

## INTEGRATION OF FORMAL AND INFORMAL ENVIRONMENTAL EDUCATION PRACTICES TOWARDS ENHANCING MANAGEMENT AND CONSERVATION OF THE NANDI HILLS FOREST IN WESTERN KENYA

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**ABSTRACT:** *The overall educational infrastructure is grossly inadequate in most of the Third World Countries, Kenya in particular; more so resources to institute appropriate environmental education are, for the most part, simply not available, even when this education is recognized as a desirable innovation. This paper sought to interrogate the current institutional environmental and educational arrangements and practices which are pertinent to the sustainable management of the Nandi Hills Forests, in Kenya. A mixed methodological design which incorporated both qualitative and quantitative methodologies was embraced. The methods included concurrent triangulation and nested/embedded designs. A four-tier analysis was carried out once all the data had been coded and grouped. This paper concludes that the contribution of indigenous knowledge to sustainable management of the Nandi Hills Forest is remarkable. This study brings to light the essence of environmental education that is incorporative of the community through formal and informal approaches in forest knowledge acquisition and management of the Nandi Hills Forests. As it is widely agreed that environmental education is the most effective means that society possesses for confronting the challenges of environmental degradation (Palmer, 1998), this study attempts to provide the necessary impetus both for the local community, the government and non-governmental institutions to understand and become involved in an integrated manner in the conservation of what remains on this ecosystem.*

**KEYWORDS:** Formal Education, Informal Education, Environmental Education, Management, Conservation.

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### INTRODUCTION

Environmental Education has permeated developing countries despite considerable efforts in recent decades by UNESCO, UNEP and the World Conservation Union (IUCN) (Tomar, 2007). This is not surprising, considering that economic conditions in many developing countries are often not only dismal but also worsening year by year; for example, gross national product per capital has been declining continually for many years in 90 or more developing countries (World Bank, 2004). In 1969 the Journal of Environmental Education was first published, in 1972 the first United Nations Conference on the Environment

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(UNCED) was held in Stockholm, which led to the establishment of UNEP in Nairobi, and the UNESCO-UNEP International Environment Education Programme (IEEP) was put into action at the United Nations Educational, Scientific and Cultural Organization (UNESCO) Secretariat in Paris, France in 1975 (Waswa *et al.*, 2006). The IEEP became relevant both in school and out of school, encompassing all levels of education and directed towards the general public, in particular the ordinary citizen, with a view to educating the populace as to the simple steps that might be taken within individual means to manage and control the environment (Tomar, 2007).

Environmental offerings at undergraduate schools and at some professional schools have expanded enormously in the USA and the National Environment Education Act (USA) provides for substantial support for Environmental Education in local primary and secondary school systems and at the tertiary level (Disinger & Roth, 1992). However, graduate environmental programs are said to be faltering for lack of sufficient federal funding (National Environmental Advisory Council, 2005). Outside of developed countries the status of Environmental Education is far from desirable (Knamiller, 1983).

All of the principal recent blueprints for coping with the World's pervasive environmental predicament have stressed the value of environmental education. Palmer (1998, p.78) has urged that "environmental education should be included in and should run throughout the other disciplines of the formal education curriculum at all levels – to foster a sense of responsibility for the state of that environment and to teach students how to monitor, protect, and improve it."

The IUCN, in partnership with UNEP and the World Wide Fund for Nature, has also stressed that governments, through central and local education authorities, should review the present state of Environmental Education (including social education) and should make part of all courses at primary and secondary, and many at tertiary level (Pandey, 2005, p.23). He reflects the views of the World Resource Institute the IUCN and UNEP when he states that at the national level, ecological literacy belongs alongside other basic skills. National curricula on biodiversity should emphasize biodiversity's contributions to community health and welfare, as well as to ecosystems, and should tie ecological, economic, and social themes together (Pandey, 2005, p.23).

The United Nations Conference on Environment and Development [UNCED] (1992, section 36.1), agrees, writing that education is critical for achieving environmental and ethical awareness, values and attitudes, skills, and behaviour consistent with sustainable development and for effective public participation in decision making and a distinguished group of 22 university presidents from 13 developing countries pledged to have their institutions play educational leadership roles in the necessary quest for a sustained future (Pandey, 2005).

The latest front in the area of environmental education and education in general is the growth of Information and Communication Technologies (ICTs). This has had significant direct and indirect impacts on forestry and has been central in accelerating the pace of globalization (Edoh, 1997). The Internet and mobile communications have created unprecedented opportunities for those who were traditionally outside the global information loop, including small and medium-sized enterprises. ICTs have increased labour productivity, reduced costs and increased returns. Online stores provide marketing opportunities for wood product and service suppliers. ICTs have also fostered institutional change in forestry (Hetemaki & Nilsson, 2005). The increased ease of information sharing and global networking diminishes the power of vertically structured organizations and fosters the development of small organizations. ICTs have helped to promote transparency and accountability on an unprecedented scale, as very little information can be kept away from public access and scrutiny. ICTs have also facilitated awareness-raising about forest-related issues such as deforestation, biodiversity loss, forest fires and the marginalization of indigenous communities. (Hetemäki & Nilsson, 2005; Nyrud & Devine, 2005).

### **Indigenous knowledge**

Traditional knowledge is defined as a cumulative body of knowledge, practice and belief, handed down through generations by cultural transmission and evolving by adaptive processes, about the relationships of living beings (including humans) with one another and with their forest environment (Berkes, 1999, p.9). Such knowledge, which developed long before the advent of formal forest science, is the mainstay of many forestry practices (Bicker *et al.*, 2004). The UN Conference on Environment and Development in 1992 catalysed interest in the contribution of indigenous knowledge to a better understanding of sustainable development and the UNCED highlighted the urgent need for developing mechanisms to protect the earth's biological diversity through local knowledge (UNCED, 1992). Many of the documents signed at UNCED reflected the need to conserve the knowledge of the environment that is being lost in communities. Similarly, the World Conference on Science (Budapest, 1999) recommended that scientific and traditional knowledge be integrated in interdisciplinary projects dealing with links between culture, environment and development in areas such as the conservation of biological diversity, management of natural resources, understanding of natural hazards and mitigation of their impact.

Consequently, whereas western knowledge systems are part of the whole notion of modernity, indigenous knowledge is part of a residual, traditional and backward way of life, a view that may be reinforced by the concentration of work on indigenous knowledge on people in low- and middle-income countries. For Indigenous peoples and local communities, concern over the preservation and maintenance of traditional knowledge is not only motivated by the desire to conserve 'biodiversity' as an end in itself, but also by the desire to live on their ancestral lands, to preserve their traditional livelihoods, to safeguard local food security and, to the extent possible, exercise local economic, cultural and political autonomy (Langton, 2003).

African traditional knowledge may be unique to a given African community, culture or society, and may possibly be seen to contrast with the knowledge generated within the modern learning system (Langton, 2003). Langton's assertion continues to point out that there are instances where traditional knowledge is used at the local level by communities in Africa as the basis for decision-making pertaining to food security, human and animal health, education, natural resource management, and other vital activities.

Similarly, while advances in modern science and technology have had significant impacts on the forest sector these technologies remain inaccessible to many in Africa and there is a continued dependence on indigenous or traditional knowledge in managing forests and other natural resources (Parrotta & Agnoletti, 2007). Langton and Ma Rhea (2003), assert that traditional methods of irrigation and crop production, and maintenance of seed stock and cultivars, have maintained food and grazing resources, and traditional water management systems have been critical to societies across all ecosystems.

Indigenous knowledge is of growing interest to forest science as it is increasingly recognized that indigenous resource-management systems can help to improve the framework for sustainable forest management (Borrini & Buchan, 1997). Low-input traditional land-use practices are particularly attractive in the context of declining energy supplies and increasing impacts of climate change (UNEP, 2007).

The oral and rural nature of traditional knowledge has made it largely invisible to the development community and to modern science and, where recognized, indigenous knowledge has often been dismissed as unsystematic (Hubbard, 2001). As a consequence, it has not been captured and stored in a systematic way, with the implicit danger it may become extinct. This brings in a crucial aspect of documentation of indigenous knowledge. The documentation of traditional and Indigenous knowledge is fundamental to the capacity of traditional knowledge holders to promote, protect and facilitate the proper use of their knowledge. Accurate documentation also enables nations and other interested parties to enter into agreements and contracts with traditional knowledge holders that will strengthen the capacity of these communities to develop economically sustainable livelihoods (World Bank, 1998).

### **Integration of formal knowledge and indigenous knowledge systems**

It appears that formal environmental education has provided a platform for the Nandi Hills Forest communities to interact, not only with their traditional forest conservation practices, but also to appreciate modern day approaches. Matiru (1999) points out that a number of NGOs, CBOs and voluntary organizations are making reliably helpful progress in enlightening the ordinary citizens on laws and their rights in Kenya, and that the escalation of environmental lobby groups has translated into greater awareness by the ordinary citizens on environmental issues that affect them and the community at large. The resolutions of the United Nations Conference on Environment and Development (1992) to advocate for sustainable development through environmental education remains a pivotal issue, internationally, nationally, and in the Nandi Hills Forests. It is this premise that

predicates formal environmental education as a crucial tool for effective forest management and conservation and, encouragingly, both the formal and informal systems of environmental education appear to have been embraced at several levels in the Nandi Hills, as evidenced in this study.

The dimensions embraced by the various players in the practice and propagation of formal environmental education may vary in terms of curricula and approach but still remain relevant in content. Depending on the target group, the depth of information investigated in this study varied, such that the higher levels of education and research embraced more technical issues while the lower levels and community-direct levels had simpler content which was often simplified by using local examples in drawing case studies and illustrations. However, findings of this study suggest that in as much as there is a large portion of the forest communities that is aware of the existence of the forests, information on the reality of their progressive destruction or conservation still remains a vital aspect that requires attention.

Richards (1995) warns that indigenous systems of knowledge and practices are threatened worldwide by socioeconomic and historical pressures. Borrini and Buchan (1997) submit that indigenous knowledge is of increasing interest to forest science as it is ever more acknowledged that indigenous resource management systems can help to improve the framework for sustainable forest management. They also note that limitations of local knowledge by knowledge mortality and lack of codification, which can lead to inter-generational loss of information, can be averted by documentation. These caveats suggests that the integration of formal and informal knowledge systems, which is being undertaken in some instances by the government, NGOs and CBOs, is a crucial aspect that ought to be cemented further in any attempts to design environmental education interventions in the Nandi Hills Forests.

## **MATERIALS AND METHODS**

The study employed a mixed methodological design which incorporated both qualitative and quantitative methodologies. The mixed methodological approaches used in this study were the concurrent triangulation and nested/embedded designs. A four-tier analysis was carried out once all the data had been coded and grouped. The sample frame of the study is for persons above 18 years in Nandi County and there was heterogeneity in the population in the sample frame due to variety of issues such as: spacio-topographical exposure to the forests, urbanization, intermarriages, migration, education levels and even economic statuses. To alleviate some of these causes of heterogeneity to the closest achievable extent, the sampling units were hence delimited based on the administrative boundaries (largely per district and finely per division). All the districts (4 districts) in the Nandi County were sampled. Relevant stakeholders (in the management of the Nandi Forests) other than the mainstream local community were also purposively sampled to obtain data. The desired sample size of households for simple random sampling was

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obtained from a formula as used by Fisher *et al* (1998) which yielded a sample size of 306 respondents. Oral interview schedules, questionnaires, Digital cameras and review of documented literature were used in data collection.

## **RESULTS AND DISCUSSION**

As such, it appears that there is a great potential for sustainable forest management by integrating formal and informal education approaches in order to enhance sustainable management of the Nandi Forests. More than half of the respondents who indicated that they obtained information on the forests and forest resources from both formal and informal sources indicated that they had got their information from lessons learnt in class. Just less than half indicated that they had acquired information on the forests through proximity knowledge acquisition (see Table 1).

Table 1: Scenarios of existing integration of formal and informal knowledge sources on Forest Significance amongst a sample of key informants (n=18)

<b>Informal Sources of Knowledge</b>						
	Storytelling and folklore	Peer information propagation	Presentation of songs	Proximity knowledge acquisition	Default knowledge acquisition	Resource destination phenomena
<b>Formal sources of knowledge</b>						
Lessons in class	x	x	0	xxxx	xxx	0
Academic visits to the forests	x	0	x	0	0	0
Attending seminars and workshops	0	0	0	xx	0	0
Awareness creation by government	0	x	0	xx	0	x
Print and electronic media.	0	0	0	0	0	x

x – Represents one respondent

0 – Indicates no respondent

The proximity knowledge acquisition is owed to the fact that most of those living within the Nandi Forests have stayed there for a significantly long time. In turn, the 'lessons learnt in class' category of formal knowledge source is owed to the fact that most of the residents had attained at least some formal education. Therefore, integrating both formal and informal environmental education should provide synergistic opportunities for better management and conservation of the Nandi Hills Forests by local communities.

## **ENVIRONMENTAL EDUCATION AND CONSERVATION IN AND AROUND THE NANDI FORESTS**

### ***Informal environmental education***

The high number of respondents who stated that their source of information on forest significance was informal underscores the importance of the preservation and propagation of the local knowledge of the Nandi Hills Forest Communities. This notion is supported by Bicker *et al.* (2004) who argue that although informal knowledge was inaugurated in communities long before the initiation of formal, forest science aspects of it form the basis of several modern forestry practices. Local knowledge among the Nandi Forest Communities is as old as the existence of the *Ogiek* in Nandi Forests and its hinterland (Ng'ang'a, 2005). The *Ogiek* were wholly depended on the forests for their source of livelihood as they were hunters and gatherers and, as such, developed an intrinsic conservation perspective, which was prevalent within all Nandi Forest communities.

Local communities have been reservoirs of vital knowledge that relates to the conservation and sustainable utilization of the forests and the forest resources (Ng'ang'a, 2005), and the various informal knowledge transmission mechanisms (storytelling, folklore, peer relay and proximity knowledge acquisition) noted in this study support this contention. Significance of the local community as local knowledge reservoirs is further adduced by the findings of the study that point out that the sources of information held by local people on forests and their related resources was majorly informal (85%). This understanding is corroborated by Langton and Ma Rhea (2003) who submit that the nature of informal knowledge places custody of the knowledge in humans. The informal education system generates customs, traditions, and norms handed down to generations both verbally and practically. In the case of the Nandi Hills these practices included, and in some cases still include:

*Circumcision ceremonies* which were performed deep inside the forest at specially designated sites which are respected and exclusively preserved. This practice is evidenced by the richness of biodiversity in these circumcision sites within the Nandi Forests.

*Herding of livestock* was prohibited in the forest except during dry spells when the locals were allowed to graze selectively at the forest peripheries albeit to a limited extent.

*Hunting and gathering practices* as exemplified by the *Ogiek* (arguably the aboriginal community of the Nandi Hills Forests and the larger Mau Forest Complex), have survived in these forests. Besides the forests being a source of livelihood for the *Ogiek* they have had a nostalgic attachment to the forests. The concerns of the *Ogiek* in preserving and maintaining their traditional knowledge



was not only motivated by the desire to conserve 'biodiversity' as an end in itself, but also by the desire to live on their ancestral lands, to preserve their traditional livelihoods, and to safeguard local food security (Langton, 2003). The *Ogiek* have therefore played an important role as conservationists of the Rift Valley forests, of which the Nandi Hills Forests are apart.

Members of local communities have continued to undertake *traditional marriages*, which form significant rites of passage for the young people. These ceremonies, according to Langley (1979), are usually a culmination of several trainings that have been carried out for the bride and groom, which include emphasis on the importance of the forests and their resources.

The proclamation of superstitious curses and blessings was a preserve of the '*Orkoiyot*' (the religious head of the Nandi tribe) and were proclaimed as consequences of behaviour or actions. A case in point would be the destruction of the meeting place for the elders, which was normally deep in the forest under a fig tree, hence enhancing the conservation of the forests (explain this – how does it enhance conservation), and;

The *Orkoiyot* had the exclusive responsibility of prescribing and in some case administering medicine to the Nandi community. This organized social structure did not allow anyone to harvest or administer the forest resources except by the sanctioning of the *Orkoik*.

It appears therefore that the local knowledge system of the Nandi Community emphasized the sustainable utilization of the forest and the forest products. Local community members had acquired sufficient knowledge of plant and animal species and their management and use to enable them to cope with changing abundances of preferred species used for food, medicine, cultural activities (circumcision & rites of passage), and other purposes. However, certain fundamental practices are slowly fading away due to rapid population growth, high urbanization rate and cross-cultural dilution effects (Langley, 1979).

### ***Formal education and management practices***

The sustainable management of forests, such as those in the Nandi Hills, depends on environmental education. The institutionalization of environmental education has acted as an interface for the informal environmental education and formal environmental education (Mula & Tilbury, 2011). In as much as the findings of this study reveal that most of the residents of the Nandi County (67%) are aware of existing relevant institutions in the management of the Nandi Forests, the remaining 33% represent a significant number of people who need to be reached if institutional frameworks geared towards strengthening the knowledge base of forestry in Africa (without which major advancements are prone to bypass the African forest sector) are to benefit the majority of local inhabitants (Matiru, 1999).

As it is widely agreed that environmental education is the most effective means that society possesses for confronting the challenges of environmental degradation (Palmer, 1998), this study is an attempt to provide the necessary impetus both for the local community, the government and non-governmental institutions to understand and become involved in an integrated manner in the conservation of what remains on this ecosystem.

## CONCLUSION

This paper has brought to light the essence of environmental education that is incorporative of the community through formal and informal approaches in forest knowledge acquisition and management in the Nandi County. Environmental education has at least acted to reveal to the local community the accruable benefits they stand to reap by sustainably managing the Nandi Hills Forests. Therefore the state of the Nandi Forests has been influenced, to a great extent, by the level of awareness of the local community on the significance of sustainable forest management and what their actions and/or inactions mean to the forests.

## RECOMMENDATIONS

The author suggests that more emphasis needs to be taken in order to not only increase the awareness of the locals about existing institutions, but also to empower them with relevant forest management and conservation initiatives and skills in order to secure the future of the forests and the forest-adjacent communities. Therefore further research needs to be undertaken to explore the possibilities of strengthening concepts of community forest management, driven by the locals.

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