Tropical Ecosystems: Structure, Diversity and Human Welfare (Supplement).
Proceedings of the International Conference on Tropical Ecosystems
K. N. Ganeshaiah, R. Uma Shaanker and K. S. Bawa (eds)
Published by ATREE, Bangalore. 2001. pp. 56–60.

An integrated conservation initiative to conserve Kakamega forest and its biodiversity

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The deforestation scenario in Kenya is very grim. Forests cover about 2.5% of the total land area yet every year forests in Kenya are under increasing pressure from encroachment and deforestation. Approximately three million people live within five kilometers of forest boundaries, and benefit from a whole range of goods and services from the forest. Kenya forests provide 90% of household energy, while forestry and wood industries provide 8% of total employment in Kenya. It also provides 40% of foreign exchange earnings for Kenya. Kenya forests generate more than $35 million a year in tourist earnings while providing environmental services worth $50 million (Emerton, 2000).

The Kakamega forest being the only rainforest in Kenya has very unique biodiversity: For example, it is known to be species-rich in forest-dependent birds. It is important for both timber and non-timber products to the extent that medicinal remedies are more readily available from the forest than from

Keywords: Forest conservation, local community, biodiversity, Kakamega forest, Kenya.

local dispensaries. It is an important ecotourist destination and an important watershed for rivers flowing into Lake Victoria. The exploitation of the forest however is more than the forest can sustain, and the forest resource has been steadily diminishing and is also losing its capacity to recover. For example, statistics for the year 2000 shows that there are over 35,000 households living in the forest-adjacent sub-locations. Ninety per cent of them use wood or fuelwood as energy source for cooking. Sixty per cent obtained wood or charcoal directly from the forest. An estimated 3,800 m^3 of indigenous timber are illegally removed every year and 500 tons of charcoal made from indigenous species. All this has been excercebated by the high population growth rates although Kenya's 1999 National Census reported a in-proportional share compared to the period 1989 because of out-migration and increased mortality arising from HIV/AIDS-related deaths. Indeed total clearance of the Kakamega forest has been predicted by the year 2031.

To ensure sustainable utilization and to avoid total Kakamega forest loss, the International Centre of Insect Physiology and Ecology in association with several institutions has initiated a conservation project which aims to tackle the major factors contributing to the loss and disintegration of the forest. Specifically the project is:

- building community awareness of the importance of the forest through environment education.
- contributing to reduction of human pressure on the forest resources through promotion of alternatives to forest-derived fuelwood and fodder, and fuelwood energy-saving technologies.
- contributing to reducing human pressure on the forest through promotion of alternative non-forest-derived income-generating activities, including apiculture, sericulture and cultivation of multi-purpose trees, medicinal plants. Providing credit for small business development is an essential element for entrepreneurship development.
- improve on existing resource management through inventorying and monitoring of selected taxa, training of parataxonomists, categorization of land use, reforesting and physical protection of the forest.

The implementation of 'environmental education' is being carried out in association with a community-based organization, Kakamega Environment Education Program (KEEP). This project is being undertaken to educate and raise awareness among the forest-adjacent communities on the importance of the forest and consequences of its destruction.

Awareness regarding 'energy conservation' is being made in association with the Intermediate Technology Development Group (ITDG, EA). This was initiated to reduce fuelwood harvesting from the Kakamega forest. It is expected to result in energy conservation and improvement of the livelihoods of the forest-adjacent communities through commercialization of the energy-

saving technologies. Discussions, participatory methods, training, demonstrations of energy-saving technologies, exchange visits and provision of resource materials were employed to deliver information to the forest-adjacent communities on the energy-saving technologies. The community has welcomed the energy-saving stoves and a large numbers of the stoves have been installed in the different forest-adjacent homes. These energy-saving technologies are being utilized by the community ensuring conservation of fuelwood that would otherwise be collected from the forest. Major constraint being experienced involves charcoal demands from town dwellers neighbouring the forest, this encourages the forest-adjacent communities to burn charcoal for charcoal users not adjacent to the forest.

The 'on-farm forestry' program is being implemented in collaboration with the International Centre of Research in Agroforestry (ICRAF) and Kenya Forestry Research Institute (KEFRI) who provide the training and information needs of the program. The program aims to develop cost-effective, multi-purpose tree planting to meet commercial and environmental objectives to enable the protection of the Kakamega forest resource. This would provide the community with harvestable products that would otherwise be harvested from the forest. KEEP members and project extension workers trained by the ICRAF and the KEFRI on various seed collection and management programs transfer this information to the forest-adjacent communities. ICIPE distributes seeds and assist the community to develop multi-purpose tree seedlings that are planted in plots of forest-adjacent communities. Some of these seedlings are being used for reafforestation activities. The main constraint in this program is limited land to plant the developed seedlings.

'Community-based cultivation of medicinal plants' is being implemented in association with the KEFRI. The activity was designed to conserve forest herbs, while providing income to the local community. Cultivable medicinal plant species with commercial potential were selected on the basis of their pharmacological effectiveness, toxicity, market value, propagation potential, availability and harvestability of the plant. Two medicinal plants have been introduced and have been planted by the forest-adjacent communities; *Ocimum kilimandscharicum* and *Mondia whytei.* The former is a perennial capable of generating 8000 US$ per hectare while the latter can produce US$ 2400–4600 per ha annually. A total of US$800 has already been paid to Muliro Farmers Conservation Group (MFCG) for their first harvest of *O. kilimandscharicum* while a total of 25,000 seedlings of *M. whytei* have been planted by the forest-adjacent communities. *O. kilimandscharicum* is used to produce aromatherapeutic products for cold, flu, muscular aches, pain and relief of insect bite. *M. whytei* is a natural appetizer, enhancer of celebral and peripheral blood circulation and a source of nutrients such as vitamin A, D, K and E.

The 'apiculture and sericulture' programme was initiated to provide income for the Kakamega forest-adjacent community to reduce their over-reliance on the Kakamega forest for income. Ninety-two farmers from 16 self-help groups have been trained by ICIPE, at Nairobi in the two technologies. The trained farmers have set up these technologies in their farms, which act as demonstration points to other forest-adjacent farmers. A total of 100 bee hives have been installed and fifty tonnes of mulberry for silkworm rearing have been planted by the farmers while one group of farmers.

The programme of 'credit provision' is implemented in collaboration with Kenya Rural Entreprise Programme (K-REP). This is expected to raise both on-farm and off-farm opportunities to raise income for the forest-surrounding households with subsequent reduction of overdependence on forest resources. Local residents are encouraged to become shareholders of the village bank. The shareholders received training on the Financial Services Association (FSA) concept; it is a user owned, financed and managed institution. The Kenya Commercial Bank, Kakamega Branch is the link bank.

The 'land use/land cover' component is being implemented in association with the Department of Resource Surveys and Remote Sensing (DRSRS). The aim was to produce the most recent statistical information on land use/land cover of Kakamega forest. The activity is aimed to produce the most recent maps of land use/land cover of the forest for efficient management and monitoring, while providing information on the actual forest resource that includes its ecological status. The Kakamega forest cover mapping used satellite remote sensing data while the coverage grid of the area has relied on landsat satellite images of 1975 and spot images of 1986. Aerial photographs were used as well as ground truthing. A digitised base map of the Kakamega forest stored in the GIS under various information layers of land use/cover, infrastructure, rivers, forest boundary and settlement has been produced. Also available are the land use/land cover classes arising from interpretation of satellite images. Preliminary data show a general decline in area under natural forest. Forest area also under both soft and hard wood plantations have also shown a declining trend. Forest area under glades has also doubled between 1975 and 1986 possibly due to overgrazing. The area under agricultural activities has tripled during the same period. Between 1986 and 2000 the declining trend continued but at a slower rate.

The inventorying and monitoring was initiated to provide information on the biodiversity of the forest, while providing data that would characterize forest health and monitor biodiversity changes in the forest over time. The data obtained would also guide the immediate and long-term planning and management, policy and decision-making at the forest and assist its identification of economically valuable products. The information would also help in defining the impact of human activity on biodiversity. A few taxa

have been selected for inventorying and monitoring, particularly those that can be utilised as indicators of biodiversity.

'Parataxonomists' training' activity is implemented in collaboration with the National Museums of Kenya (NMK). The activity was initiated to provide employment for the local community as well as training local assistants who would participate in the inventorying and monitoring activities. Initial training involved formal training being provided by the National Museums of Kenya with inputs from experts from the Royal Africa Museum, Tevuren, Belgium. Additional training will be an on-the-job training during surveys of various taxa at Kakamega forest.

'Forest protection' has been an ongoing activity being provided by the Kenya Wildlife Service in collaboration with the Forest Department. ICIPE contributes to effective policing by these institutions by providing funds for capacity building.

Acknowledgements

We thank Wilberforce Okeka of KEEP, Richard Bagine of KWS, Mr L. Mweke of the FD, Kavaka wata Mukonyi of KEFRI, James Were of The ICRAF, Betty Nzioka and Charles Situma of DRSRS, Hellen Owala and Rose Okodo of ITDG-EA, Koen Maes of the NMK and Miriam Cherogony of K-REP.

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