Mangrove conservation management, Kiunga Marine National Reserve

November 2002

SUMMARY

Key points:	1. Conservation value: A key habitat in the Eastern Africa Marine Ecoregion. 2. Mangroves in Kenya are unmanaged. In the absence o policies, plans and guidelines, most have been completely degraded or have become commercially useless. 3. Lamu District contains about 70% of Kenya's mangrove cover, but much of this requires rehabilitation, re-invigoration and replanting. 4. KMNR contains 20% of Kenya's mangrove cover, including the nation's best examples of intact mangrove habitat. 5. KEMFRI/FD studies suggest that the Reserve retains good potential for sustainable exploitation. 6. Mangroves in Reserves effectively are unprotected Involvement of local users now is vital to ensure protection o the last remaining intact mangroves in Kenya. 7. System-level plans for mangrove management have been initiated several times and failed to materialise. 8. Since KMNR is a special case, site-specific guidelines are appropriate. 9. Guidelines will protect KMNR from the fate of other areas they would be quick and cost-effective to produce and they could be adapted for application to degraded mangroves elsewhere if and when they recover. 10. There is almost no information on mangrove harvesting demand, resource economics, access, etc. in KMNR. 11. There is a quantitative baseline on KMNR's mangroves which could be developed as a supporting production model. 12. Guideline development and implementation by local resource users can be a KMNR co-management activity. 13. Effective mangrove management will improve sustainable livelihoods for local resource users in KMNR; well-managed mangroves have potential for ecotourism.
Conservation partners:	WWF ; IUCN; UNESCO; KWS; Fisheries Dept (FiD); Forest Dept (FoD); Kenya Marine Fisheries Research Institute (KEMFRI); Local Resource Users; Private investors

Background

Along the Kenyan coast nine species of mangrove occur. All are found in the mangrove forests of Lamu District, which, at 46,000ha, represent 70% of national coverage and the second largest area of this habitat type in the Eastern African Marine Ecoregion.

Kiunga Marine National Reserve and Dodori National Reserve protect an exceptional assemblage of habitats in a marine-hinterland continuum: continental shelf, patch reefs, islands, lagoons, seagrass beds, mangroves, tidal creeks, mobile and fossil dunes, freshwater lakes and rivers, floodplain grasslands, coastal forest and semi-arid closed canopy woodland and savanna.

Kiunga Marine National Reserve (KMNR)'s mangroves cover about 16,000 ha, or about 20% of national coverage. These are Kenya's most intact mangrove habitats, and they perform a variety of ecological services that maintain the integrity of the wider coastal and marine ecosystem:

- Trapping and consolidation of sediments
- Improvement of water quality, favouring development of corals and sea grass
- Buffering sinks for flushes of nutrient and pollutants
- Protecting shorelines from water and wind erosion
- Provision of spawning, feeding and nursery grounds for fish and crustacea
- Staging and stopover sites for migrating waterfowl and shorebirds.

Mangroves were the basis of a sea-borne export trade with Arabia: this began in pre-recorded times and by the 1950s ranked third amongst Kenya's exports. Today, the Government has imposed a ban on export, but mangroves continue to provide important items of subsistence use, such as building poles, crabs, medicinal plants and fuelwood for local resources users.

KMNR's mangroves were the subject of a quantitative reconnaissance by KEMFRI and Forest Department in 2000. The survey indicated that KMNR'S are the only mangroves left in Kenya that can presently be managed for sustainable extraction of poles. Mangroves elsewhere are either commercially depleted or more fundamentally damaged and require various types of restoration before they can be used again.

KMNR is potentially an ideal venue for an innovative programme of co-management by local resource users and residents in collaboration with statutory authorities and local government. Among other things, the approach will involve resource user groups who will develop and implement principles of good practice in management of fisheries and other renewable resources.

Mangroves are an obvious candidate for sustainable management by local resource users, and participatory development of good practice guidelines will be a pre-requisite for this.

In view of the healthy status of its mangroves, KMNR is a special case but, since previous attempts to produce system level plans for Kenya's mangroves have failed, a site-specific approach seems pragmatic. It would provide a basis for action to protect the last intact mangroves on the coast and obviate the need for rehabilitation work of the type that is being attempted elsewhere.

Guidelines developed for KMNR could be applied to other sites once they have been rehabilitated and use resumes

A. **Issues – the need for Guidelines**

1. Lack of controls and protection

Aerial surveys of the mangrove habitat were carried out during the 1960s, 1980s and 1990s, intended as the basis for planning. The surveys showed marked declines in mangrove coverage in many areas of the Kenya coast, but the information was not applied to production of mangrove management plans.

In Marine Protected Areas such as KMNR KWS ostensibly manages mangroves and other habitats by reference to the Wildlife Act. Outside the protected area system the mangroves are the responsibility of the Forest Department, which implements the Forest Act. This division of responsibilities has been expressed in a Memorandum of Understanding between KWS and FD.

Neither agency has translated the provisions of its governing legislation applying to forested habitats in general into workable regulations or plans that can be applied to the special case of mangroves. As a result mangroves are everywhere unmanaged and, even in Marine Reserves, unprotected.

2. Economic aspects

Where mangroves are managed for production, e.g. in Malaysia and Indonesia, this is done on a 20-30 year rotation[1], suggesting that commercially there are temptations to exploit mangroves by "mining" them - i.e., clear stands for poles of various size classes and possibly also for charcoal, invest the proceeds in bank accounts or other investment vehicles that grow faster than mangrove trees and make no investment in rehabilitation or stimulating regeneration. This trend was clearly evident in the Kenyan commercial trade from the 1950s onwards, and led to the wholesale clearance of large areas of mangrove, much of which was exported to Arabia, the Gulf and India via traditional Swahili ocean trading routes.

Mangrove export has been banned since 1992. Despite the clearly unsustainable harvesting practices the export ban was not instituted out of conservation concerns but for political reasons, mirroring the low priority accorded to environmental issues by

[1] In the 1950s a 20 year cutting rotation for Kenya's mangroves was proposed but not adopted

business and government.

KEMFRI/FD research shows that all area with mangroves around KMNR have been denuded of marketable poles, known as *boriti*, *mazio* and *pau*. These forests retain only large trees which are “overgrown” in commercial terms.

These mature trees presumably have some importance as seed-producers and progenitors of the next generation, but they also inhibit regeneration of shade-intolerant mangrove species – rehabilitation will demand a careful weeding out and pruning of big trees to accelerate natural regeneration.

The more immediately accessible mangroves of Lamu’s southern swamps and of the nearby islands of Manda, Siyu and Pate are so degraded that restoration will require replanting programmes .

By contrast, with an average standing stock of 145 m^3 ha^{-1} (of which stems over 5cm diameter make up 700m^3 ha^{-1}) and high potential for regeneration, KMNR was judged to have good potential for sustainable pole production.

A political decision to resume harvesting for export would give immediate impetus to businesses intent on mining the remaining mangrove resources. KMNR’s mangroves would be a prime target for exploitation in that event, and in the current management and policy vacuum there is no reason to suppose they could be protected from a fate similar to that of mangroves elsewhere in coastal Kenya.

Full advantage must be taken of the hiatus created by the mangrove export ban to put in place some controls that will engage local resource users and residents and protect their interests from speculative large-scale extraction projects.

At the micro-economic level, mangrove harvesters from anywhere in Kenya can cut mangroves in KMNR if they have a licence, and licences can be obtained from Forest Department offices anywhere in the country.

The licences permit the holder to trade in mangrove products and each licence holder employs a number of cutters to do the work of harvesting. Although FD’s licensing policy is to keep the number of licencees constant from one year to the next, there is no provision to limit offtake per licence, nor to restrict harvesting to designated areas.

The current licensing system is therefore ineffectual as an instrument of sustainable management, and it encourages unsustainable offtake by traders from outside the area who seek to mine the mangrove resource. Most of the proceeds will not enter the local economy.

Sustainable and productive co-management of mangroves could be achieved by involving local resource user groups in mangrove stewardship, according to standards embodied in guidelines. This would help to avert the over-exploitation and loss of local economic benefit that is invited by the current open access situation.

3. Local issues of sustainability

Very little information is available on the use of mangroves in KMNR. While stocks appear to be exceptionally healthy by comparison with other areas, there is anecdotal evidence that traditional uses are not so sustainable as they once were.

A handful of licensed mangrove dealers live in KMNR's villages. They employ teams of cutters to harvest poles for building.

Cutting takes place throughout the year. No management regime has been recorded so far, but some cutters assert that young trees are always left untouched while others say that areas harvested are not revisited for at least a year.

Some cutters report that demand for suitable specimens for building occasionally outstrips supply, a situation that never arose in the past. Another trend suggestive of declining sustainability is the longer distances cutters report they must travel to find suitable poles in the larger *boriti* size-class.

The process of guideline development will investigate traditional harvesting practices, indigenous knowledge and indicators of sustainability trends, through close collaboration with resource users. This will also shed light on the structure, volume and value of the market for mangrove products.

The mangrove cutters will help in definition of the essential resource management issues to be addressed in the guidelines. Where prescriptions on harvesting activity and practices are needed, deliberations with users will play a vital role in making these as workable, fair and socially acceptable as possible.

Developing guidelines for mangrove management in Kiunga

Development of guidance will demand a combination of quantitative resource assessment and investigation of traditional knowledge systems and harvesting practices. The process of evaluating the implications of the information and agreeing whether and what interventions should be instituted is a participatory one.

Skills needed are renewable resources assessment, ecology, economics and participatory resources enquiry. GIS expertise would be useful for spatial analyses. The mangrove dealers and cutters should be residents of the area and familiar with the history and status of local mangroves.

1. Production sustainability assessment – desk study and PRA

The aim of this activity is to derive a realistic assessment of the present status and future trends in demand and supply of mangrove products. This will involve:

- Literature research, consultation with local people, local authority to establish demographic trends around KMNR.

- Through PRA and consultation with cutters etc., estimate annual mangrove requirements of average family for housing, boat maintenance, repair, consumption. Extrapolate future demand from demographics.
- Research with local private sector and NGO operators to establish their start-up, ongoing maintenance and projected expansion needs for mangrove
- With cutters, establish size classes and uses by species.
- With cutters, estimate licensed offtakes
- With cutters investigate magnitude of offtake by cutters from outside
- If appropriate, probe the issue of unlicensed use
- Reconcile local cutter licensed production with people's annual needs
- Literature review to establish mangrove growth and production parameters by species and age/size-class.
- Revisit the 2000 KMNFR/FD stock assessment and apply growth and production parameters to estimate available total stocks and offtake potential by age/size class.
- If possible, work with cutters, maps and GIS to assess whether and to what extent any areas of mangrove are effectively unusable due to access, etc., and modify supply model accordingly. This will indicate areas which could be classed now as "closed" or "off-limits" because they are never used.
- Seek input from cutters on resource quality variations within the mangrove community depicted on KEMFRI/FD maps.
- From a comparison of estimated supply and demand, assess current and future sustainability of mangrove management in KMNR to meet local needs.
- From sustainability analysis assess need for offtake controls, enrichment planting or other interventions.

2. Economic assessment – desk and PRA

This activity aims to establish the current value of the mangrove crop and to investigate possibilities to enhance this value or raise revenues from permit fees, etc.

Offtake restrictions might be justified by the sustainability analysis. There could be a place for permit controls to protect the resource base and to raise revenues to subsidise the co-management process. It is also useful to look into the structure of the market to see where demand originates and to establish the respective shares of offtake going to local and remote markets.

If necessary this analysis could be undertaken later provided the following information is collected as part of this project:

- With cutters and local residents establish pricing structure
- Valuation of the mangrove trade
- Subsistence, traditional uses
- Commercial – remote markets, e.g. Lamu traders
- Commercial - NGO/tourist operator uses
- Investigate local-remote market split, differential pricing, fate of poles, etc.
- Estimate revenue that co-management structure could raise by sustainable

trade, permits, entry fees or other levies

3. Harvesting practices participatory assessment – PRA

This activity aims to investigate harvesting practices of cutters, investigating which factors influence their operations, etc.

- Revisit areas sampled in KEMFRI/FD baseline survey to see impacts of harvesting.
- Revisit other sites harvested by cutters, preferably with known time intervals.
- Conduct oral history research with older members on trends in mangroves.
- Accompany cutters on harvest trips to learn about their methods:
- Site selection.
- Cutting, extraction, stockpiling, etc., practices.
- Tools and methods.
- Ancillary activities.
- Traditional knowledge, proscribed practices
- With cutters and others discuss collateral damage and ecological impacts associated with mangrove harvesting.

Collaborative management principles - workshops

With cutters, other mangrove users (e.g. crab fishers, etc.) and local residents, present and discuss issues identified in the survey. Introduce the concept of co-management and consider the need for, and modalities of, mangrove management interventions. These might include:

- Basic sustainability: demand versus supply, past and future trends
- Economic aspects
- The local versus the remote economy
- The need for restrictions
- The form restrictions should take
- The need for improved harvesting practices
- Reserved or closed areas
- Replanting
- Localised harvest plans
- Defined areas for local user groups
- Permitted activities; Proscribed activities
- Compliance monitoring methods
- Provisions for review of guidelines

Mangrove use in Mafia Island Marine Park, Tanzania

1. Mangrove use is strictly regulated under a resource use permit system.

2. *Bona fide* residents wishing to undertake harvesting apply for a permit through their village liaison committee. Permits are available free of charge to residents, who are certified as such – the certificate of residence also is *gratis*.

3. Non-residents must pay for an entry permit and further pay for permits authorising regulated resource use – in the case of mangroves, non-resident use is not permitted under any circumstances.

4. Mangrove cutting for commercial sale is not permitted, not is cutting by non-residents.

5. Mangrove cutting for boat building, repair and house construction is restricted to residents. All material must be used in the marine park villages (i.e. it cannot be sent to remote markets) and it must be collected from designated zones only.

6. Collection of dead mangrove branches, seeds, fruits and leaves is allowed in most areas of the MPA without a permit.

7. Cutting for small-scale beach or inter-tidal area clearance requires a permit. Large scale clearance is not permitted.

8. The frequency with which a cutter can re-apply is regulated.

9. Cutting permit states the number of trees that can be removed.

10. Permit applications in which the applicant commits himself to plant a number of seedlings of agro-forestry alternatives is encouraged and may even be a condition of issuance of the permit.

11. Cutting sites will be designated by a warden or his rep – sites are chosen to maximise the likelihood of regeneration. Sites close to important fishing grounds or near tourist developments are to be avoided.