

Integrating Indigenous Knowledge in Adult Environmental Education through the ODL Strategies for Sustainable Conservation of Mau Forest, Kenya: The Ogiek Experience

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Abstract: *In Kenya, environmental degradation has occurred at an alarming rate in areas such as the Mau Forest, the home of the majority of the Ogiek people. Traditionally, the Ogiek are hunter-gatherers and have distinctive histories of interaction with the natural environment. But, they have been increasingly rendered homeless through appropriation of parts of the Mau Forest for other uses since the colonial periods. Mau Forest is located in the Rift Valley Province and straddles Kericho, Nakuru, Narok and Bomet districts. Over the years, the Ogiek have inhabited the Mau Forest with little impact on the environment. This paper critically examines the integration of Ogiek's Indigenous Knowledge in Adult Environmental Education through ODL Strategies for Sustainable Conservation of Mau Forest in Kenya. An ethno-historical approach was employed in the design, instrumentation, data collection, analysis and interpretation. To achieve systematic collection of data, purposive sampling techniques were used. Forty-five members of the Ogiek community, mainly cultural consultants, were interviewed for the study. Cultural consultants provided the most complete and representative information about particular aspects of Ogiek life because of their experience and training. The main instruments for data collection were observation and interview schedules. In addition to oral interviews, this study used a variety of documentary sources. The information obtained from the various sources was checked for validity and reliability using triangulation as well as external and internal criticism approaches to data analysis.. The paper acknowledges that integrating indigenous knowledge and technology-based knowledge would yield a better understanding of the interaction between human beings and nature into open and distance adult learning programmes, thereby imperatively noting that the Ogiek people who have been constantly rendered vulnerable, have a special authority and competence in protecting their own environment since pre-colonial times. The Ogiek society facilitated intergenerational kinship ties and raised Awareness on the need to conserve Mau Forest ecosystem for their sustainable livelihood. Accordingly, the council of elders contends that they had a holistic understanding of their bio-physical environment and had the sole responsibility to define the best options of improving Conservation of Mau Forest complex's watershed including its rich biodiversity of animals and plant species. The results further reveal that education for environmental Sustainability should be a life long process based on ODL mode so that ecological problems should be effectively addressed within a socio-economic, political and cultural context. In essence, the provision of learning opportunities for all, including, the unreached and the excluded (Ogiek) is the most urgent concern so as to realize an all inclusive integration and synthesis of the two knowledge systems for effective environmental action. It is hoped that the research findings will be useful to policy makers in such fields as education and environmental conservation on the need for the integration of indigenous knowledge systems into modern environmental management through ODL strategies highlighted thereof.*

INTRODUCTION

Indigenous education was not only concerned with the systematic socialization of the younger generations into the norms, religious and moral beliefs as well as collective opinions of the wider community, but it also placed a very strong emphasis on learning practical skills and the acquisition of knowledge which was seen to be useful to the individual and the society. Just like the Alaska native people (Kowagley, 1995), the Ogiek of Mau Forest had their own ways of looking at and relating to the world, the universe, and to each others. The Ogiek people maintained their traditional adherence to the principle that wealth must be shared and that knowledge was communal and for the benefit of all.

Therefore, the transmission of knowledge and values was achieved primarily through apprenticeship and experiential learning, whether from subsistence activities or cultural practices. In this way, most of the successes in sustaining Ogiek culture and ecological conservation have been through the practice of keeping children close to their parents, with transmission occurring both passively and actively through imitation, copying, apprenticeship and practice. However, a widespread aspect of formal education was provided through apprenticeship schemes. Their indigenous education was carefully constructed around observing natural processes, adapting models of survival, obtaining sustenance from the plant and animal world. They did use natural materials to make their tools and implements. All these were made understandable through thoughtful stories and demonstration. Indeed, the Ogiek people have traditionally acquired their knowledge through direct experience with the natural environment (Kratz, 1989). Ideally, Ogiek indigenous education was meant for their immediate induction to the society and it was strictly utilitarian in nature.

In principle, this meant that children learnt what was useful to them. Education emphasised moral and spiritual ways of living, social, ecological and economic communal participation as well as job orientation and the application of what they have learnt to the needs of the society. Children were engaged in participatory education through *inter alia*, work, rituals, ceremonies, hunting, bee-keeping, herbal medicine, oral literature so as to be functional in the society. In fact, the continued use and management of the Mau Forest by the traditional Ogiek community had been of vital importance. Essentially, their indigenous economic system had a very low impact on biological diversity (Towett, 2004). They relied on hunting economy, catching large and small game as well as gathering honey from beehives kept in tall trees (Ottenberg, 1960).

Indeed, hunting and gathering peoples of Africa represented an environmental adjustment that is found in isolated areas of low population density (Ottenberg, 1960). This was a true reflection of the Ogiek of Mau Forest in Kenya who have heavily relied on simple technologies, usually owning no more material goods than they could carry on their own as they engaged in migratory search for food. They directly depended upon wild plants and animals for their survival.

The Ogiek, also referred to as the Dorobo, form a minority group among the Kalenjin of Kenya. They constitute a sub-stratum for the Kalenjin and Maasai people and perhaps the Kikuyu according to Muriuki (1976), Kipkorir and Welbourn (1973). The Ogiek are one of the earliest known inhabitants of East Africa. They are presently among the few survivors of the early inhabitants of East Africa. Unfortunately, they are facing extinction as they are being assimilated by other communities (Sutton, 1976 and Towett, 2004). The Ogiek have been mostly hunter-gatherers who inhabited the forest areas of East Africa. Representatives of this group are today scattered over various parts of Kenya, but the majority of them are to

be found in the Mau Forest. Mau Forest, the home of the Ogiek people, is located in the Rift Valley Province and straddles four districts: Kericho, Nakuru, Narok and Bomet.

The Ogiek lived in small isolated settlements inside the dense, high-altitude evergreen forest, their permanent home and wet-weather hunting ground. According to Kratz (1986), the forest has been mentioned as the place the Ogiek regarded as their domain, contrasting sharply with their neighbours' spatial understandings. Hence, closely related to the space itself was the way in which the Ogiek made their life in it, by hunting and gathering honey. They largely depended on hunting and to a lesser extent on gathering for their food. Hunting was an important and integral part of the Ogiek pre-colonial economy and diet. Traditionally, three-quarters of their diet consisted of game meat while honey contributed less than a quarter of it (Blackburn, 1974). Therefore, as the Ogiek continued practicing their ancestral life style as hunters and gatherers (Astill, 2002) in the Mau Forest, the survival of the Ogiek heritage was of great importance, and its preservation for posterity was highly enhanced and valued.

Further, the Ogiek indigenous management system of wildlife conservation incorporated prescriptions against the killing of big animals. Moreover, the sacred animals were spared too, as defined within their totemic and clan based systems. Indeed, mothers with the young ones were not allowed to be killed for whatever purpose and likewise those in their late gestation period. The rules and regulations governing Ogiek's system of wildlife management were regularly monitored by the council of elders. During social ceremonies particularly on the onset of initiation period, boy initiates were reminded of the code governing the administration of hunting and violation of the same were not tolerated. Instead, punitive and severe punishment measures were stipulated and written in people's hearts. Essentially, obedience was seen as the guiding philosophy. Evidently, with all these regulations being clearly defined, the Ogiek, understood best the importance and benefits of their detailed indigenous knowledge of conserving their natural environment for posterity and for their survival as a distinct ethnic group.

METHODOLOGY

A relevant research design for this study was an ethno-historical design. This is the systematic and objective location, evaluation and synthesis of evidence in order to establish facts and draw conclusions concerning past events. The study sought to investigate the socio-cultural aspects of hunting apprenticeship as indigenous education as practiced by the Ogiek that were able to engender sustained management of wild life resources in Mau Forest.

The subject of inquiry was based on the assumption that individuals construct social reality in the form of meanings and interpretations and that the reconstructions tend to be transitory and situational (Cohen, 1993; Gall, 2003; Payne & Payne, 2005; Parkash, 2007). This was the study of a people's representations of their history and hence linked to the study of their oral tradition. An ethno-historical design typically combined two research strategies, the *emic* (local viewpoint) and the *etic* (scientist-oriented) approach. On the one hand, the emic approach investigated how the local people explained, thought, perceived and categorized their ecological worldview. From this, the researcher identified the rules of behaviour and the meanings attached to them.

On the other hand, while in the field the researcher used the *etic* (scientist- oriented) approach that shifted the focus from the local categories, expressions, explanations and interpretations to those of the ethno-historian. This approach counter-checked the defects of the first approach taking into account that members of a culture are often too involved in what they are doing to interpret their culture impartially. Operating ethically, the researcher

emphasized what was observed and seen to be important to this study. In this way, the researcher tries to bring an objective and comprehensive view point to the discussion.

The research sample was drawn from seven sites in Eastern and Western Mau Highlands: Teret, Sururu, Nessuit, Mariashoni, Bararget, Tinet and Kiptororo. These are the areas where majority of the Mau Ogiek reside (Towett, 2004). These areas also took into account the distribution of the major clans, which were represented by the research sites (Blackburn, 1974; Kratz, 1990). For instance, in Eastern Mau notable clans include: Mariashonik, Sururu, Kipasisek, Kimeitek, Kipchesang while in Western Mau are the Kapelach and Kipchornwonek. To ensure an objective and comprehensive data, selection of the informants was done using purposive sampling technique. Using this technique, the researcher identified forty five (45) elderly Ogiek men and women whose ages range from 65-120 years, they provided useful information on specific issues that this study sought to investigate (Babbie, 1986 and Gall, 2003). These people were then used as informants to identify others who qualified for inclusion in the study and these, in turn, identified yet others, hence the number kept on snowballing (Dalen, 1979; Cohen, 1994; Gall, 2003). Some of the informants were identified from the Kenya National Archives (KNA) in Nairobi while undertaking collection of archival sources. The others were mentioned in the course of the fieldwork. Most informants were interviewed individually as often group interviews were susceptible to biases and distortions of information. Such biases could occur because of informants' over glorification, oversimplification and overgeneralisation of the events that took place during the period under study.

The main instruments that were used to collect the data were an observation schedule and interview schedules. The researcher administered observation and interview schedules for each of the targeted groups; the council of elders, hunters, herbalists, initiation experts and religious leaders who were chosen because of the specific knowledge they were bestowed with as key cultural consultants of the Ogiek community. The items in the instruments were designed in such a way that they were relevant to each of the group of informants mentioned above and were ultimately useful in achieving the research objectives outlined thereof.

The data was collected by interviewing individuals, observing events (skills and techniques of hunting, hunting parties, ecological settings). Further, in the field, observation focused on council of elders' meeting, herbalists' gatherings, preparing herbs and caring for the sick, material culture used in hunting, hunting related songs, proverbs and folksongs.

The observation schedule was employed to supplement interview schedule and it was administered together with an interview schedule. These instruments entailed a core set of questions that were posed to all the selected informants. Specific questions related to these discussions were formulated in advance before undertaking the fieldwork. This was to guard against the contention that, "observations could easily be mired in a hopeless array of competing events" (Zanden, 1988:41). Therefore, unobtrusive observation was utilized in this study whereby behaviours of those selected individuals to be studied were observed without them knowing. These in turn bring about more accurate data since the subjects may not change. Moreover, sensitive social issues (as identified above) were suitably addressed using observational research. As a result, a daily records of things observed were written down in form of short notes. Hence, an observation schedule being an analytical form (or coding sheet) was filled by the researcher based on structured observations. Thus, it carefully specifies beforehand the categories of behaviour outlined above or events under scrutiny as well as what circumstances they should be assigned to those categories highlighted thereof. Observations were then coded into more manageable pieces of information constituting

themes and categories. As a “site-specific” knowledge, observation provided the researcher with a valuable opportunity to learn more about the practices and contexts about the Ogiek indigenous education as it relates to hunting apprenticeship. Apart from obtaining information through oral sources by administering an interview and observation schedules, the study also critically analysed documentary (primary and secondary) sources.

The critical undertaking in analyzing qualitative research was for the researcher to manage and organize the data. The researcher constructed patterns that emerged from the data and tried to get meaning out of them. Starting with a large set of issues and data, the researcher progressively narrowed them into small and important groups of the key data as acknowledged by earlier scholars and based on the research objectives (Dey, 1993; Krathwohl, 1998; Kottak, 2002; Gall, 2003). Following in data and content analysis, the investigator undertook a multistage process of organizing, categorizing, synthesizing, and interpreting the data. Each of these processes were found to be iterative as the researcher cycled through these stages more than once in a continual effort to narrow and get meaning of the emerging themes and categories that formed the organizing frame work in this study. Four steps in analyzing qualitative research data, were utilized in this study, namely: reading or memoing, describing, classifying and interpreting.

RESULTS AND DISCUSSION

This paper critically discusses the relevance of integrating Ogiek indigenous knowledge in Adult Environmental Education through ODL strategies for sustainable conservation of Mau Forest in Kenya. The study put more emphasis on the need to integrate this rich, refined and well developed indigenous knowledge system into environmental management strategies as practiced in Mau Forest. The whole discussion and synthesis centred on an acknowledgement that the Ogiek presented a unique and typical example of how they have to sustain and maintain balance equilibrium of ecosystem management with their subsistence mode of livelihood without any significant degradation of the Mau Forest’s natural environment. The discourse in this paper also established that the integration of Ogiek’s indigenous knowledge systems into modern environmental conservation strategies have been very fruitful in mitigating environmental degradation of Mau Forest. This has been clearly exemplified by the activities of SUMAWA, FOMAWA, Unilever Tea Kenya and other international organizations. The process of integration of both systems has led to the rise of the co-management conceptual model. Indeed, has shown in this study, the integration of Ogiek indigenous education and more so appreciating the unique relationship between their mode of subsistence, culture and the natural environment clearly became a unifying frame through the discourses in this study, thus paving way for the need for co-management strategy. This approach emphasizes the need for the local people to share and participate in the decision-making process and the implementation of restoration projects on their lands (IPRN, 2006). Indeed, the dual model strategy helped to foster environmental best practices that would be adapted and utilized beyond the local condition in which they were developed.

In order to realize the integration and synthesis of the two episteme, there is need for the Ogiek to be enrolled in Adult Education programmes so that they are taught varied strategies of delivery of knowledge relating to environmental education. In this case, the role of the mass media, utilization of open and distance learning models that are applicable as pertinent principles of adult learning must be taken into account. The current thinking was brought about by the realization that most Ogiek adult learners are illiterates and hence integration of modern environmental strategies with their indigenous knowledge systems, may not be achieved unless vigorous mass literacy level as envisaged as per the Kenya Post Literacy Project (2010-2015) are effectively carried out. Therefore, adult education programmes

relating to environmental conservation would be successfully enhanced if ODL strategies are ultimately utilized.

However, successful integration would require a thorough and thoughtful synthesis where broad based curriculum, skills, techniques, modes of teaching and learning processes must take into account their cultural context. They should not be seen as fragmented pieces of information which are not related to the local setting as they would be far removed from their conception of reality. Essentially, indigenous knowledge systems of apprenticeship, initiation, religious beliefs and practices as practised by the Ogiek of Mau Forest play a larger part in preserving biodiversity and in promoting environmental sustainability.

Indigenous Education and Environmental Conservation

As demonstrated by the Ogiek, indigenous knowledge provides a powerful asset of incalculable value to environmental conservation. Yet, it has not been universally utilized as a useful alternative strategy that provides successive avenues, and approaches to environmental conservation as reflected in Mau Forest case. The Ogiek since time immemorial have been deeply rooted in applying and using indigenous knowledge to master and monitor their natural environment in a more sustainable manner for the benefits of the future generations.

Therefore, indigenous management system of the environment, greatly emphasized learning by doing and was ultimately seen from the Ogiek's perspective as a part of a general process of self-organization arising from the necessity of a social group to deal with specific information from the environment such as hunting, bee keeping economy, herbal medicine and other complex practices of apprenticeship schemes. In acknowledging, Berkes (1994) the knowledge held by social groups contain recipes for responding to and managing of ecological feedback. Indigenous environmental knowledge as practised by the Ogiek of Mau Forest tends to be domesticated and ideally holistic in content. It integrates the physical and spiritual world view (cosmo vision) as extensively discussed in this paper. It evolved overtime and thus stressed on the practical application of apprenticeship skills and knowledge.

The role of religious and cultural institutions among the Ogiek helped in identifying and facilitating traditional values and practices which in turn benefit conservation of the environment, thus making the best use of their appropriate indigenous knowledge. This would also empower them in managing their environment in a more sustainable manner as they have been since time immemorial. Therefore, the Ogiek ideology of conserving Mau Forest environment as dictated by their religious beliefs and practices was for posterity. Their practices of traditional and cultural ceremonies in the designated sacred sites such as in Mariosihoni and Tinet areas of Mau Forest were meant to protect them against any desecration. The Ogiek associated the Mau Forest with their cultural identity. For this to be done more effectively, there is need to enforce more vigorously the legal policy and institutional changes that take into account the welfare of the Ogiek as the indigenous 'custodians' and 'guardians' of the Mau Forest environment. The Ogiek have a vital role to play in environmental management and conservation of Mau Forest through their well refined and broad based indigenous knowledge practices (as embodied in their indigenous education) that have paved way to thriving of unique biodiversity. These have ultimately predetermined their livelihoods and the future survival of them as a distinct ethnic group.

They developed this knowledge system of ecological management from the experience gained over centuries of interaction and adaptation to the local culture and their natural

environment. Ogiek's indigenous system were transmitted orally from generation to generation and it was collectively owned as it took the form of stories, songs, folklore, proverbs, rituals, community laws, cultural values, language, apprenticeship practices such as hunting, bee keeping and herbal medicine. Their indigenous knowledge system as it was for many African societies were largely practical in nature and put much emphasis on what was of utility to them as an ethnic group. In fact, the Ogiek had deeper understanding and had built powerful incentives on the need to conserve the Mau Forest environmental resources. They depended on it and essentially had guaranteed them in controlling access to these resources as well as enjoying their benefits of the same through collective action and sense of social responsibility. Instead, they should not be dictated by external powers such as the government of what to do about their natural environment.

In this way, learning from indigenous knowledge improved the understanding of the local conditions. This provided productive context for the activities that were designed to help the Ogiek as a community to develop specific and simplest technologies that were appropriate to their needs. As demonstrated from their intricate unique indigenous systems and more so reflecting on their apprenticeship schemes that took into cognizance their urgent attention to preserve their immediate natural environment, the Ogiek continued to cherish these virtues in broadening and diversifying their ideals of environmental conservation strategies. In essence, their indigenous knowledge could be viewed as a system of self-management in safeguarding valuable sources of environmental information thus allowing them to protect and preserve their way of life. Such vital information about their natural environment was clearly developed and it formed the basis for decision making regarding beekeeping, hunting and gathering, food preparation, resource management, herbal medicine as well as in their social, economic and political organization. Therefore, their relationship with the environment best described the inextricably link between man and biological diversity as articulated by various international conventions and declarations as contained in Principle 22 of the Rio Declaration and Declaration of Berlin of 1988.

Community Oriented Approaches to Wildlife Conservation

The Ogiek people had developed a more complex wildlife conservation strategies that helped them to regulate exploitation of wildlife products and ensured that they had adequate natural resources at their disposal. Rules and regulations governing hunting and subsequent exploitation of resources facilitated the conservation of the environment. For instance, each *Koinoto* ('Koinotuek') or territorial units consisted of formidable hunting grounds whereby the clans were guided and controlled by rigid rules and regulations in the day to day running of the hunting activities. In some sacred places such as Tinet, parts of Nessuit and Marishoni areas were seen as protected areas where hunting as well as grazing of livestock and cultivation were forbidden. And, any body violating the same was brought before the Council of elder's Tribunal. They did adjudicate cases of that nature with a lot of seriousness and severe punishment was administered to any offender without any mercy. In tandem with the Ogiek's enforcement of wildlife conservation strategies, seasonal hunting and basic trapping of small animals as well as birds were selectively done mainly for home consumption.

Totemic inclination also became another strategic mode where animals associated with certain clans were not killed or eaten by members of that same clan thus regulating indiscriminate hunting expeditions of wildlife in Mau Forest. Those animals included, *inter alia*, hyenas, monkeys, and other several bird species, notably an owl, crane and an eagle (Sang, 2006). In this way, the Ogiek generally advocated for the protection of the ancestral

land right and for the conservation, management and sustainable use of their great ecosystems of Mau Forest.

According to Towett (2004), Chairman of Ogiek Welfare Council, the term forest does not exist in Ogiek's vocabulary as according to them, they see trees as part of their larger society while animals and plants, respectively, are regarded as part of their larger environment. As a matter of fact, due to their long cherished historical roots and protracted processes of conservation, Mau Forest is in fact the home to important and unique plants and animal species (C.S.V, 2002). For instance, the Mara River is the lifeblood of the Maasai, Mau, and Serengeti ecosystem which is closely linked to the spectacular migration of millions of zebras and wild beasts that attract thousands of the local and international tourists every year in Kenya (Daily Nation, 2004). Similarly, Eastern Mau Forest, is also home to the world's largest concentration of flamingoes in Lake Nakuru which is protected under the International Law (Ramsar Convention).

With the advent of colonialism in Ogiek's territory of Mau Forest, the colonial government imposed strict regulations governing the management of wildlife that were viewed with contempt by the Ogiek. They saw these policies as being prohibitive and denied them their most cherished mode of subsistence which ultimately determined their base of survival and livelihoods. The colonial administrators did not appreciate or recognised the hidden curriculum behind the Ogiek's techniques of regulating and governing their indigenous *Konoituek* hunting practices. Hunting as practiced by the Ogiek society provided them with a clearly defined and rational utilization of available animal and plant resources. They also took into cognizance the concept of tomorrow and as such, the Ogiek had developed a complex social organization structure (demarcation of territorial hunting units) that acted as a regulating strategy for effective and selective hunting of wildlife species. This cumulatively assisted in regulating exploitation of wildlife as well as ensuring that there was constant supply of food for their present and future generations. Further, the Ogiek indigenous management system of wildlife conservation incorporated prescriptions against the killing of big animals. Moreover, the sacred animals were spared too, as defined within their totemic and clan based systems. Indeed, mothers with the young ones were not allowed to be killed for whatever purpose and likewise those in their late gestation period. The rules and regulations governing Ogiek's system of wildlife management were regularly monitored by the council of elders. During, social ceremonies particularly on the onset of initiation period, boys initiates were reminded of the code governing the administration of hunting and violation of the same were not tolerated. Instead, punitive and severe punishment measures were stipulated and written in people's hearts. Essentially, obedience was seen as the guiding philosophy. Evidently, with all these regulations being clearly defined, the Ogiek, according to one informant (Sangwea, 2006) understood best the importance and benefits of their detailed indigenous knowledge of conserving their natural environment for posterity and for their survival as a distinct ethnic group. The management of wildlife and other resources were collectively owned by the Ogiek as a community, thus reinforcing a system in itself that provided checks and balances for effectively sound and broad based ecological management of Mau Forest ecosystem.

In this discussion, it would be imperative to note that Pre-colonial Ogiek society's approach to wildlife conservation was greatly predetermined by their economic and social rationale. Therefore, it would be important for the government, as it was not during the colonial period, to appreciate the role that the indigenous Ogiek have played in wildlife management and conservation strategies. This appreciation of the Ogiek's role would be emphasized with a view to integrating their indigenous knowledge systems into modern environmental

management strategies, and in turn influencing their socio-economic status. There is need for the government to involve the Ogiek in the management of wildlife within Mau Forest. This would assist to provide them with economic incentives in order to conserve wildlife rather than resorting to poaching as a reactionary approach to government's monopoly of the same. Yet, they did enjoy the direct benefits from this programme as they interacted with wild animals on a daily basis. The Ogiek people of Mau Forest have virtually lived in harmony with nature for centuries. They viewed themselves as 'custodians' of preserving their natural environment for the future generations. Hunting as practiced by the Pre-colonial Ogiek society facilitated intergenerational kinship ties and raised awareness on the need to conserve Mau Forest ecosystem for their sustainable livelihood. Accordingly, the council of elders contends that they had a holistic understanding of their bio-physical environment and had the sole responsibility to define the best options of improving conservation of Mau Forest complex's watershed including its rich biodiversity of animals and plant species. For instance, as attested by the co-ordinator of Ogiek Welfare Council, Sang (2001) that both the colonial and post-colonial governments resorted to planting of conifer trees in the Mau Forest and replacing the indigenous ones due to the fact that they were not sure what were suitable to the Ogiek community. Conifer plantation forests did not provide viable substances nor provisions that could be used by the Ogiek or the wildlife in the capacity of food or honey production. This also confirms the fact that had been postulated by Astill (2002) and Nomi (2004) that conifer plantation forests in Mau Forest further upset the ecosystem and biodiversity of the Mau Forest.

Through the activities Ogiek People's Development Programmes (ORIP), Ogiek Welfare Council (OWC) and Ogiek Rural Integrated Project (ORIP), the Ogiek have been applying their indigenous education in order to enhance understanding, trust and co-operation among all parties involved in the conservation of wildlife in Mau Forest. For effective environmental education to be effective, it is imperative to integrate ODL strategies in conservation of wild life. This approach to the conservation and management of natural resources bridges the gap that had long existed between the Ogiek, environmentalists, Non-governmental Organizations (NGOs) and the Government of Kenya on matters related to conservation, wildlife management of natural and economic development. This newly created superstructural partnership should be further enhanced by monitoring the implementation of wildlife conservation and training through Participatory Rural Appraisal (PRA) programme. This would lead to the creation of a simple community based biodiversity monitoring system. The Ogiek should also be inculcated with skills and relevant modern techniques regarding wildlife conservation. This would adequately enhanced preservation of wildlife for future generations. To attain sustainability of the environmental conservation from the two episteme, the use of mass media, ICT technologies and modern management systems should be promoted as an integral government programme of action. In this way, SUMAWA, Unilever Tea Kenya and FOMAWA organizations have been trying to provide support to the Ogiek and other community based organizations dealing with conservation programmes in Mau Forest. Specifically, they are assisting them to engage in projects where the local people are to benefit in their quest to preserve their environment. They ensured that their presence and conservation of wildlife and ecosystem management would generally have tangible benefits for the Ogiek community.

CONCLUSIONS AND RECOMMENDATIONS

The fourth objective of this paper was to examine the need for the integration of Ogiek's indigenous knowledge systems into modern environmental management strategies. In this context, the findings revealed that the Ogiek as a community have sustained their unique worldviews and associated knowledge systems since time immemorial. They have perfected

the same even while undergoing major social upheavals as a result of transformative forces beyond their control. Many of their core values, beliefs and practices, associated with the Ogiek's worldview have survived throughout centuries and are beginning to be recognized as having an adaptive integrity that is as valid for today's generation. However, though with slight modifications and adjustment as a result of the process of assimilation by other ethnic groups, as it was for generations in the past, this system of indigenous education has been useful in providing insights to this discourse. In fact, their broad based contextualization of their indigenous knowledge that was deeply rooted in the long inhabitation of their ancestral homeland of Mau Forest presents a clear testimony of how a community has ultimately utilized and appreciated the aesthetic values of their natural habitat and resources thereof without causing any significant imbalance in the biosphere and its rich biodiversity. The existence of such unique equilibrium have enabled them to enjoy a more satisfying, gratifying and sustainable livelihood. Therefore, the long interrelationship between Ogiek's indigenous knowledge system and resource management can best be captured by their long-term survival philosophy as evidenced within their most cherished ecologically sustainable framework. As resource users, the Ogiek have powerful in-built incentives to conserve environmental resources on which they depend on and more so they did that in order to control access to these resources as well as working out the rules governing their collective action and management of the environment in general. However, with the advent of modernization, environmental strategies and processes such as reforestation and agro-forestry farming practices were launched; particularly the growing of conifer plantation forest. Eventually, these activities upset the ecosystem and biodiversity management of the Mau Forest. Those who were employed as forest guards by the Forestry department aided and catalysed the erosion of their culture and heritage of the Ogiek people. The Ogiek endeavoured to preserve Mau Forest as an embodiment of their culture. Each member of the Ogiek community had the sole and moral responsibility to be guided by the laid down physical and spiritual laws of nature. In this way, the Ogiek's spirituality was based upon not only on the respect of their environment but also upon the philosophy of collective responsibility.

The Ogiek devised a variety of coping strategies that made them to be more resilient to environmental change. Evidently, their expertise and well versed knowledge of environmental education and conservation as practiced by the Pre-colonial Ogiek society had and still has a high degree of acceptability amongst them. This is clearly reflected in their day to day interaction with their natural environment. It was found in this study that Ogiek indigenous knowledge systems were essential elements in the development process and especially in determining the livelihood and survival of this community. Thus, most of the useful and relevant insight information about modern conservation and management of the natural resources in Mau Forest have been heavily borrowed from the Ogiek's practical strategies and experience and hence there is need to enhance the same through a sound framework of integrating ODL strategies so as to enrich their environmental Adult education programme.

The Ogiek had established a detailed indigenous ecological knowledge such as how plants and animals interact in the biosphere. Through hundreds or even thousands of years of practice, they have known how to manage the natural environment in the most sustainable manner. As enshrined in their God's (unwritten) constitution to paraphrase Oduor (2004) assertion that the Ogiek had a clear philosophy and ultimate understand that their basic rights would be threatened or undermined by the destruction, logging and haphazard exploitation of their natural environment in Mau Forest. The Ogiek took charge and extra caution as well as care in the usage, nurturing and utilization of these most cherished natural resources.

In this way, it would be imperative to note that they strongly believed that the long term-protection of Mau Forest ecosystem and their rights of existence, subsistence and livelihood as distinct ethnic group are inextricably linked to their communal spirit of environmental conservation. To a greater extent, it was this conceptualization reality that made the Ogiek of Mau Forest live in a perfectly harmonious relationship with their natural environment, hence preserving their habitat for the future generations. It was within the context of this broader understanding that the Ogiek have been in loggerheads with the colonial and post colonial governments, for they have been evidently struggling to remain in the ancestral homeland of Mau Forest. For this reason, the latter have consistently alleged that they wanted to force the Ogiek out of the forest so as to protect the environment. However, contrary to this view, the Ogiek as revealed in this study had a complex, well refined and developed methods of conserving their natural environment than their new settlers.

In this paper, it was also established that there is need to carefully integrate indigenous knowledge systems into modern environmental conservation strategies without substituting each other. But, instead the two sets of values should be respected and more so building on their respective strengths. Efforts should be made to integrate the two systems as reflected in the series of activities that have been carried out by various international, regional and local organizations working in Mau Forest, namely; SUMAWA, FOMAWA, Unilever Tea Kenya, Tropical Limnology Group and the Green Belt Movement. These groups have been trying to fit the Ogiek's indigenous knowledge systems into their scientific framework of modern environmental conservation and management approaches. Indeed, such efforts already made by these groups together with Ogiek Welfare Council, Ogiek Rural Integrated Programme, Ogiek People Development Programme, Survival International and Right Features Services have highly maintained an international and high profile campaign to protect the Mau Forest and the Ogiek's way of life.

The study findings further revealed that there is growing demand for the blending of modern environmental conservation technologies with the Ogiek innovative indigenous knowledge systems for their effective sustenance of their resources, values and more so for the benefits of this community. This is in acknowledgement and in tandem with the Kenya Forest service's policy which advocated for the devolution of ownership and management responsibilities to the forest adjacent communities. Hence, joint management agreements have been established under the co-management spirit where the Ogiek council of elders, opinion leaders and the government's ministries of Environment, Water, Forestry and Wildlife has been actively involved in the management and conservation of the Mau Forest ecosystem.

The Ogiek remained as an outstanding conservators and repositories of vast accumulations of indigenous knowledge. Their diminishing status as a distinct ethnic group has been due to rapid assimilation leading to its gradual extinction. This presents a daunting challenge as their disappearance is a loss for the larger society which could learn a great deal from their traditional strategies in sustainably managing very complex ecological systems in Mau Forest as well as elsewhere. To avert this conflict between the government and the Ogiek, the study findings revealed that in order to achieve effective management of the natural environment, a participatory bottom-up mode or approach should be employed. This is where all stakeholders with respect to locally based natural resource management techniques should be given the first priority. However, as further established in the findings, the conception of resource conservation as an activity removed from the community and carried out through

state agencies have pre-empted the enlistment of the Ogiek community in the conservation and management of the Mau Forest.

It was because of this reason that when the colonial and post colonial authorities recommended conservation techniques and strategies that were seen to be alien, the Ogiek had no option but to resent the new environmental policies. In view of this, Ogiek saw it as a contravention to their set objectives. They regarded these new government policies as an imposition that had not taken into account their suitability such as the establishment of conifer plantation forests and replacing the same with indigenous plantation forests. Instead, it would be necessary to contend that community based decision and rules governing resources management do play a critical part in preserving biodiversity.

Furthermore, they should be entirely encouraged to sustainably conserve environmental resources, rather than being relegated as passive recipient of processed knowledge from without. In fact, Ogiek's community-based territorial (*Konoito*) system that governed the control and use of resources such as hunting, gathering, bee keeping rights, herbal medicine and other apprenticeship schemes, represented as integrated management approach that has been transmitted orally from generation to generation. This broad based management structure was motivated by the fact that the Ogiek regarded Mau Forest and its resources as their heritage to be managed for the present and future sustainable use. Therefore, indigenous knowledge system as practiced by the Ogiek, of Mau Forest is gaining prominence for its potential value and influence in addressing issues of contemporary environmental concerns.

Application and use of indigenous knowledge by the Ogiek community has not been harnessed to fit into the current scientific framework for effective environmental conservation strategies. This study, therefore, recommends that scholars need to revisit and deepen their understanding and insight information concerning this strategy so as to develop a more useful, meaningful and appropriate conceptual model that ideally addressed the critical and fragile area of integration or mainstreaming of indigenous knowledge into modern scientific knowledge systems. This would enhance the overall efficiency and effectiveness in sustainable development and management of natural resources and more so with the integration of Open Distance Learning (ODL) strategies for sustainable environmental conservation of Mau Forest.

However, to achieve a successful integration, requires a thoughtful and thorough synthesis of relevant and appropriate concepts that should be considered within their social and cultural contexts and not as pieces of knowledge to be inserted into the prevailing scientific framework. The process of integration between the two episteme would pave way for the establishment of an efficient legal frame work that stipulate comprehensive laws and regulations governing environmental management strategies and meeting the needs of emerging environmental crisis currently facing the Mau Forest ecosystem and its rich biodiversity. In line with these emerging trends, the government should not rather victimise the Ogiek as intruders and destroyers, instead they should be in the forefront to appreciate the cardinal role that the Ogiek have played as custodians and guardians of the Mau Forest since the pre-colonial times.

They should endeavour to enact new resource management laws and to establish boards that take into cognizant an integrative and participatory decision-making approaches in the spirit of co-management of their environmental resources. By recognizing their vital role as good environmentalists who followed God's Constitution (natural law) in conserving the environment it would be imperative for the government and other stakeholders to reward

them by engaging them in meaningful participatory environmental education, action plans and programmes. Instead, they should not accuse them as a nuisance, destroyers and liabilities in the management and conservation of environment of Mau Forest. Their involvement in natural resource conservation should be enhanced through co-management strategic approach. In essence, the Ogiek's traditional knowledge of forest management should be incorporated into the conventional forest management systems. This framework would assist them in setting up a structural plan for the government and local community that stresses dialogue and co-operation among these stakeholders.

This study further recommends that the Kenyan schools, colleges and universities' curriculum, contents and teaching methodologies should be based on a worldview that do recognize and appreciate the role of indigenous notions and ideologies as an interdependent and integral part of the universe. In this context, the integration of indigenous knowledge systems into modern environmental management systems should be promoted in all fields. Therefore, there is also need by the Kenya government and other local and international organizations to educate school children to understand wildlife and conservation issues as well as techniques that are useful for the benefit of the future generations. This in turn would promote and enhanced the legal environmental frame work and rights that assist in community forestry, agricultural self-sufficiency and other related programmes that would be necessary to effectively integrate them into the school and college curriculum.

Ultimately, the school education curriculum should endeavour to improve and protect the environment through producing an "environmentally" informed, committed and active citizen. This would eventually assist in future planning to enable the country to manage the environment in a more sustainable manner.

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