

# ACTUAL APPLICATION OF ECOSYSTEM BASED MANAGEMENT APPROACHES ON THE ENVIRONMENT: CASE STUDY, EAST AFRICA

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## **1. INTRODUCTION**

The debate on ecosystem-based management work, has been increasing over the recent past. In East Africa, there is scant literature on the approach. This implies that the approach has not been applied much as a management tool. Consequently there is a need for an examination of how responsive East African policies, are to ecosystem-based management and bio-diversity management. It is incomplete until we have examined the meaning of the concept itself.

I have adapted the following approach to this paper. First, I attempt to give my understanding of an ecosystem as a concept, based on existing literature and my personal experience in environmental management.

In the following section, I take a close look at selected and relevant East African government policies/approaches that are in existence. I further examine whether they provide an appropriate framework, which can be applied to manage the ecosystem and the environment in their totality, thus making ecosystem-based management appropriate.

## **2. WHAT ARE ECOSYSTEM BASED MANAGEMENT APPROACHES ON THE ENVIRONMENT?**

An ecosystem is the basic functional, ecological unit and includes organisms and the biotic environment. Ecosystems comprise a Biome assemblage of organisms, functioning together with the environment. Ecosystems have been described further in other terms such as microcosm, Holocoem, Maturkorplot, and Biogenoecosis.

Fundamental aspects of ecosystems involve the transformation and circulation of energy and matter through the medium of living things and their activities, such as photosynthesis, decomposition, predation, parasitism and other symbolic activities, storage of activities and energy. For example, food chains in non-living parts of an ecosystem, circulation of energy and matter are composed by such physical process like evaporation and precipitation.

Ecosystem-based management work, in my understanding, involves environmental conservation and management approaches that are used to manage biodiversity; the principle aim is to have a balanced cycle of harvest and renewal of natural resources.

Ecosystem-based management work includes conservation and protection approaches like landscape/seascape, agro-ecology, agro-forestry, water shade and river shore management techniques. These approaches are applicable in areas such as: range lands, forests, wetlands, wildlife and wildlands.

Wetlands and forests are resources that encompass a wide range of habitat including most terrestrial freshwater and marine habitats. There are cardinal principles in hydrological cycles, conservation of plant species which enable ecologically stable and prosperous biodiversity to ensure sustainable yields and development. Furthermore they are responsible for the stabilization of water supply and the conservation of the soils and nutrients in East African environments. Although scientifically unproved, climatic conditioning by wetlands is high probable coupled with the association of forests,

wetlands, rain catchment, water availability and moderating floods. All of these make ecosystem based management work resourcefully to the general environment.

Rangeland is land that is unsuitable for crop production. Range management is the manipulation, alternation and control of ecosystem depletion when sustained production of goods and services is required. Range management approaches should be holistic with clear goals like multi species and grazing. Fodder species have to be improved through selection schemes, based on producers or through an institutional framework so as to ensure biological diversity management to make ecosystem based management work.

Coupled with the above, good management of rangelands can provide recreation sites and other rangelands benefits needed such as the production of domestic and wild animals. Furthermore rangeland management includes control of native plants, seeding of grasses, legumes and fertilization for the purpose of rehabilitating the natural vegetation.

However it should be known that a range manager follows the principle that land is borrowed from his children, rather than inherited from his father, and that it must be passed on without damage.

Agro-forestry, is a component of agriculture that involves a close association of trees or shrubs with crops and animals. It may involve a combination of practices in the same place at the same time such as intercropping and related practices.

The most widely practiced agro-forestry system in the dry land areas of East Africa are based on trees dispersed in croplands. The trees and their leaves increase the production of the surrounding crops and improve the soil and water conditions for crop growth. Others include contour strips and multi-purpose trees, alley cropping, multi-storey mulching. This type of agriculture fosters ecosystem-based management approaches on the environments of East Africa and also protects and conserves the ecosystems.

A pond is a small water source on land or mountain. A mountain pond is an ecosystem. Pond management increases primary productivity usually by applying fertilizers, and establishing a fish population of specific composition best suited to the type of harvest desired. The species used will depend on the locality, and whether food of primary concern is at available at intervals. When the ponds dry up, crops are planted, and the nutrients and fertilizers greatly increase production.

Pond ecosystem management generates primary productivity, usually by applying fertilizers and establishing specific compositions best suited to harvest.

Water shade and river shore management, sources of fresh water in most East African countries are fragile swamps and mountains. On their way to river sources, they pass through other ecosystems like forests, wetlands and hills. They are detected through techniques like remote sensing and geographical information systems, and also involve integration of core protected areas with ecological diversity,

### **3. WILDLAND AND WILDLIFE MANAGEMENT**

Wildland management is necessary to prevent the untimely and often irreversible loss of large proportion of the world's remaining biotic resources, including the more visible plants and animals species by reserving the integration of the biotic community. Wildlife is the term largely used with research on game and vegetation, plants and animals which interact directly with the physical environments in wild life management. The principle of ecological successions is of basic application because each game species is best adapted to a particular surrounding. By preserving the integrity of the biotic community

and its plant and animal species, wildlands are important for the replenishment of surrounding degraded or abandoned areas. Therefore they present valuable development opportunities if they are not irreversibly destroyed. In addition, there are important scientific, aesthetic, ethical and practical reasons to avoid or minimize the extinction of the remaining biotic stock. While some species can be conserved ex situ (such as in zoos or seed banks), wildland management is the only technically and economically feasible means of preserving most of the world's existing biological diversity. Many wildlands also perform important "environmental services", such as improving water availability for irrigated agriculture, industry, or human consumption; reducing sedimentation of reservoirs, harbors, and irrigation works; minimizing floods, landslides and coastal erosion (and possibly droughts in some regions); improving water quality and providing essential habitat for economically important fishery species.

#### **4. CONCLUDING REMARKS**

I have observed, that the East African countries -- Uganda, Kenya, Tanzania -- have a growing interest in ecosystem based management approaches. There such methods of work have been put to the test in managing landscapes and organic farming. These environmental approaches may involve changes to existing sectoral approaches so as to enable the implementation of techniques in making ecosystem based management work. Care should be taken so that prey species don't outnumber the predators.

The most obvious of these concerns is the ecological succession of the newly created impoundment as the organism of flowing water (lotic ecosystem) are replaced with those of lentic ecosystem and planktonic and littoral species. River, shore and watershed management effectively controls the turbidity and temperature of flowing water. Additional crucial roles that ecosystem management contributes are air and water purification, waste detoxification, flood and drought moderation, seed dispersal, and nutrient recycling which affirm the importance of ecosystem based-management in protecting freshwater sources