

activities on the environment. Ecological goals are considered equally and simultaneously with economic and social goals.

AN ECOSYSTEM APPROACH

As a means to promote sustainable development through the integration of social, environmental, and economic goals, the ecosystem approach views human activities as part of ecosystems. The ecosystem includes the environment and what people do (their social and economic activities).

An ecosystem approach is based on the idea that if humans subscribe to and apply an appropriate set of values and are equipped with the required knowledge and tools, they can protect and maintain ecosystems, derive a quality existence from them, and simultaneously ensure that opportunities for future generations are retained. An ecosystem approach is an adaptive process that employs a suite of integrated programs to care for the earth's natural assets by managing our relationship with other components of ecosystems and ensuring that our perceptions, values, and behaviours work in support of ecosystem function. It is an encompassing process that captures the range of social, economic, and ecological values that ultimately define human-ecosystem relationships.

The approach requires an ecological context for decision making, reflecting an evolution in the way we assess and manage the impact of human activities on the natural environment. In the case of land

Ecosystems

Ecosystems are composed of a dynamic complex of plant, human, animal, and micro-organism communities and their nonliving environments interacting as a functional system. Many components perform specialized roles within the ecosystem. Ecosystems provide ecological services such as the conversion of solar energy into carbohydrates and protein, oxygen production, water purification, and climate moderation. They produce the soils in which we grow crops, and they remove greenhouse gases from the air. Human health, like the health of all other living things, is linked to the well-being, or integrity, of these systems.

Properties reflective of the state of ecosystems can be measured. For example, populations can be measured with regard to age, size, reproductive success, incidence of disease, and rate of death. Alternatively, the status of individual organisms can be measured by biochemical, cellular, physiological, or behavioural characteristics.

The concept of an ecosystem can be applied at different scales. An ecosystem may be as small as a pond or as vast as a continent or the globe. Chemical, biological, and physical characteristics vary from one ecosystem to another.

Understanding Whole Ecosystems

Understanding whole ecosystems means moving beyond the scientific study of individual ecosystem components (air, land, water, and biota) to the integration of science across many disciplines, including the examination of interrelationships and cumulative effects and socioeconomic considerations. A number of academic institutions and research institutes in Canada promote multidisciplinary collaboration on ecosystem science. The Government of Canada's National Water Research Institute, for example, conducts a program of ecosystem-based research and development in aquatic sciences, in partnership with Canadian and international science communities, including the examination of the impacts on aquatic ecosystems of atmospheric ozone depletion, climate change, and pollution from agriculture, industry, and urban developments.