INDIGENOUS KNOWLEDGE (IK) AND ECOLOGICAL MANAGEMENT.

Indigenous knowledge and ecological management

Traditional Knowledge (TK) refers to the knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity. In Kenya, TK encompasses Indigenous Knowledge (IK) often held by indigenous communities and intangible knowledge held by a local community. TK is created and held by individuals, a family, clan, tribe or whole community and at times by several communities. TK is embedded in Traditional Knowledge systems, which each community has developed, maintained and passed on from one generation to the other in its local context. It is evolving all the time as individuals and communities take up the challenges presented by their social and physical environment. Unfortunately, TK is being eroded at a higher rate than it is being passed on to the next generation partly due to the changing life styles and partly due to the influence of Western culture.

Often, indigenous or Traditional Knowledge systems contain a rich understanding of plant, crop, tree species, herbal medicines, animal breeds, and local ecological and Genetic Resources (GR). They may also include useful technologies and adaptations to local environments that may require recognition, protection and ownership just like modern technologies. TK is closely associated with GR in both traditional and modern settings. Therefore, access to Genetic Resources requires intervention of the community providing the knowledge or resources for equitable sharing of the economic and other advantages that their utilization generates.

- Has been applied in agriculture, food preparation, health care, education, conservation and the wide range of other activities that sustain a society and its environment in many parts of the world for many centuries.
- IK represents very valuable data base that provides us with insights on how several communities have interacted with their changing environment (floral and faunal resources).
- Though previously ignored, today IK and local level organizations have been recognized by increasing number of African governments and international development agencies as a

foundation for participatory approaches to development that are cost effective and sustainable.

- Indigenous people have wide knowledge of the ecosystems in which they live and of ways of using natural resources sustainably.
- Traditional ecological knowledge is used to understand and predict environmental events upon which the livelihoods/survival depends.
- For ecologist, traditional ecological knowledge offers a means to improve both research and resources management and environmental impact assessment.

IK and biodiversity conservation

- Farmers can be excellent conservators of biodiversity e.g. resource-poor farmers breed local crop varieties for improved production using informal innovation systems based on IK.
- Much of the world's biodiversity is in the custody of farmers who follow age-old farming and land use practices hence understanding farmers' indigenous management strategies can help in the establishment of national programs for in-situ conservation of germplasm that complement the ex-situ programs already in existence.
- Indigenous crop pest management systems,
- Indigenous approaches to the management of soil and water.
- Weather/climate prediction – help in knowing best planting time for the farmer; time to migrate for the pastoralist; disaster management – avoid calamity.
- Natural disaster management.
- Currently more recognition of the role of participatory decision approaches for sustainable development.
- Recent evidence indicates a strong relationship between IK and sustainable development.
- IK of ecological zones, natural resources, agriculture, aquaculture, forest and game management – this knowledge offers new models of development that is both ecologically and socially sound.

IK and environmental Conservation in Kenya

- Communities in Kenya have well developed IK systems, ranging from food production, health care, conservation and disaster management.
- IK has played vital role in environmental management and conservation in Kenya:
- Grazing management – wet and dry season grazing areas; migration – pastoralists.
- Wildlife management – human – wildlife interactions e.g. no arbitrary hunting – Maasai.
- Forest management – the Kaya forest are a classic example – shrines for worship but also sanctuary for a variety of indigenous trees, plants, animals, birds and insects. Njuri Ncheke and forest management;
- Soil fertility management – shifting cultivation mixed cropping etc.
- Climate prediction – 'rainmakers'; 'prophets'; 'wisemen'; - the Nganyi family in Western Kenya.

Roles of local and indigenous knowledge in addressing climate change

Traditional or local knowledge is strongly tied to local culture. This type of knowledge is also referred to as indigenous. All around the world, indigenous populations have lived in perfect harmony with nature. Over long period of times these populations have acquired knowledge about the inner workings of their immediate surroundings or environment. Accordingly, these populations have developed intimate knowledge on a wide array of topics ranging from environmental, biophysical, economic and social issues to spiritual knowledge (Sand, 2002).

The content of indigenous knowledge is not confined to one subject only but covers a wide range of diverse topics in a particular area. These include agriculture, animal husbandry, education, natural resources management etc. (Warren, 1991).

TLIK practices include: knowledge of indigenous plants, food preservation techniques, seed selection to avoid drought, disease control in livestock, among others.

IK is the resource that is most readily available to smallholder farmers, pastoralists, fishing communities and forest dwellers in Kenya.

Seasonal forecasting: the value and role of indigenous knowledge

Effective seasonal forecasting strategies for rural communities by exploring how local/indigenous knowledge can be integrated with scientific information

Four indicators can be used:

1. Astrological
2. Vegetation (e.g. baobab, acacia) indicators
3. Birds (shift in the seasonal migration)
4. Wind

Kenya is already experiencing negative impacts from a variable and changing climate. Some of the indicators of climate change are recurring weather variability, floods, droughts and temperature changes. To use temperature change, for example, analysis of both minimum and maximum temperatures based on the standard seasons of December-January-February, March-April-May, June-July-August and September-October-November (Kenya Metrological Department in Republic of Kenya, 2009) reveals that the rise in temperatures over the northern parts of the country is relatively higher than in other parts especially from October to February period. Similarly the decrease in minimum temperatures in the northern parts of the coastal strip is also relatively higher than in the southern parts of the coastal areas during the same period. Lamu in the north coast shows drop of 1°C from a mean of 24.5°C in the early 1960s to 23.5°C in the recent ten years. Whereas Mombasa in the south coast indicates a drop of about 0.3°C from 23°C in the early 1960s to 22.7°C in the recent ten years. The droughts of 2008/2009 and 2010/2011 have been described by the elderly as "the worst in living memory".

To help cope with the negative impacts of anthropogenic climate change, communities employ traditional-, local- and indigenous-knowledge (TLIK) based practices. TLIK includes

- gender defined knowledge of indigenous plant and animal species, especially drought-tolerant and pest-resistant varieties;

- water harvesting technologies; water conservation techniques to improve water retention in fragile soils;
- food preservation techniques such as fermentation, sun drying, use of herbal plants, ash, honey, and smoke to ensure food security;
- seed selection to avoid the risks of drought; mixed- and or intercropping and diversification;
- soil conservation through no tillage and other techniques;
- use of early warning systems to predict short, medium and long term climate changes;
- transhumance to avoid draught and risk loss of livestock;
- herd accumulation;
- use of supplementary feed for livestock;
- reserving pasture for use by young, sick and lactating animals in case of drought;
- disease control in livestock and grain preservation;
- use of indigenous techniques in the management of pests and diseases;
- culling of weak livestock for food;
- multi-species composition of herds to survive climate extremes.

This knowledge, or parts of it, for example knowledge of local edible fruits has ensured survival of thousands of starving pastoralists, but not the loss of their animals, which more often than not have succumbed to shortage of water and pasture. Such shocks and related loses come at a heavy price to affected communities as livestock is the mainstay of the local economy in the arid and semi-arid lands (ASAL) of Kenya. (Kenneth Odero)

Indigenous and local knowledge (ILK) should play an integral role in building climate resilience. Existing adaptive local practices can be harnessed and tailored to ensure communities are able to reduce their vulnerability to climate change.

Climate change is expected to bring increasingly hotter conditions, and a likelihood of increasing rainfall variability. The impacts of low river levels, drought and rainfall variability on agriculture and thus food and income security are expected. With almost all communities being

purely reliant on rain-fed agriculture, strong warming and associated drying will have a severe impact on yields. **(**Stephanie Midgley)

The role of women

Women have extensive knowledge of their communities, have good social networks within their own communities, and play an important role in managing resources for domestic use. As part of these roles, women need to be supported to enable them to become active participants in developing and designing adaptation strategies which will benefit the whole community.

For effective adaptation to climate change, women need to be supported so as to enable them to become active participants in developing and designing adaptation strategies which will benefit both men and women.

Recent reports show that women, who make up almost 80% of the agricultural work force in the tropics, are increasingly vulnerable to climate variability and change (Denton, 2002). A phenomenon common in many developing countries is that women in communities generally do not own land and have hardly any rights regarding the management of natural resources, despite often working in the fields (UNDP, 2010; Ngenwi et al., 2010; ISDR, 2009). Despite these odds, women have been able to cope with and adapt to the negative effects of exclusion from the control of resources they have right to and to climate change through indigenous knowledge practices.

Rural women have adopted various methods to adapt to climate variability and change. These methods depend on the resources they are exposed to, level of education and indigenous knowledge. Adaptation strategies could be related to food production, storage, alternative sources of cooking energy, trade by barter and involvement in off-farm activities for income generation

Common adaptation practices by rural women to climate change include the following measures:

- Alteration of planting dates;
- Alternative use of maize and guinea corn stalk and cow dung in place of firewood for cooking: These women indicate that the smoke from these materials affects the aroma of the food and also requires that the fire be attended to constantly. The latter takes much of the time of the woman and the girl child - a suitable assistant to the woman;
- Mixed farming – In addition to arable farming, women in west and central Africa rear small ruminants and non-conventional livestock like snails in their backyards.
- (d) Storage of extra harvest for food supply separately from that destined for the market. Similarly planting materials for the coming planting season are separated from food reserves. Women have also adopted the use of local plant materials in protecting grains against weevils in storage.

e)Crop diversification: It is a common practice to find many crop species on the same piece of land to guard against crop failure in times of adverse climatic conditions;

(f) Trade by barter: they often provide labour to large scale farmers who sometimes pay them with produce from their fields. They trade their labour for food;

(g) Off-farm income: This is critical to livelihoods and overall adaptive capacity.

(h) Alteration of planting dates.

Objectives and principles of legislation

The objectives of environmental legislation are to provide a set of enforceable and standard rules to contribute to the pursuit of:

(i) preserving, protecting and improving the quality of the environment;

(ii) protecting human health;

(iii) utilising natural resources in a prudent and rational way;

(iv) promoting measures at international level to deal with regional or worldwide environmental problems.

Environmental legislation seeks to regulate pollution of the natural environment in relation to air, noise, vibration, water, radiation and soil. It contains rules relating to the conservation of the natural environment, the protection of endangered species, the promotion of biological diversity, the protection of forests and the pursuit of environmentally friendly agriculture. With regard to the human environment, it seeks to protect human beings (the consumer) against contaminated food, dangerous or defective products,

economic harm and danger in travel. With regard to the human-made environment it seeks the protection of historic and cultural environment. It seeks harmonisation of standards and the enforcement of those standards through legislative provisions particularly relating to the introduction of appropriate environmental management systems to harness scarce resources.

The further objectives of environmental legislation are to set standards such as achieving a high level of protection by taking into account the diversity of situations in the various regions, to give a legal basis to the precautionary principle whereby legislative action is taken where there is no reason to believe that substances or energy or materials introduced directly or indirectly into the environment, may, or are likely to create, hazards to human health, harm living resources, damage communities or interfere with other legitimate uses. This can be done even where there is no conclusive evidence of a cause or relationship between inputs and their effects and to give a legal basis to the principle that preventive action should be taken as prevention and if successful, to advise all the detailed legislation relating to steps to be taken to cure a problem.

Environmental legislation is generally based on the principles that environmental damage should, as a priority, be rectified at source and that the polluter should pay. Environmental protection requirements should be integrated into the definition and implementation of legislation relating to non-environmental issues. Where cross border matters relating to provisions primarily of a fiscal matter, measures concerning town and country planning and land use (other than waste management), management of water resources and measures significantly affecting the choice between different energy resources and the general structure of energy

supply, decisions should only be adopted with unanimous agreement between the participants.

Other legal principles produced by the expert group are that countries must:

- conserve and use the environment including its natural resources for the benefit of both the present and future generations;
- maintain ecosystems and ecological processes essential for the functioning of the biosphere, and preserve biological diversity;
- observe the principle of optimum sustainable yield in use when dealing with natural resources and ecosystems;
- establish adequate environmental protection standards and monitor changes and publish relevant data on environmental quality and resource use.

LEARNING ACTIVITY 2.4

List some of the environmental legislations and international conventions and treaties related to your area of work.

Note:
a) Write your answer in the space given below.
b) Check your answer with the one given at the end of this Unit.