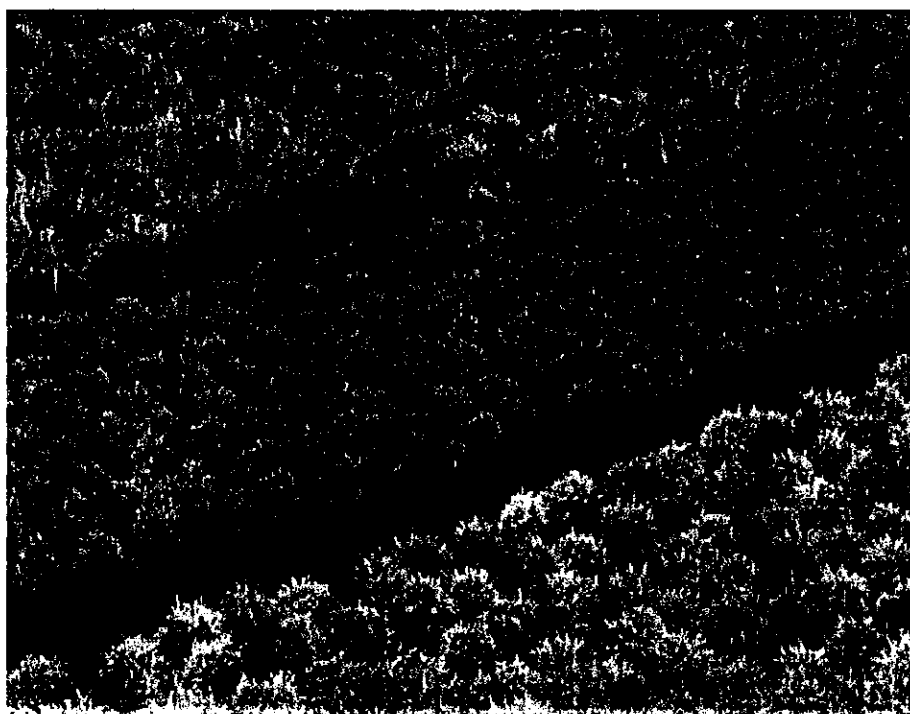


*ARABUKO SOKOKE FOREST MANAGEMENT AND
CONSERVATION PROJECT*

**STRATEGIC FOREST MANAGEMENT PLAN FOR
Arabuko-Sokoke Forest**

Zonation Workshop

*Proceedings of Zonation Workshop held at Gede Ruins on 30th
November 2000*



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Zonation workshop Proceedings

Held on 30th November 2000

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Position Paper presenter: Mr. Kaleb Mwendwa, Ag Centre Director KEFRI, Coast

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Opening of the workshop

Dr. Roger Safford, Head of Projects and Programmes, Birdlife International, officially opened the workshop.

1.0 STRATEGIC FOREST MANAGEMENT PLANNING PROCESS

Mr. Joram Kagombe, Forest management Co-ordinator presented the process of preparation of the strategic forest management plan.

The planning framework for Arabuko-Sokoke will be developed to meet the needs of forest managers who have to take into consideration multiple stakeholders and multiple objectives. Multiple-stakeholder forestry requires multiple objectives to be resolved within a single area.

The planning framework will consist of both top-down (strategic) and bottom-up (operational) plans. This allows the strategic forest management plan to be prepared for a longer period (25 years) with various types of operational plans to be prepared for different types of activity over much shorter periods (normally less than 5 years). The strategic forest management plan provides the broad framework against which operational plans are approved. If an operational plan does not comply with the priorities, principles and strategies outlined in the strategic plan, it will not be approved for implementation.

Information and data required

- low-resolution data is required for strategic planning
- high-resolution data is required for bottom-up planning

Strategic plans are less data intense, but more data diverse

Since at strategic level, only enough data is required to make strategic decisions

1.1 Strategic Forest Management Plan Characteristics

- **The plan is strategic rather prescriptive.** It will allow for bottom-up planning and accommodation of a wide range of stakeholder interests, but it will not prescribe what is to happen in each part of the forest for the next 25 years and therefore contains no budget – only prioritised strategies.
- **The plan will be more comprehensive.** It covers a wider range of forestry interests including the public, community, and government sectors that conventionally were not involved in forest management planning and as a result it will be more open to public scrutiny and will respond to the need for transparency. It will be prepared through a **participatory process** of consultation, which is inclusive of all stakeholders or their representatives.

- **The SFMP will interpret national forest policies in the local context of Arabuko-Sokoke**
- **Rather than being prescriptive, the SFMP broadly categorises the forest to give a range of choices/management options**
- **SFMP should be readily accessible to a wide range of non-technical stakeholders. It is therefore expected to be a relatively short document, attractive, and as far as possible with information and strategies being map-based. It is expected that the SFMP would be approved centrally (CF level).**
- **Do not contain a budget**

Operational Forest Management Plan Characteristics

- **Time bound plans maybe 1-5 years in duration (depending on the type).**
- **Prepared following the principles and guidelines articulated in the SFMP and focus on achieving objectives through implementing activities for a specific, identified site.**
- **Often they will be prepared by front line staff (with specialised assistance if needed)**
- **Contains budget**

1.2 STEPS IN PREPARATION OF SFMP

- 1.0 VISIONING WORKSHOP Held in September, 2000
- 2.0 DRAFT STRATEGIC MANAGEMENT OBJECTIVES –GOALS
- 3.0 INDICATIVE ZONATION
- 4.0 IDENTIFICATION OF WORKING PRINCIPLES
- 5.0 ISSUES IDENTIFICATION
- 6.0 STAKEHOLDER IDENTIFICATION
- 7.0 ASSESSMENT OF INFORMATION REQUIREMENT FOR EACH ZONE
- 8.0 FURTHER INFORMATION GATHERING

9.0 ZONING WORKSHOP

10.0 PREPARATION OF POSITION PAPER FOLLOWED BY WORKSHOP FOR EACH THEME

- 10.1 Problem Animal Control
- 10.2 Ecotourism and education
- 10.3 Infrastructure
- 10.4 Human resource Development
- 10.5 Illegal Activities
- 10.6 Biodiversity Conservation
- 10.7 Sustainability

- 10.8 Subsistence use
- 10.9 Policy, Legal
- 10.10 Environmental profile
- 10.11 Monitoring and Approval
- 10.12 Crosscutting themes
- 11 PREPARE MANAGEMENT GUIDELINES FOR EACH THEME
- 12 SUMMARISE WORKSHOP PROCEEDINGS
- 13 CONSULT KEY STAKEHOLDERS
- 14 DRAFT MANAGEMENT PLAN
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- 16 REVISION OF THE PLAN
- 17 APPROVAL OF THE PLAN

1.3 Vision Statement for Arabuko Sokoke Forest

This long-term vision for Arabuko-Sokoke Forest guides our purpose, objectives and approach to conserving and using the forest at present, and into the future. Our vision reflects the need to adapt our approach to forest resource management to one which meets the continually changing needs of society and which incorporates the diversity of interests and values which our society attributes to the forest, both for today's and future generations.

Arabuko-Sokoke Forest is a unique and important asset. It has global importance due to its uniqueness and its an Important Bird Area (IBA).

Our vision for 2025 is for an intact and fully functioning forest ecosystem with no reduction in the existing forest area. We envisage that:

- **Local forest adjacent communities will have the opportunity to participate in meaningful ways in the management of Arabuko-Sokoke Forest, and to be the primary beneficiaries of its products and services.**
- **The unique biodiversity of the forest will be expressly conserved and enhanced through any forest management interventions and actions.**
- **Forest resource condition will be developed and improved through management actions that emphasise the use of best practice and the best available information.**
- **Environmental education and eco-tourism will be enhanced as opportunities for linking wider society with for management of the forest.**
- **Sufficient resources will be made available to support an effective and motivated forest management team enabling them to meet the challenge of this ambitious vision.**
-

. Overall Purpose

- *Sustainable forest management and conservation practices established and in operation*

1.4 Strategic Management Objectives

The strategic forest management objectives give us the emphasis and direction we need to take in order to move towards the long-term vision. To a certain extent, the strategic objectives for Arabuko-Sokoke Forest are determined by national objectives for forest management and conservation of indigenous forest in Kenya as expressed in the forest policy. However, whilst these national policy objectives are broad-brush, they can be further refined and emphasised to expressly fit the local and unique context of Arabuko-Sokoke Forest.

In order of priority these are:

- *To conserve and enhance the unique biodiversity of the forest*
- *To contribute towards meeting subsistence needs and improving livelihoods of forest adjacent communities*
- *To improve and develop forest condition and utilisation potential for a range of forest products and service*

Principles of long term Approach

- *We believe in ensuring relevant stakeholder participation in planning and implementation of all activities*
- *We believe in resolving and reconciling competing interests “on site” as far as possible and prior to any implementation*
- *We believe in establishing working partnership arrangements between government agencies and other stakeholder groups in civil society in order to implement actions.*
- *We believe in the importance of building transparency and openness into working practices*
- *We believe that priority must be given to forest resource conservation rather than to its development or extraction*

- *We believe that our actions should focusing on sustainable use of the forest rather than sustainable yield of products.*
- *We believe in the precaution of acting cautiously and monitoring the impacts of all our actions*
- *We believe that the planning guidelines developed in this strategy should underpin the preparation and implementation of all operational plans*
- *We believe that all management activities should be carried out on the basis of approved operational plans which conform with the strategies and princip'es outlined in this strategic forest management plan.*
- *We believe in identifying the respective responsibilities and roles as well as rights and benefits of relevant stakeholders for planning, implementing and monitoring all activities in the forest*
- *We believe that building up our knowledge base and understanding through ongoing studies and research is critical to better management of the forest resource*
- *We believe that the re-inforcing link between reward and effort is critical to successful implementation of all activities.*

2.0 Discussion paper on Forest zonation presented by Mr. Kaleb Mwendwa

2.1 Introduction to zonation

The Zonation plan presented is for discussion purposes only and to present the various views Arabuko Sokoke Forest Management Team (ASFMT) has gathered in the course of time. Zonation *per se* is not a new concept and basically tries to introduce management units that can be managed in a more intense manner. It has been realised with time that management of natural ecosystems can no longer be prescribed blanket management regimes due to their high macro and micro-biodiversity. The Zonation plan intends to be the first in a series of ASFMT workshops to feed into the 25 year Strategic Management Forest Plan (SMFP) of ASF that started with a Visioning workshop in September 2000. And as such this will be the baseline for the other thematic workshops

A departure from the zonations that have been described before, is the inclusion of the intervention zone. This is of particular importance as the management of the forests is moving away from "managing the forests against the people" to "managing the forests with the people". Also the paper presents different schools of thought on types of zonation areas within forests which were subjected to discussions in the workshop.

The proposed plan is a strategic one addressing only the Arabuko Sokoke Forest, a natural Forest and surrounding plantations. The Draft Forestry Bill, October 2000, Section 50, Management strategies and practices, outlines the provision of management plans for the sustainable utilization of forests be it plantation or natural/indigenous forest (Box 1). The mid-term review report of Arabuko Sokoke Forest Management and Conservation Project (Harrison *et al.*, 1999), pointed out that there was no overall management plan for Arabuko Sokoke Forest. The report suggested that a strategic plan setting out the vision for the joint participatory management of ASF be put in place if not at least an operational plan.

It recognised that some components were already being addressed e.g. tourism, conservation education, forest protection and problem animal control but no plan had been prepared for community participation in forest management and rural development. However, since then (Mid-term review) a series of community meetings have been held in the envisaged pilot area of Dida Sublocation concerning participatory forest management and currently a report on their outcomes has been prepared. The meetings comprised of the forest managers (ASFMT) and community members.

Box 1: Section 50, subsection 1, 2 and 6 Management strategies and practices.

(1) All forests shall be managed on sustainable basis with the multi purpose production of goods and services, with the primary objectives for natural forests being that of conservation and non-consumptive use, and for plantation forests being production of wood and other products and services.

(2) In pursuit of sub-section 1 of this section, the Chief Conservator shall cause to be prepared regularly forest management plans, for approval of the Board, to guide the planting, tending, protecting, utilizing and development of State and Provisional Forests.

(6) In protected forests, only controlled collection of fallen dry wood and non-wood products such as medicinal plants may be allowed, provided however that such collection shall not interfere with the objectives of soil, water and biodiversity conservation and other management objectives.

2.2 Zoning concept

Mapping and quantitative assessment of indigenous forest reserves in terms of benefits and services they provide, for example biodiversity conservation, environmental protection and utilization can facilitate the zoning of ASF for multiple use. The expert system (Skidmore, 1989, 1998 and Groten, 1996) formalizes a resource as a set of rules which may be used to classify digital spatial data and is particularly relevant when used in combination with information from participatory and rapid rural appraisal methods¹. KIFCON (1994) advocated for a multiple use zoning in terms of protection, utilization and plantation zones. The assumptions are that within the protection zone, there will be areas strictly protected and areas left to regenerate and some rehabilitation work may be carried out i.e. non-extractive activities and enrichment planting. In the utilization zone there will be subsistence use by the local communities. Lastly there will be commercial plantation zone for both exotic and indigenous tree species. In summary, based on the size, type, socio-economic and cultural aspects, and nature and degree of forest degradation, an indigenous forest will be divided according to values and services the various zones can provide.

The Zonation plan can be summarised to include the following aspects: consumptive and non-consumptive utilization and areas under protection. The zones are listed as follows:

1. Protected areas- Non -extractive areas
2. Commercial utilization areas- Plantations and Indigenous forest (a) Polewood and firewood areas (b) Timber areas-Plantations
3. Community utilization areas (subsistence use) - Trial and control areas (fuelwood and non-timber forest products).
4. Rehabilitation/degraded areas²
5. Tourism areas
6. Intervention areas adjacent to the forest boundary³

¹ ASFMCP has installed GIS facilities with a view of integrating socio-economic and biophysical data of ASF.

² These are not necessarily zones but can form part of the core activities to be undertaken. However they have to be mapped out for the managers to include them in the SFMP.

³ These are specifically the villages listed as Forest Adjacent Communities that number about 50 and stretch to 3 to 5 kilometers from the forest boundary. This is a definition of target population as far as

Different schools of thought on zonation of ASF

2.2.1. Possible criteria for Zone – subsistence use.

- Area of forest within a certain distance from the village (e.g. 1, 2, or 3 km from the forest boundary)
- Area of forest adjacent to a village up to a specified maximum area (e.g. 100 ha, 500 ha etc)
- Degraded forest area (e.g. less than a given canopy density)
- All forest area being used by the village (regardless of criteria)

2.2.2 Possible criteria for Zone – non-extractive use (non-consumptive).

- A specified percentage of the whole forest (e.g. 50%, 30% etc.)
- All forest which is in good condition (e.g. above a certain canopy density)
- All forest beyond a specified distance from the forest boundary (e.g. 1, 2 or 3 km)
- At least some forest area in each of the 3 main forest types (Mixed; *Cynometra*, *Brachystegia*)
- All areas where the 6 most important bird species are known to live

2.2.3 Possible criteria for Zone – commercial use

- All forest areas not covered by zones 1 or 2
- All forest area having more than a given timber stocking
- Only forest within a certain forest type (e.g. mixed forest)

2.2.4 Alternative zones

The Zonation plan can also comprise of the following: consumptive and non-consumptive utilization and areas under protection. The zones are listed as follows:

1. Protected areas- Nature Reserve
2. Commercial utilization areas- Plantations and Indigenous forest (a) Polewood and firewood areas (b) Timber areas-Plantations
3. Community utilization areas (subsistence use) - Trial and control areas (fuelwood and non-timber forest products).
4. Rehabilitation/degraded areas
5. Tourism areas
6. Intervention areas adjacent to the forest boundary²

the Arabuko Sokoke Forest Management and Conservation Project (ASFMCP) is concerned. The management plan does not seek to exclude the communities/utilizers of the forest who are far away. Intervention could be through creating buffer zones via tree planting programmes, conservation education to the local population or other rural development activities reducing dependence on the forest.

² These are specifically the villages listed as Forest Adjacent Communities that number about 50 and stretch to 3 to 5 kilometers from the forest boundary. This is a definition of target population as far as the Arabuko Sokoke Forest Management and Conservation Project (ASFMCP) is concerned. The management plan does not seek to exclude the communities/utilizers of the forest who are far away.

7. Cultural/ religious areas-Kayas³
8. Problem animal control areas⁴

The following is a description of each of the zone:

- Subsistence zone addresses issues of wood curving, meat from animals, who has right to the resource, should we use area or distance as criteria for zonation. There is need of information flow in some areas to convince people not to utilise some certain parts of the forest
- Commercial utilisation zone include areas under plantations with a view of community access and issues of commercial fuelwood licensing
- Tourism zone tackles on how to promote tourism while minimising the negative effect it has on the forest. There is overlap of tourism zone and biodiversity zone. Can they be merged?
- Pilot PFM addresses issues of resource *viz.* verse forest access by the community

2.3 Arabuko-Sokoke Forest birds presented by Dr. Leon Bennun, Ornithologist Chairman Nature Kenya

- More than 230 species, many confined to forest
- Six globally threatened and three near-threatened species
- Five regionally-threatened species
- Five out of seven 'restricted range' species of the East African Coastal Forests Endemic Bird Area

Conservation issues

- Forest birds respond mainly to habitat structure — plant species not so important
- Other animals (like butterflies) may respond more directly to floral composition
- Disturbance (e.g. selective logging) changes **structure** of forest

Intervention could be through creating buffer zones via tree planting programmes, conservation education to the local population or other rural development activities reducing dependence on the forest.

³ Current information from the Coastal Forests Conservation Unit (CFCU) shows that there are no Kayas in Arabuko Sokoke Forest. However some locals claim there exist some around Chumani-Mida area.

⁴ While it is recognized that some animals like elephants, buffaloes and hippos might have a distinctive movement pattern others like baboons and monkeys tend to be unpredictable in their movements. For the former it might be possible to delimit their areas of operation and a plan to monitor them put in place.

- Three forest types differ in structure: (vegetation density *Cynometra* > *Afzelia* > *Brachystegia*)

Response to disturbance also differs according to forest type

Results following selective logging:

- *Cynometra*: dense shaded thickets, high small stem density, low canopy
- *Brachystegia*: open grassy glades, reduced canopy cover
- *Afzelia*: reduced canopy height, reduced high canopy cover, denser understorey
- Disturbed *Afzelia* changes least in structure— maybe because of its greater floristic diversity

Other disturbance

- Pole removal: opens up the understorey
- Fuelwood removal:
 - reduces **invertebrate abundance** (especially termites and beetles)
 - removes **nest sites** for hole- or ground-nesting birds
- **Threatened and forest-specialist birds**
- Show preferences for particular habitat types (not all the same ones!)
- Show strong reactions to disturbance – some have very patchy distributions as a result
- Estimated populations of threatened birds range from c. 1000 Sokoke Scops Owls to c. 7400 East Coast Akalats
- **Viable population sizes** unknown: probably at least 1500 (= 500 pairs)
- Large parts of the forest are probably **sinks** for particular threatened species – they hold low-density populations that cannot maintain themselves and persist by recruitment from high-quality habitat
- Protection of high-quality habitat is essential for the survival of these species

Sokoke Scops Owl

Mixed Forest	Disturbed	7
	Undisturbed	7
Brachystegia	Disturbed	7
	Undisturbed	7
Cynometra	Woodland	λλλ
	Intermediate	λ
	Thicket	7

- **Densities:** 7 km⁻² in tall *Cynometra*: 750 birds; 1.2 km⁻² in intermediate *Cynometra* (250 birds); 3 km⁻² in white soil *Afzelia-Cynometra* (25 birds)
- **Foraging level:** Mid-level
- **Key habitat requirements:** Tall *Cynometra* forest with closed canopy. Nest trees unknown — suspected to be *Brachylaena*. Feeds largely on beetles
- **Management implications:** No removal of old or dead trees with potential nest holes. No further removal of *Brachylaena*. Limit dead wood removal because of negative effect on beetle abundance

Sokoke Pipit

Mixed Forest	Disturbed	λ
	Undisturbed	λλλ
Brachystegia	Disturbed	λ
	Undisturbed	λλλ
Cynometra	Woodland	μ
	Intermediate	γ
	Thicket	γ

- **Densities:** 79 km⁻² in disturbed *Brachystegia* (2,450 birds in 31 km²); 19 km⁻² in disturbed *Brachystegia* (680 birds in 36 km²). Densities in undisturbed Mixed Forest probably similar to *Brachystegia*
- **Foraging level:** Ground
- **Key habitat requirements:** Tall forest with good canopy cover and extensive, deep leaf litter; key factors are densities of **ants** and **termites**
- **Management implications:** No selective logging to avoid disruption of canopy. No removal of dead wood to maintain good termite populations

East Coast Akalat

Mixed Forest	Disturbed	γ
	Undisturbed	λ
Brachystegia	Disturbed	γ
	Undisturbed	γ
Cynometra	Woodland	λλλ
	Intermediate	γ
	Thicket	γ

- **Densities:** 23 km⁻² in Mixed Forest, in parts where it occurs (900 birds in 40 km² of habitat); 37 km⁻² in northern *Cynometra* woodland (1,200 birds); 81 km⁻² in southern *Cynometra* woodland (5,300 birds)
- **Foraging level:** Ground/understorey

- **Key habitat requirements:** Dense forest with high canopy cover and few cut stems; high percent cover at 2 m height; large amounts of **dead wood**, especially **mossy logs**
- **Management implications:** No selective logging to avoid disruption of canopy. No pole extraction. No removal of dead wood

Spotted Ground Thrush

Mixed Forest	Disturbed	μ
	Undisturbed	λλ
Brachystegia	Disturbed	μ
	Undisturbed	μ
Cynometra	Woodland	λ
	Intermediate	λ
	Thicket	μ

- **Densities:** Unknown. Very patchy.
- **Foraging level:** Ground
- **Key habitat requirements:** Dense well-shaded forest with deep leaf litter and patches of tangled stems
- **Management implications:** No selective logging to avoid disruption of canopy. No pole extraction

Amani Sunbird

Mixed Forest	Disturbed	7
	Undisturbed	μ
Brachystegia	Disturbed	λ
	Undisturbed	λλλ
Cynometra	Woodland	μ
	Intermediate	7
	Thicket	7

- **Densities:** 37 km⁻² in *Brachystegia* (c. 2,800 birds). About 4 times more abundant in undisturbed than in disturbed *Brachystegia*
- **Foraging level:** Canopy
- **Key habitat requirements:** Tall *Brachystegia* woodland with good canopy cover
- **Management implications:** Avoid selective logging of *Brachystegia*

Clarke's Weaver

Mixed Forest	Disturbed	1
	Undisturbed	1
<i>Brachystegia</i>	Disturbed	λλ
	Undisturbed	λλλ
<i>Cynometra</i>	Woodland	1
	Intermediate	u
	Thicket	7

- **Densities:** Unknown
- **Foraging level:** Canopy/mid-level
- **Key habitat requirements:** *Brachystegia* woodland; less susceptible to habitat alteration than some other species
- **Management implications:** Avoid selective logging of *Brachystegia*

Other forest specialists

Mixed Forest	Disturbed	λλ
	Undisturbed	λλλ
<i>Brachystegia</i>	Disturbed	1
	Undisturbed	λλ
<i>Cynometra</i>	Woodland	λλλ
	Intermediate	u
	Thicket	u

- **Densities:** Unknown
- **Foraging level:** Various
- **Key habitat requirements:** Extensive high canopy (Little Yellow Flycatcher), high stem density (Olive Sunbird), extensive middle-level cover (Tiny Greenbul, Crested Flycatcher)
- **Management implications:** Avoid selective logging, no pole cutting

2.4 Ann Robertson Presentation

- The structure of the mixed forest has changed considerably due to extraction
- Nature reserve as it stands today does not function as one.
- Need to redesign the nature reserve
- The whole forest can be considered as biodiversity area
- There is need to closely monitor subsistence use of the forest
- Forest plantations are an important habitat for birds

3.0 Comments from Presentations

Birds are good indicators of good forest condition. Arabuko sokoke forest is an important bird area. The number and diversity of birds in various points of the forest can be used as an indicator of the forest condition.

The current trend in forest management is to involve people in management. This arises due to recognition that efforts in conservation that do not take consideration of peoples needs are not sustainable. 52 villages surround Arabuko-Sokoke Forest and the communities in these villages derive part of their livelihood from the forest. Community involvement will ensure that the residents living near the forest benefit from the resource and in return take a leading role in forest protection and conservation.

It is at times difficulties to reconcile conservation and production functions of the forest.

- Who should pay for conservation efforts? This is a major question, which any conservation agency should address. The local community may not understand the indirect benefits for the conservation. They need to be supported to meet their daily requirements for them to perceive the forest to be important for them.

There are some degraded areas in the forest that need rehabilitation eg the former Kaj Hansen sawmill that is colonised by *Lantana camara*.

- Time table for the workshops- Members suggested that a time table for the forthcoming workshop be prepared so that the participants can harmonise it with their other activities
- Suggestion to include roads at the edge of the forest in the GIS map and link them with the forest roads. The main Malindi – Kilifi road to be inserted in the map.
- The plan needs to be inter-institutional to ensure continuity
- Members inquired why the zonation workshop came before the other workshops. It was explained that the zonation workshop ideas are important in guiding the other workshops. It was also felt that if the zonation workshop is done last, it's likely to overturn the ideas made in the other workshops. An agreement was reached that the zonation workshop will give indicative zonation to guide other workshops. After all the other workshops are conducted, the zonation will be revisited considering the issues raised in various workshops

4.0 Group discussions for identified zones

The participants were divided into four groups with each group discussing a specific zone. Members were requested to join the group where they feel they have more interest.

Tasks for each group

- To define which criteria or criterion they used for zonation
- To shade the zone using one colour
- Describe the uses permitted in that specific zone
- Comment on areas of further investigation to fill the missing gaps
- Give recommendation on the zone
- Draw/define the criteria

Possible zones

Tourism: leader Mr. Mwavita

Members; Silas Mweri, Kabugi, Tsofa Mweni, 2 Chiefs

Biodiversity; leader Dr. Bennun

Members: Simon Wairungu, Sally Crook, Ann Robertson, Alex Mwalimu, Tom Omenda,

Commercial use: Leader Mr. Muchiri

Members; Paul Matiku, Roger Salford, Ndirangu, Harrison Oganda, Bernard Kivyatu, Sub Chief kakuyuni

Subsistence: Leader Mr. Mbuvi

Members; Nderitu, Mwakoro, Assistant Forester Jilore, Secretary DIFABA, Chief Ngerenya

Intervention; Leader Mr. Kaleb

Members; Jacklin Kiage, Enock Kanyanya, Washington Ayiamba, Chief Sokoke

4.1 Tourism zone

Criteria for zoning

- Potential bird watching areas
- View points e.g. Nyari view point
- Potential camp sites
- Threatened species (Plants and mammals)

The issue on tourism is how to provide tourist services while minimising the negative effects on the forest. There is overlap between the tourism zone and biodiversity zone

The areas identified for tourism include

- Sokoke water pools
- Nyali view points
- Nature reserve for Sokoke owls
- Nature walking trails
- Arabuko Sokki national park that can be converted into a community park
- View park at Mandunguni forest
- View parks outside the forest reserve

The group noted that Commercial fuelwood collection could negatively affect tourism.

Permissible activities in Tourism zone include;

- Sustainable utilisation of forest products
- Subsistence utilisation with proper controls

In the Eastern part of the forest, the subsistence zone should be lower than one kilometre owing to the unique mixed forest in the area

It is better to consider subsistence use in terms of area other than the distance from the reserve

4.2 Biodiversity zone - This zone could be considered as the non destructive zone

Criteria

- To include representation of all habitat types in Arabuko-Sokoke Forest
- To include area with the best closed canopy forest
- To include centres of abundance for threatened species
- To include other known key biodiversity areas e.g. pools
- Total area to be at least **20%** of the total forest area.
- This area to be used for non-extractive activities that would allow research and monitoring in the zones

The group proposed to have areas of destructive and non-destructive uses. However it was noted that these terminology need to be harmonised with the terms used in the New Forest bill to avoid confusion in their use.

The group Proposed to have **50%** of the forest under non-destructive use. The following uses are allowed in the non-destructive areas;

- Tourism
- Education
- Research/monitoring

- Transport network
- Recreation
- Bee keeping
- Controlled extraction of medicinal plants, butterflies, fruits and water

Nature reserve should be preserved. An additional nature reserve should be identified and established. These two areas should be set aside for strict protection. The site for the proposed nature reserve is shown in the map. Subsistence zone should not exceed one kilometre from the forest boundary otherwise it will interfere with biodiversity zone. Cynometra thicket is of less important to the biodiversity zone as compared to *Brastegia* and mixed forest.

The location of pilot PFM at Dida has a problem since this is an important Biodiversity zone.

4.3 Commercial use zone

Criteria

The criterion for defining this zone was based on uses e.g.

1. There were already *Casuarina* and *Eucalyptus* plantations that can be utilized for poles.
2. There were *Eucalyptus* plantations and indigenous fuelwood and dead fallen wood within ASF.
3. *A. Cunninghamii*, *Gmelina arborea*, *T. ivorensis*, *Azadiracta indica* could be used as timber. The timber plantations can also be used in rehabilitation zones so as to be able to earn revenue for the government and can create employment.
4. There were several alternative species that existed either in plantation or on the farms that could be used as curving wood. These include plantations of *Azadiracta indica*, *F. cycomonis*, *Gmelina arborea* and *Zyzipium schumunii*. These species could help in conservation of *Brachylaena huillensis*.
5. Commercial collection of medicinal herbs can lead to debarking of certain tree species causing dieback. However it requires some quantification to know the distribution of medicinal herbs, rate of removal and amount of revenue collected. The main areas of distribution of these plants in ASF need to be ascertained so as to demarcate areas of commercial importance.
6. There were areas in Jilore and Kaembeni which have a potential as a source of murrum, hence quarrying can be allowed as a commercial activity.
7. Commercial seed collection could also be done however there was need to investigate effects on natural regeneration e.g. *Azalia quanzensis* and areas where collection can be allowed.
8. Fodder grass collection during the dry season.
9. Kitsafu (*Encephatos hildenbrandtii*) has long been used for making of basket ropes and the areas of abundance could be delineated.

4.4 Subsistence use zone

Definition of subsistence use

Subsistence use refers to use of forest produce for domestic consumption. The forest produce include:

- Firewood
- Mushrooms
- Vegetable and fruits
- Water
- Building poles
- Medicine
- Grass
- Meat from wild animals
- Carving wood

The quantities removed should not compromise the biodiversity of the forest

Criteria for subsistence zone can be based on;

- Availability of the produce
- Forest type
- Can depend on other forest uses leading to trade off
- Safety of the persons collecting the materials
- The zone should not be more than 2 KM from the boarder
- Need flexibility depending on forest type and resources available.

Whichever criterion is chosen it must respect the regulations that are in force for managing the resource.

How boundaries will be recognised

- By use of forest roads, paths, tracks
- Land mark e.g. a hill, valleys, swamp,
- Artificial markers jointly agreed where necessary

How to monitor

How to measure quantities and removals

- Agreed self regulatory mechanisms
- In the process it can shift to allow recovery

Comments

1. Responsibility to be in the hands of forest associations
2. Where resources is restricted, possible alternatives will be explored through intervention zone
3. Drawing a map defining subsistence use zone
 - Resource distribution and area will not work

- Inadequate data –Participatory resource assessment required to be able to draw a proper map of the subsistence zone.

The group was unable to come up with clear zone for the use type but proposed that zonation can be done in terms of compartments.

There is need to create awareness in the tourism zone that certain subsistence use can be done like collection of medicinal plants.

4.5 Intervention zone

Criteria

a) Intervention area was defined as Sub-locations bordering the forest.

Reasons/justification for the zone

- To reduce local conflict and promote goodwill with community members
- Sub-locations are the existing administrative structures
- Population growth will bring more pressure to the forest.

b) User groups

- Commercial firewood dealers
- Need to work closely with local community eg FADA collecting the firewood and selling to the user groups

Activities in the intervention zone

1. Use of forest produce e.g. bee keeping and butterfly farming
2. Use of alternative modern technology to reduce forest use in the long run
 - Improved jikos
 - Alternative building materials
 - Use of forest for recreation purposes
3. Developing an Integrated Development and management Plan for the intervention zone to reduce dependence on the forest
 - Plan to be multidisciplinary including environmental, agriculture, health and water issues.
4. Problem Animal Control. Look at the possibility of electric fence to reduce damage to crops.
5. Develop an environmental Accounting System to be used in getting the value of the forest and in Environmental Impact Assessment baseline information
6. Participatory process for community empowerment
7. Environmental Awareness and Education for local community, schools and other organised groups
8. Develop regulations and guidelines on
 - Intellectual property rights

- Access to genetic resources/bioprospecting
- Traditional medicinal knowledge/ethnobotany
- Traditional and cultural rights
- Equitable sharing of benefits

9. Rehabilitation of degraded areas

- Rehabilitation of Arabuko Sokoke National park to a community park and camping site
- Rehabilitation of Mandunguni area that is prone to soil erosion

Overall objective in Intervention zone

- To reduce pressure of forest use
- Improve community livelihood
- Use forest for recreational purposes
- Improved forest condition

4.6 THE PILOT PFM 'ZONE'

This, for the time being can be called a Zone. However it has to be looked into with the hindsight of the subsistence and commercial utilization zones respectively. As earlier described (section A 4.3.1) this 'zone' is awaiting operationalization where the surrounding Dida Sublocation community will actively participate in managing the Forest (*see Figure 7*). It is expected that this will provide important lessons that will be extrapolated to the rest of the Forest as well as other similar forests in Kenya. It is the first time this is being carried out in Kenya and will be a very crucial process in defining future management of Kenyan Indigenous forests.

4.7 REHABILITATION ZONES

Currently there are scattered areas within the forest that need to be rehabilitated through enrichment planting or restocking. Demarcating or zoning these areas has not been easy due to the way they are scattered. However the harvested plantation zones will be considered as potential sites for rehabilitation. The areas where Kaj Hansen Ltd. extracted timber and had a large village (*see Figure 8 and section C 1.1 para.2*) have no records of any rehabilitation that was done. Today the area is heavily colonized by *Lantana camara*, an invasive species. Other areas are around North East of ASF (Shela, Kaliapapo and Kakuyuni) where there was Arabuko Sokoke Sawmill; that clear fell a part of the forest but never planted any trees. Also to the East there is section which was cleared by Mida Sawmills and then abandoned. The same fate befell a section of the forest to the South (around Sokoke). This could be the other area to be considered for rehabilitation.

5.0 Plenary discussions for all zones

Tourism and Biodiversity zones have a lot of overlap but within the tourism zone, a nature reserve should be established. Further discussions should be done during respective thematic workshops to see whether the zones could be merged.

Proposal by the biodiversity zone to set up a no use zone around Kararacha can create political problem since the area has had pressure for excision. Excluding the community from utilising the forest resource will increase the pressure for excision.

The location of PFM in Dida is not well suited from biodiversity perspective. The area has high biodiversity value and this means that the initiatives with community have to ensure that these values are not lost.

Forest plantation development in coast province can assist in conserving the remaining natural forests. However such plantations should be established in areas where plantation have been tried in the past and in degraded areas. Natural forest should not be converted into plantation. More emphasis should be put to plant wood carving species that will act as alternative to the current use of Brachyleana.

The potential supply of firewood from the forest is low according to the recent inventory data. One way of meeting community demand for firewood is to promote tree planting in the intervention zone

The one kilometre subsistence zone is not practical. One way of solving this problem is for the community to come up with forest user maps in which they will visualise how they use the forest and the extent they move to get various products. The community need too identify species preferred for firewood

There is a need for trade-off between the biodiversity and subsistence zone. In some areas the community can allow biodiversity zone to extend to the end of the forest while in some other parts the community can extend their subsistence zone beyond the stipulated distance. Skip and compensate policy

Population increase can affect the sustainability of resource use. The planning should take into consideration the population increase during the planning period.

The definition of forest adjacent community was agreed to include the sublocations neighbouring the forest. Some members felt that sublocation is a big area. However, considering the long term nature of the plan, the sublocation was considered adequate since the community members impacting on the forest will continue increasing.

6.0 Action points

1. Community forest user maps should be done to cover the entire forest. The exercise will tap information on how the communities perceive the forest and the extent to which they use the forest.
2. The criteria to be used in zonation should be developed for each zone and be harmonised for the whole forest.
3. There is urgent need to identify criteria for the subsistence use and the Dida pilot area. This will guide in developing operation plans for the forest prior to implementation of PFM
4. The terms and definitions used in the plan need to be harmonised with the ones used in the forest act
5. Natural regeneration should be expanded
6. Map showing the geographical features should be prepared
7. Baseline survey should be conducted to collect data that will be used in management
8. There is need to share information that will assist in developing of the plan
9. Maps will be produced based on the workshop proceedings. These maps will be fed to the other workshops