Indicator: Greenhouse Gas Emissions

Indicator: Reducing Transboundary Environmental Pressures

Conceptual modelling

Environmental Information System (EIS) development is a complex task involving modeling several aspects of the physical real world and complexity management. Conceptual modeling is an essential premise for a correct development of complex information systems. Reusable conceptual schemas have the potential to facilitate this difficult and time-consuming activity. In addition, linking conceptual schemas to reusable software components may provide a way for reusing not only concepts but also software applications.



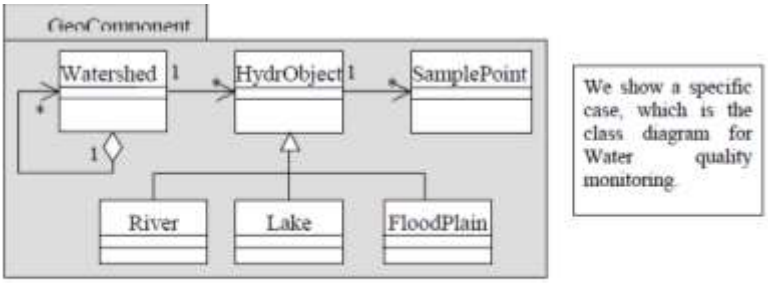


Fig. 2. GeoComponent: Defines the appropriate relationships and hierarchies that will be used for the environmental objects to be monitored.

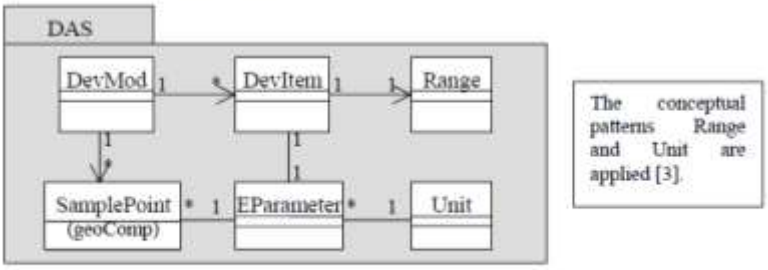
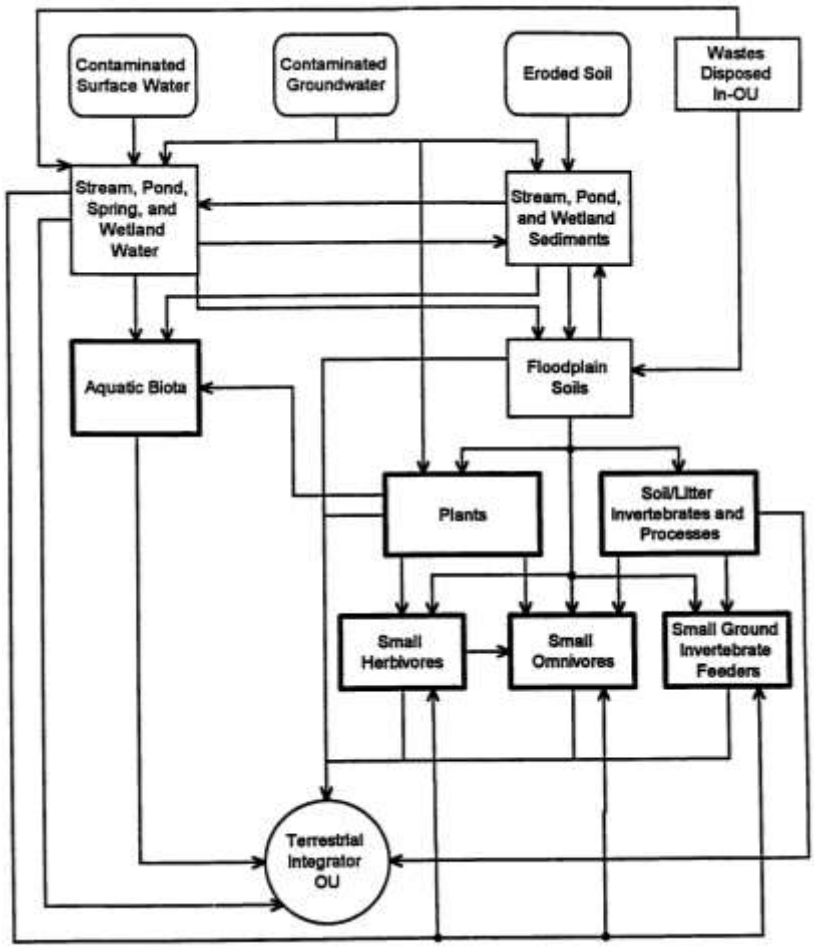


Fig. 3. Data Acquisition: The basis for building monitoring tools based on the use of remote devices. For a more detailed conceptual model of a generic DAS, see [8].



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2- EEAA. Retrieved 2013-01-03.

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