



# The Arc Journal

## Tanzania Forest Conservation Group

P.O.Box 23410, Dar es Salaam, Tanzania e-mail: [tfcg@tfcg.or.tz](mailto:tfcg@tfcg.or.tz)

Biannual Newsletter Issue No. 28

June 2013

ISSN 0856-8715

## Special Edition on Tanzania's Coastal forests

### Where are Tanzania's coastal forests and why are they important?

**S**mall patches of lowland rainforest are found all along the coastal strip of Tanzania. Often embedded within larger areas of coastal miombo woodland, the forest patches support an amazing diversity of animals and plants. Thousands of these species are only found here, and large numbers face becoming extinct according to the global 'red list' of threatened species.

The need for charcoal, firewood, timber, building poles and land continues to put pressure on forest resources, and these pressures are especially intense close to urban areas – especially Dar es Salaam. Exploitation of almost

all forest products within 50-200km of major urban centers is highly unsustainable.

Reserved areas have provided some buffering against the strong pressures from people for forest products, but many reserves are now heavily degraded. In more remote areas of the coast, for example from Rufiji to Lindi, larger areas of forest and woodland remain. Here sustainable community-controlled harvesting of high value timber, REDD and the creation of village managed reserves are being promoted as conservation strategies that are delivering tangible economic benefits.

Find out more about the biodiversity and conservation of Tanzania's Coastal Forests



# TFCG News

## **New projects launched in the South Pare Mountains and South Nguru Mountains with funding from the European Union**

**W**ith funding from the European Union, TFCG has started to implement two new projects in the Eastern Arc Mountains. The 'Adding Value to the Arc' project aims to strengthen participatory forest management and sustainable economic development around the South Nguru Mountains. The 5 year project will work with 31 villages in Mvomero District to engage in joint and / or community-based forest management. The project is a partnership with MJUMITA, Mvomero District Council and the Tanzania Forest Service.

In the South Pare Mountains, the 'Sustainable management of Chome Nature Reserve' project will operate for 3.5 years to establish joint forest management around Chome Nature Reserve and to improve water resources management. The project is a partnership with ONGAWA, Same District Council and the Tanzania Forest Service. In addition to participatory forest management, it includes support for improved water facilities; and training on livelihood activities including agriculture and eco-tourism.

## **Building linkages between climate change adaptation and REDD through climate smart small-scale agriculture**

In October 2012, TFCG launched the Climate Change, Agriculture and Poverty Alleviation project

in partnership with ActionAid, MJUMITA, MVIWATA and the Tanzania Organic Agriculture Movement. The project is financed through the Accountability in Tanzania programme and aims to reduce poverty amongst small-scale farmers in Tanzania and to reduce greenhouse gas emissions from agriculture through the widespread adoption of climate resilient, low emission agricultural practices. As well as advocating for more pro-poor and climate change compatible agriculture policy and policy implementation, the project is demonstrating climate smart small-scale agriculture in montane villages in Kilosa and dryland villages in Chamwino District.



*Training farmers on planting basins for soil moisture conservation in Kilosa District*

## **Sustainable charcoal production underway in Kilosa Village Forest Reserves**

TFCG's Sustainable Charcoal project has begun to produce charcoal from village forest reserves according to a sustainable harvesting plan and using efficient kilns. The project aims to channel revenues to charcoal producing communities in order to incentivise the sustainable management of their village forest reserves. Following an analysis of the current charcoal market by an external consultant and extensive consultation with the communities and other stakeholders, the project is developing and



testing guidelines on the integration of sustainable charcoal harvesting into community based forest management. The project is also advocating for a fairer share of the value of the charcoal to remain with the communities by reducing the burden of fees and taxes that accumulate between the producer and the point of sale. The project is financed by the Swiss Agency for Development Cooperation



*Trainees from Ulaya Mbuyuni village learn about the benefits of improved basic earth kilns for charcoal production.*

### Conservation agriculture brings benefits to farmers and the environment

TFCG has been providing training and support for farmers in over 40 villages in Lindi, Kilosa, Mpwapwa, Korogwe and Lushoto Districts. Following evaluations of the uptake and impact of the approach, it is clear that farmers are increasingly willing to adopt at least some of the conservation agriculture techniques. Conservation agriculture covers a range of agricultural practices that aim to minimize soil disturbance; maintain permanent organic soil cover; and diversify crop rotations with a view to conserving soil fertility, structure and moisture. Almost all of the farmers who have applied the techniques have enjoyed increased yields and there is growing demand in these five districts for training on conservation agriculture.

### New Generation Watershed project in Korogwe and Lushoto Districts

With support from Gorta, TFCG has been assisting communities in the West Usambaras to benefit more from the Eastern Arc Mountain forests' water ecosystem services. By installing water delivery points such as this hand pump at Chumbageni (see photo), the communities who are conserving the watershed can benefit even more from the conservation of the catchment forests. This pump is expected to serve about 1120 water users living around Kwabosa village. The water users have been trained on participatory water resources management and water user groups have been established to maintain the water delivery

infrastructure. Gorta have recently renewed their support to TFCG through a new 3 year project which will also encourage an exchange of experience on watershed management between stakeholders in East, West and Southern Africa.



*Water starts to flow from the new hand pump constructed by TFCG in Kwabosa Village in the West Usambara Mountains.*

### TFCG celebrates World Environment Day in Mufindi District

Actors, poets and artists came together on World Environment Day in Mufindi District to celebrate the Eastern Arc Mountain Forests. With funding from the Critical Ecosystem Partnership Fund, community members and local leaders came together to discuss the importance of conserving the Udzungwa Mountain forests and renewing commitments to work more closely together to tackle the challenges of illegal logging and hunting in the area.

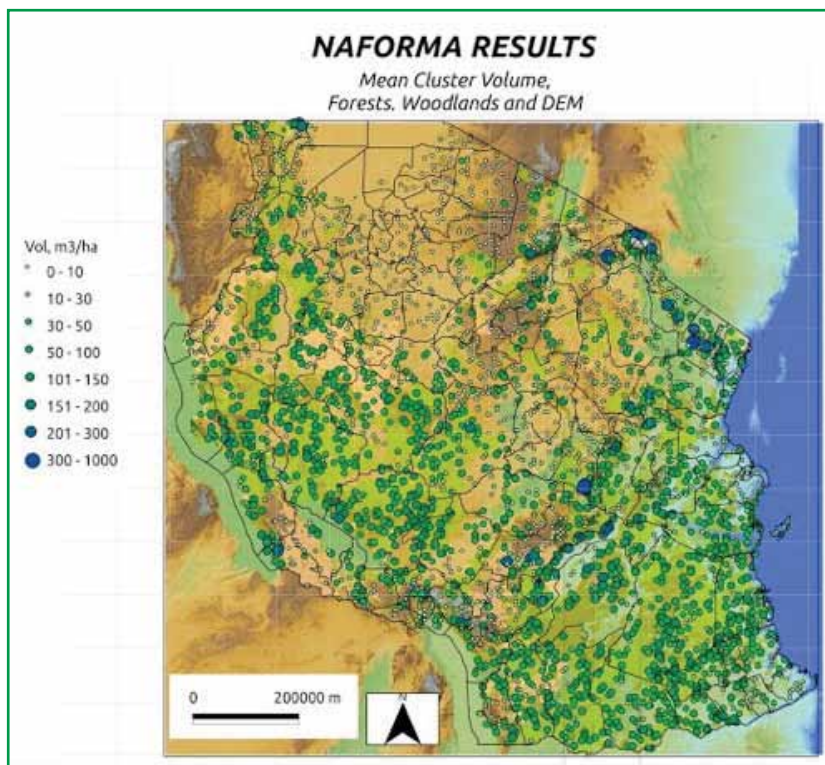


*Local artists sing about the importance of conserving forests during World Environment Day celebrations in 2013. Photo by Elisha Pallangyo*

### Updates to the Coastal Forest website

TFCG's coastal forest website has over 200 publications about the coastal forests of Tanzania, Kenya and Mozambique. With support from CEPF, we have been adding new publications. Take a look at our publications page to get the latest research and news on the East African Coastal Forests. If you have reports that you would like to post there, please contact [tfcg@tfcg.or.tz](mailto:tfcg@tfcg.or.tz)

# News of the Arc



## Tanzania launches its National REDD strategy

The Government of Tanzania endorsed and officially launched the National REDD strategy in March 2013. The strategy aims to facilitate well coordinated and effective implementation of REDD+ related policies, processes and activities so as to contribute to the climate change agenda and overall sustainable human development. The strategy reflects some of the lessons learned from a series of REDD pilot projects being led by non-governmental organisations across Tanzania, including the Tanzania Forest Conservation Group [www.tfcg.org/MakingREDDWork.html](http://www.tfcg.org/MakingREDDWork.html). In August 2012, an external review of these pilot projects was published by Deloitte and is available from the TFCG website. Overall the review demonstrates the value of piloting REDD in terms of testing policy issues on the ground and channelling that experience into the development of the National REDD strategy.

## National Forest Resources Monitoring and Assessment (NAFORMA) programme completes its data collection

With the completion of the data gathering phase, the National Forest Resources Monitoring and

Assessment programme has begun to communicate the results of the assessment to stakeholders. The data is now stored on a database held by the Tanzania Forest Service. The data is intended to enable the Ministry of Natural Resources and Tourism to make informed decisions to promote sustainable forest management. Despite pressure from some stakeholders to make the data freely available, access to the data is still restricted. Stakeholders are now being invited to comment on how the data can be made accessible and available to decision makers.

## New reports available from the Valuing the Arc project

New publications are now available from the Valuing the Arc Project <http://www.valuingthearc.org>

The project has generated over 60 publications looking at a range of issues related to forest values, conservation and threats in the Eastern Arc Mountains and Coastal Forests.

## A new information management system for the coastal forests

By Adam Kijazi

One of the challenges of managing the coastal forest resources is the availability of reliable information at the location of management decisions. In an effort to provide accurate data to the management authorities, UNDP employed a consultant to take the information from the various coastal forest baseline reports on reserves, management effectiveness, species data, budgets etc and put these together within a single computer system. This work was completed and an information management system was delivered to TFS on the mainland in 2012.

The system will enable the Tanzania Forest Service and other forests stakeholders to maintain up to date information on the coastal forests of Tanzania. The system can be used as a tool for monitoring, assessment and decision making.



# Tanzania is losing its biodiversity-rich Coastal Forests

## Deforestation in Tanzania's Coastal Forests

*By Japhet Kashiagili, Boniface Mbilinyi, Karyn Tabor, Jaclyn Hall, Isaac Malugu, Peter Sumbi, Adam Kijazi and Neil D. Burgess*

Over periods of millions of years the area of forest along the Eastern African coast increased and declined in accordance with patterns in the regional climate and local weather. One of the major drivers of historical forest change will have been the incidence and intensity of natural fires. Coastal high forest is an evergreen to semi-evergreen habitat type where the trees and bushes are ill-adapted to fire. Unlike the surrounding miombo woodlands which are fire prone with fire resistant and fire adapted species, most coastal high forest species die if fires burn them. In drier climatic periods fire incidence, will have gone up and forest would have declined, and in wetter periods there would have been less fire and the forest would have expanded.

More recently the dynamic change between forest and woodland habitats according to climatic fluctuations, has been accentuated by the setting of fires and the clearance of forest habitats for agriculture

by humans. The impact on forest area from human activities over tens of millennia is presumed to have been significant, albeit dynamic with periods of intense and less intense impact.

### Recent changes in forest area

In a recent study of changes in forest area in the coastal regions of Tanzania, the remaining cover and carbon stock of Tanzania's coastal forests and the CO<sub>2</sub> emissions due to forest loss between c. 1990 and c. 2007 were estimated. The study found that Coastal Tanzania contained over 273 700 ha of forest in 2007. Deforestation rates in the area have slowed from 1.0 % yr<sup>-1</sup>, or > 3735 ha yr<sup>-1</sup> during the 1990s, to 0.4 % yr<sup>-1</sup>, or > 1233 ha yr<sup>-1</sup> during 2000–2007. Despite lower deforestation rates in 2000–2007, the percentage forest lost from within reserved areas has remained steady at 0.2 % yr<sup>-1</sup> for both time periods.

Table 1. Deforestation in coastal Tanzania between 2000 and 2007 within and outside reserves

	Forest loss		
	Total (km <sup>2</sup> )	Km <sup>2</sup> per year	Rate (%) per year
Within protected areas	41	6	0.14
Outside protected areas	933	133	0.61

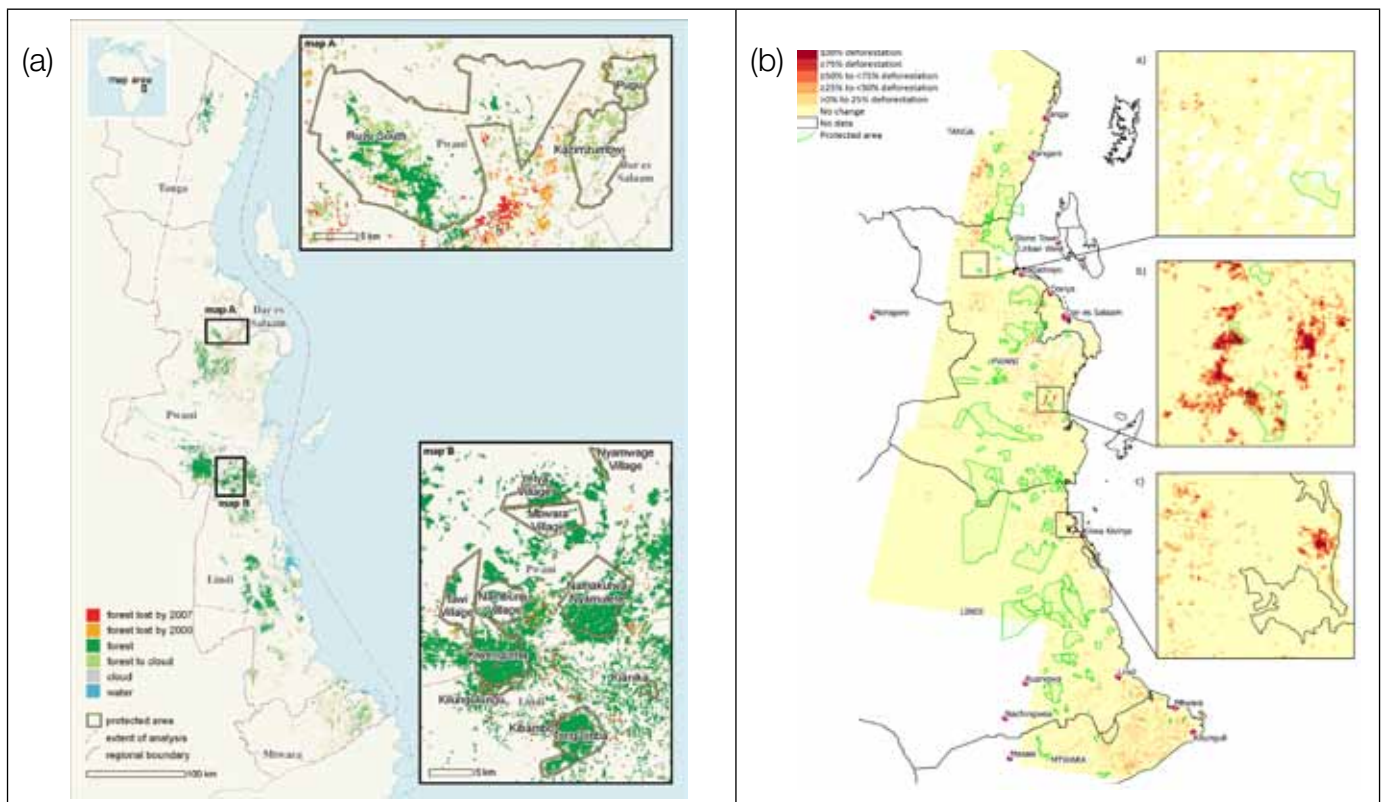


Figure 1 a) The extent of the coastal forests of Tanzania and Kenya, and forest cover change between 1990–2000. The two map insets detail patterns of deforestation from 1990–2000 in Coastal Kenya (map 1) and East Usambaras (map 2). b) Forest change analysis between 1990 - 2007 across coastal Tanzania with 3 insets

### Forest degradation

In addition to forest loss, many remaining areas of forest have been heavily degraded through different kinds of human use. These uses are primarily cutting of trees and shrubs for use as timber, building poles, withies, firewood, and for the production of charcoal. All forests close to major coastal cities, such as Dar es Salaam, are heavily used. This includes forests managed by Central Government and Local Government. Forests within Game Reserves and National Parks are, on the other hand, relatively intact. Village Land forest reserves also seem to suffer less from intense degradation than other forested areas.

### Focus on the area around Dar

The last Arc Journal (27) showed that loss of forest cover is proceeding rapidly in the region around Dar es Salaam, with Ruvu South Forest Reserve now bearing the brunt of the loss and conversion to charcoal to fuel the city. This is the continuation

of a trend where Pande (now recovering), Vikindu, Pugu, Kazimzumbwi and Masanganya have been sequentially targeted for charcoal production and have become degraded to thickets and grassland.

### Focus in the East Usambaras

The East Usambara forests are subjected to very different deforestation processes. Instead of the driver being charcoal production for a huge urban area, the conversion of forest is due to agricultural expansion in the lowlands and uplands. Between 2000 and 2010 considerable areas of lowland (coastal) forest and woodland were converted to agriculture in the East Usambaras (Figure 2), and this loss is continuing. Conservation efforts include improved agricultural practices to minimise the need for new farmland, working with villages to set aside key areas of forest land for sustainable production of woody materials for local use, and trying to maintain corridors between the remaining forests that can facilitate dispersal of forest species.



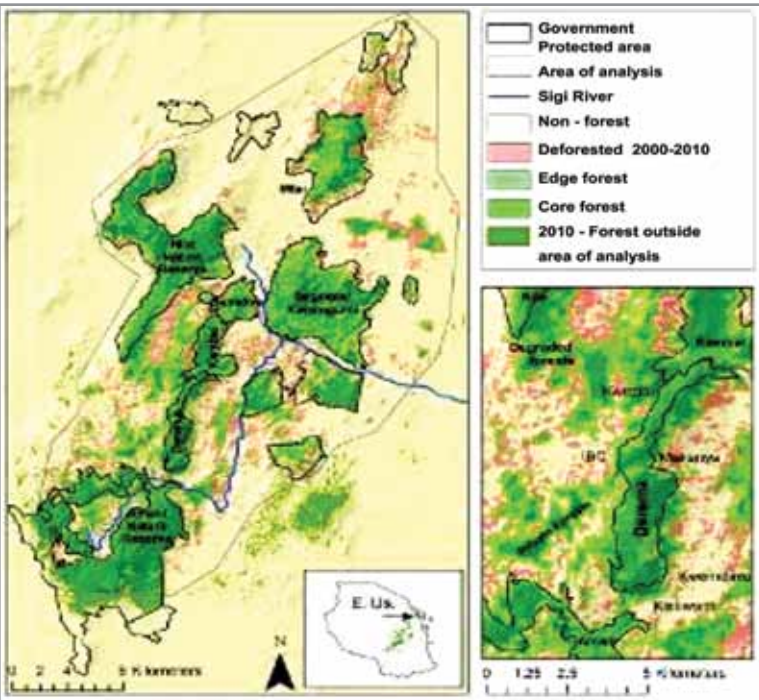


Figure 2: Map showing the remaining forests (in green), reserved areas, and regions of forest loss (in pink) in the East Usambara Mountains 2000-2010

### Focus on the southern Tanzanian Districts

Rates of forest loss and degradation in the districts of Rufiji, Kilwa and Lindi (especially Kilwa) are low and large areas of forest and woodland remain. These forest areas are used by elephants, lions, and even wild dogs. Forests in Rufiji district are affected by the logging of high value timber, which peaked in 2003, but still continues. Legal logging is an important source of revenue for the district and villages; but illegal logging is widespread in reserves and non-reserved land. In Kilwa district, survey teams in 2011 discovered considerable logging of high value timber (including African black wood, *Dalbergia melanoxylon*) and *Pterocarpus angolensis* (red wood) taking place within national forest reserves. The timber from *Pterocarpus* is heavily demanded for sale in Dar es Salaam, as well as Zanzibar, and it may also be being exported. In Lindi, human population densities are higher, and there is greater pressure on the remaining forest and woodland areas to provide farmland, and there is high pressure on remaining forest resources, and encroachment into the edges of forest reserves.



TFCG chairman and Mpingo logs outside Mavuji village, Kilwa district.

### Focus on Zanzibar (Pemba and Unguja)

Detailed forest change analysis is not available for Zanzibar, largely due to persistent cloud cover over these islands. More than 1.3 million people live on Zanzibar. Woodfuel demand is high to supply Stone Town, the local rural population, and tourist hotels. Despite tree planting programmes in many areas, regions of remaining forest on the island continue to be heavily degraded. For example, the Muyuni area to the south of Jozani national park on Unguja has gone from forest trees with an open understory, to a dense thicket, in less than 20 years. Cutting of poles for firewood continues, with the main market being Stone Town. On Pemba natural forest patches outside the reserves in the north (Ngezi, Msitu Mkuu, Ras Kiunyi) are few and scattered



Wood harvesting on Unguja from Muyuni proposed forest reserve

In conclusion, recent work on forest cover mapping and field work in the Tanzanian coastal forests shows a general declining trend of forest area and condition, especially close to cities. In more remote areas considerable forest and woodland resources remain, however the reach of resource extraction to supply the needs of Dar es Salaam is expanding. Reserves are shown to be at least partially successful at preventing forest loss, with village land forest reserves becoming ever more important in terms of their coverage of important forest areas.

*Rondo galago, Galagoides rondoensis is a critically endangered nocturnal galago only found in 7 Tanzanian Coastal Forests*



# Tanzania's Coastal Forests are a Biodiversity Hotspot

*By Kim Howell, Charles Msuya, Andrew Perkin, Willirk Ngalasson, Phil Clarke, Roy Gereau, Frank Mbago, Cosmos Mligo, Andrew Williams and Neil D. Burgess*

**T**anzanian coastal forests contain large numbers of endemic and threatened species of plants and animals. Past syntheses of available data have resulted in these forests being categorised as a 'global biodiversity hotspot' for their species assemblage.

Recent work has updated the number of species that are known to be found only in these forests and how many of these are on the IUCN red list of threatened species. This includes the forests of the mainland of Tanzania and also on the offshore islands of Pemba, Unguja and Mafia.

In addition, targeted field work has been undertaken in the forests of Rufiji, Kilwa and Lindi districts to study poorly known forests. This new field work aimed to determine if rare and threatened species were found in these forests. And there was a specific aim to search for any remaining populations of two species of trees that were regarded as 'Extinct' or 'Possibly Extinct' on the IUCN Red List of threatened species.

## Endemic and threatened species

Current knowledge (summarised in Table 1) shows that the Coastal Forests in eastern Africa support numerous endemic species of vertebrates (15 birds, 12 mammals, 5 amphibians, perhaps as many as 70 reptiles) and more than 1,500 endemic species of plants if we count forest and non-forest species. It is very hard to give precise statistics on the number of these endemics within different forests, especially for plants, as records are not fully compiled and new specimens and records are being found every few years, which changes the statistics. Defining precisely the species known only from the Tanzanian coastal forests is also complicated by difficulties of deciding if a species is found only in lowland coastal forests or also exists in the adjacent (and often adjoining) Eastern Arc forests. We have not considered invertebrate species as data are too poorly compiled, although we know that many species are found only in coastal forests.



Table 1 –Summary of vertebrate species endemic to coastal forests or woodland mosaic habitats within the coastal area of Kenya and Tanzania

Species	
<b>BIRDS</b>	<b>MAMMALS</b>
Sokoke Scops Owl <i>Otus ireneae</i>	Pemba Fruit Bat <i>Pteropus voeltzkowii</i>
Sokoke Pipit <i>Anthus sokokensis</i>	Aders Duiker <i>Cephalophus adersi</i>
Little Yellow Flycatcher <i>Erythrocerus holochlorus</i>	Golden rumped Elephant Shrew <i>Rhynchocyon chrysopygus</i>
Clarke's Weaver <i>Ploceus golandii</i>	Rondo Galago <i>Galagoides rondoensis</i>
Reichenows Batis <i>Batis reichenowi</i>	Four new Shrews ( <i>Crociodura</i> spp)
Pemba Scops Owl <i>Otus pembanensis</i>	Tana River Mangabey <i>Cercocebus galeritus</i>
Pemba Green Pigeon <i>Treron pembaensis</i>	Tana River Red Colobus <i>Procolobus rufomitratu</i>
Pemba White Eye <i>Zosterops vaughani</i>	Bat <i>Chalinolobus kenyacola</i>
Pemba Sunbird <i>Nectarinia pembae</i>	Zanzibar Red Colobus <i>Procolobus kirkii</i>
Malindi Pipit <i>Anthus melindae</i>	<b>AMPHIBIANS</b>
Scaly Babbler <i>Turdoides squamatus</i>	<i>Mertensophryne micranotis</i>
Tana River Cisticola <i>Cisticola restrictus</i>	<i>Mertensophryne howelli</i>
Violet-breasted Sunbird <i>Nectarinia chalconelas</i>	<i>Stephopaedes loveridgei</i>
Lesser Seed Cracker <i>Pyrenestes minor</i>	<i>Stephopaedes usambarensis</i>
Mouse-coloured Sunbird <i>Nectarinia verouxii</i>	<i>Afraxalus sylvaticus</i>
	<i>Hyperolius rubrovermiculatus</i>

The majority of the species of vertebrates endemic to these forests are also threatened according to the IUCN red list. This includes 13 threatened mammals, 10 birds, 3 amphibians and 2 reptiles (although reptiles have not fully been assessed). The main threats are the small extent of remaining habitat and the ongoing loss and degradation of the remaining forest areas. However, some of the large species of mammals in particular (for example elephant, rhinoceros, lion and hippopotamus) are threatened through being hunted.

In terms of plants, although the IUCN red list has not yet been updated with full details, it is also known that around 50% of the 500 plants that are endemic to the coastal forests are also threatened; with current information on the IUCN red list website suggesting that 2 species of plants are extinct or possibly extinct, 5 are critically endangered, 28 are endangered and 64 are vulnerable to extinction. The plants are threatened due to many of the same processes as threaten the animals – the small area of remaining habitat and the ongoing loss of the forest habitat within the matrix of various habitats types along the coast.



This is an Azure Hairstreak (*Hemioleus* sp.) that was recently photographed at the Pugu Hills. 97 different butterfly species were seen over the course of a single day, including several East African coastal endemics such as the Gold-Banded Forester (*Euphaedra neophron*), the Forest Queen (*Euxanthe wakefieldi*) and the Spotted Sylph (*Astictopterus stellata*). This forest is likely to contain over 200 butterfly species. Photo by Dino Martins'



*Zanzibar red colobus monkey in Jozani Forest, Unguja*



*Mertensophryne micranotis from Pande Game Reserve. This species is endemic to the Eastern African Coastal Forests*

### Focus on offshore islands

The islands of Zanzibar (Pemba and Unjuga) are biologically distinct and support a number of endemic species. Best known of these are the Zanzibar red colobus (see Picture), the four endemic birds and fruit bat on Pemba and newly described species of amphibians in the Jozani forest on Unguja. These species are not only of interest in their own right, but the colobus monkey in particular is the main draw for tourists to the Jozani National Park, which makes a significant financial contribution to the economy of the country. In total around 120,000 international tourists visited Zanzibar in 2006. Smaller numbers of tourists also seek out the Pemba Fruit Bat and the endemic birds of Pemba Island.

### Focus on Southern Tanzanian districts

Field work in 2011 / 2012 has shown that the forest areas of Rufiji, Kilwa and Lindi contain considerable biological values. Some of these values were already known and provided the basis for the conservation investment into the area. For example the Rondo

forest area contains important assemblages of plants and animals within a well conserved area of natural forest. Due to these values the area is in the process of being upgraded to the status of Nature Reserve.

Elsewhere the most interesting new findings were in the forest and woodlands of Kilwa District. Here the team re-confirmed the location of two species of trees that had been regarded as extinct. *Erythrina schleibonii* and *Karomia gigas* were the two species of concern (see Photos) and the *Erythrina* has recently been given the dubious honour of being one of the 100 most threatened species on the planet, with fewer than 50 individuals known to remain, and in an unprotected location. The *Karomia* is found within a forest reserve where there is considerable evidence of logging, but the wood of this tree is not valued as timber and hence it is not being targeted for that purpose. However, the tree does seem to be confined to the few remaining patches of semi-evergreen forest on the higher points of the reserve where it has been found, and hence may be intolerant of regular burning.





Photos: *Erythrina schleibeni* seed pod and seeds



*Karomia gigas* tree in situ in the dry season. Example of the dried flower/fruit and the stem of the small tree (together with the TFCG chairman John Salehe and a local villager who knew the location of the tree)

### Areas of intense threat to biodiversity

As has been noted in recent issues of the Arc Journal, some of the remaining coastal forest patches, especially close to Dar es Salaam face intense threats and what was forest cover some 10-20 years ago, is now low thicket. It is not known whether the endemic and threatened species previously recorded in these forests still remain, for example in the Pugu and Kazimzumbwi forests. Levels of forest loss and degradation in other remaining patches of forest may also be impacting biological values, but quantitative data are largely lacking and hence we are not sure whether the list of endemic and threatened species we present at the start of this report is still accurate.

### Further information

Howell et al. (2012). Biodiversity Surveys of Poorly Known Coastal Forests of Southeastern Tanzania and Zanzibar. <http://cf.tfcg.org/publications.html>





Coastal Forest within  
the proposed Rondo  
Nature Reserve. Photo  
by Andrew Perkin.

# How are Coastal Forests being protected?

## The coastal forest reserve network and its management

Neil D. Burgess, Isaac Malugu, Nicholas Kinyau, Peter Sumbi, Adam Kijazi, Richard Komba, Paul Harrison, James Lazier, Andrew Williams and Zawadi Mbwambo

**P**rotected Areas are one of the most important conservation interventions, and available evidence (also from the coastal forests in Tanzania) shows that protection status reduces the rate of loss of forest habitat, and maintains (or at least slows the decline) of species compared with areas outside the protected area network. As such, there has been considerable focus on the development of protected area networks within all nations of the world, with the current Aichi targets under the CBD encouraging countries to achieve the following: *By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes.*

### Management of the reserve network

The reserve network in the coastal districts of Tanzania comes under various designations and management regimes. On the mainland the central government is managing the Sadaani National Park (managed by TANAPA) and the Selous and Pande Game Reserves (managed by the Wildlife Division), and has devolved management of a large number of central government forest reserves to the districts, who are also managing their own set of local authority forest reserves (see Figure 1). Central government forestry services are managing directly the mangrove forest reserves and the proposed Rondo Nature Reserve and central government plantation project on the Rondo Plateau. In addition there are an increasing number of locally managed Village land Forest reserves that are under the direct management of the village government, and a wildlife management area on the border of the Selous Game reserve, that is collectively managed by a village level 'Authorised Authority'.



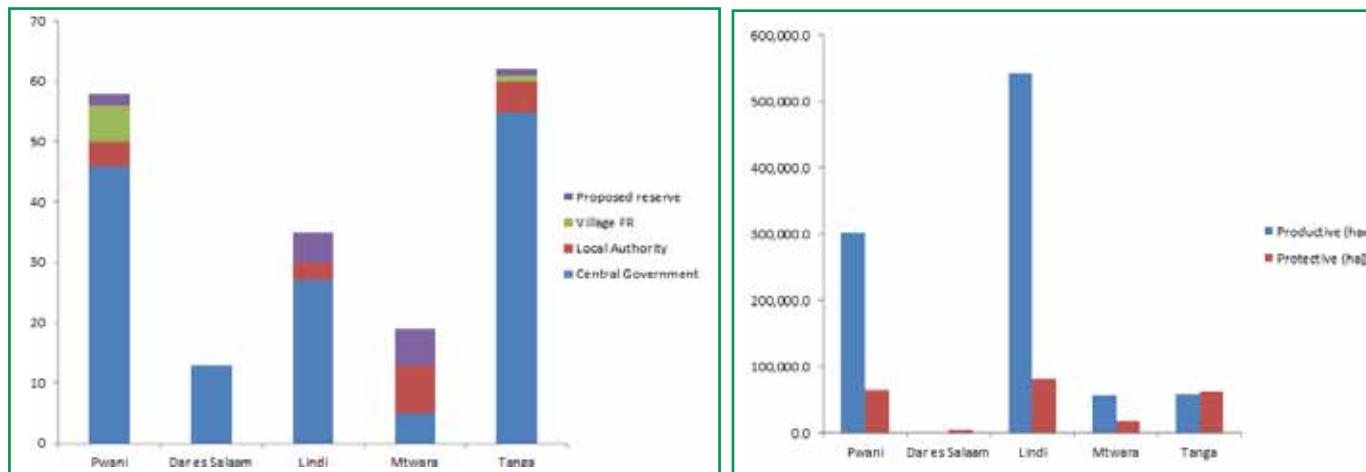


Figure 1. Number (left) and area in hectares (right) of forest reserves of various types in the coastal districts within 5 regions of Tanzania.

One of the challenges of reserve management in the area is that the forest reserves that are under central government ownership have been devolved to district levels for management, but with no resources allocated for the management from either central or local government. In the main these reserves have become a form of no-mans land where exploitation for timber harvesting and charcoal production has proceeded. Only where project support has been provided, or the reserves are very remote, has the forest remained in good condition.

A clarification of the management situation in these central government forest reserves is being addressed by the UNDP GEF Coastal Forest project through the development and signing of Memoranda of Understanding between the national government, Tanzania Forest Service, and the local Government District Councils over the joint responsibilities for the management of these reserves. So far MOUs have been signed in the four Districts in Tanga Region, and are being progressed in the four districts of Coast Region.

### How effectively managed are these reserves?

The number and area of reserves in coastal Tanzania is one measure of how well conserved the forests and biodiversity of the area is. But these measures do not tell anything about the actual effectiveness of the reserves on the ground. Effectiveness can be measured in various ways, ranging from the inputs that are provided for the management of the reserves (budgets, plans, staffing, boundaries), through to the actual outcomes in terms of habitat status, species

populations, benefits provided to surrounding communities, etc.

### Effectiveness in terms of inputs to reserves

We have compiled management effectiveness data using the Management Effectiveness Tracking Tool (METT) for 146 sites across mainland Tanzania and Zanzibar. A summary of the results of these assessments (Figure 2) shows that the best managed reserves according to the data collected by the METT are the national parks and village land forest reserves. The least well managed reserves are the national forest reserves, which are similar in management effectiveness to the proposed reserves in the coastal region. This is likely to be because the national forest reserves have been left without management input for many years and hence are scarcely being managed at the present time. Reasonably good management is found in the Game Reserves, Nature Reserves and Local Authority Forest Reserves.

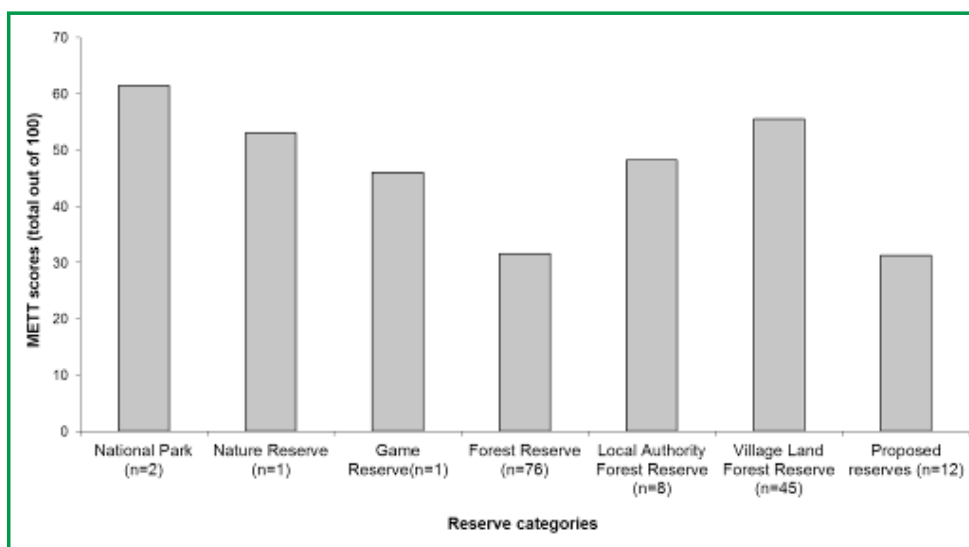


Figure 2: Mean management effectiveness scores for different categories of reserve (146 reserves in total) within the coastal districts of Tanzania and Zanzibar

Overall reasons for the poor scoring of the forest reserves are due to factors such as: poor to no budgets, few to no staff, no management plans and reserve boundaries poorly marked in many reserves. These challenges arise from the weak financial position of the management agencies; this is despite the fact that the reserves generate financial revenue from timber, charcoal, building poles and other minor forest products. But these values are not being captured by the reserve managers. At best the revenues are being used to support the budgets of the district government, and at worst they are providing illegal benefits to a few powerful individuals. As such the METT tool provides a good overview of the management challenges facing the protected area network in the coastal forests.

### Effectiveness in terms of outcomes of the reserves

Outcomes for the reserves in the coastal districts can be measured in terms of forests conserved, species populations maintained, and benefits accruing to national, district or local stakeholders. In terms of habitats conserved, the forest change analysis has shown that the reserve network has been four times better than unprotected land at preventing the conversion of forest to other land uses (mainly agriculture). The reserve network has, using evidence from studies on forest condition, been less effective at controlling the use of the forest and condition in all reserves close to major urban areas has declined as biomass has been used for building and fuel by urban dwellers. The evidence

base for outcomes of the reserves in terms of species conserved and populations maintained is less concrete, with few forests having been studied in the past and recently to assess if the known species remain, or to discover their population status or trends. In some of the most degraded reserves close to Dar es Salaam some obvious forest species like black and white colobus monkeys have been lost in the past 20 years.

### Monitoring the future

Now that we have gathered management effectiveness data and forest change data there is a good baseline for measuring the levels of management input and the impact of the protected area network on outcomes such as habitat cover and condition. In terms of benefits to communities, this will be a longer task to investigate, but this will be important to measure and monitor, especially from the village land forest reserves that are designed to specifically provide control at the local level and where benefits can also remain at that level.

### Further reading:

Shemdoe and Abdalah 2011. Socio-economic baseline and benefits for selected Coastal Forest landscape in Tanzania. <http://cf.tfcg.org/publications.html>

Kilimanyika 2011. Management effectiveness assessment of 146 reserves within coastal Tanzania. GEF project report. <http://cf.tfcg.org/publications.html>



*Village protected forest in the Mavuji gorge, Kilwa district.*



# Update from the field – status of Pugu and Kazimzumbwi in 2011 and 2012.

By Nike Doggart, Justine Gwegime, Moses Mwangoka and Elia Mulungu

**A**mong the most famous coastal forests in Tanzania are Pugu and Kazimzumbwi, two forest reserves which lie on the outskirts of Dar es Salaam. These forests represent the main water catchments for the Msimbazi, Kimani, Nzasa and Nyeburu Rivers. They offer enormous potential for education and recreation for the citizens of Dar es Salaam.

As part of the Forest Justice in Tanzania project, TFCG has been carrying out biodiversity and forest condition surveys in selected forests in the Eastern Arc Mountains and Coastal Forests. The overall aims of the surveys are to document the biodiversity value of the forests and to assess levels of human resource use and disturbance.

The results of the surveys in Pugu and Kazimzumbwi have been published recently in a report now available online at: <http://www.tfcg.org/publications.html>. The surveys were conducted over 17 days in 2011 and 14 days in 2012 in Pugu and Kazimzumbwi Forest Reserves. Surveys focused on recording the forests' plants and birds, and the extent and intensity of human disturbance.

## Plants

In total, 343 plant species in 234 genera and 70 families were recorded during the botanical surveys, conducted at four sites including Buyuni, a recently cleared site in Kazimzumbwi forest and three sites in Pugu: Mambisi and Pugu Relini, historically and recently deforested; Pugu Dunda and Kimani, recently degraded and being cleared; and Pugu Mpakani and Minaki Bwawani in less disturbed forest. Of these four sites, Buyuni had the most distinct species assemblage, while the three sites in Pugu had many species in common. The most species-rich site, with 260 species, was the less disturbed forest at Pugu Mpakani and Minaki Bwawani. Of the plant species recorded, 18 are IUCN Red-Listed species above the category "Least Concern" with four Near Threatened, ten Vulnerable, three Endangered, and one Critically Endangered species.

## Birds

Despite the high rates of disturbance over the past 20 years, these forests continue to be of

importance for coastal forest birds. The bird survey yielded a checklist of 105 species. Among these were five species listed in the IUCN Red-List above LC level. These were the African crowned eagle, *Stephanoaetus coronatus*, and bateleur, *Terathopius ecaudatus*, both NT; spotted ground thrush, *Zoothera guttata*, (EN); Moreau's sunbird, *Nectarinia moreaui*, (NT); and the east coast akalat, *Sheppardia gunningi* (NT). In the past, the Sokoke pipit *Anthus sokokensis* (EN), Southern banded snake eagle, *Circaetus fasciolatus* (NT), and Uluguru violet back sunbird, *Anthreptes neglectus* (NT) have been recorded in these sites, but these species were not seen during the recent surveys.

## Forest disturbance

Pole and timber extraction, fire, charcoal production, and cultivation continue to be major threats to both forests. While the 2011 disturbance surveys detected more cutting (poles and timber per hectare) than surveys carried out in 2012, in both years, more cut than live trees were recorded. Charcoal kilns are widespread across both reserves. In total, 107 and 72 charcoal kilns or kiln scars were counted along 9 transects in Pugu in 2011 and 2012 respectively; 114 and 48 charcoal kilns or kiln scars were found along 9 transects in Kazimzumbwi in 2011 and 2012 respectively. Fire is also a widespread problem in Kazimzumbwi where 169 events of fire were recorded in 2011-2012, while in Pugu, 115 fire events were recorded. Only six snares or traps were found across both survey years suggesting that most of the forests' small mammals may have already been hunted out.

At current rates of deforestation, assessed on the basis of surveys and satellite image analysis carried out by TFCG, the forests of Kazimzumbwi and Pugu will vanish by 2014 and 2017, respectively. Coordinated conservation efforts are urgently needed to save these important and unique forests. This requires a different approach with high level political support and a commitment to enforcing the Forest Act.

# What is living in Tanzania's coastal forests?

Through camera trapping and biodiversity surveys, the TFCG biodiversity survey team and associated researchers, have been documenting the wildlife found in Tanzania's coastal forests. These are some of the animals that the teams have photographed over the last two years.



Rondo galago *Galgoides rondoensis* This Critically Endangered nocturnal primate is found in only seven forests in Tanzania, including Ruvu South Forest Reserve where this animal was photographed by primatologist, Andrew Perkin. Small-eared greater galago



Four-toed sengi *Petrodromus tetradactylus* These animals make and maintain trails through the forest to mark their territories and for rapid escapes from predators. They can be detected from the sounds of their rapid foot-tapping. Photo from Ruvu South Forest Reserve by Andrew Perkin



African pitta *Pitta angolensis* African pittas are trans-African migrants, most frequently observed in Tanzanian coastal forests in April and May. This picture was taken in Rondo Forest Reserve by Elia Mulungu.



Bearded leaf chameleon *Rieppeleon brevicaudatus* is found in several Eastern Arc Mountain and Coastal forests. Photo by Elia Mulungu.





*Otolemur garnettii* These large galagos are endemic to Tanzania and Kenya's coastal and montane forests. They enjoy tree sap and have been known to become inebriated on pombe mnazi. They are renowned for their loud cackling cries at night. Photo from Ruvu South Forest Reserve by Andrew Perkin

Great plated lizard *Gerrhosaurus major* These lizards can be found in Tanzanian coastal forests and are particularly visible in and around coastal forest on Unguja where this photo was taken. Photo by Andrew Perkin.



Black and rufous sengi *Rhynchocyon petersi* These insectivorous mammals use their trunk-like noses to forage for food in the leaf litter. They make leaf nests on the forest floor. This picture was taken in Segoma Forest in the lowland East Usambaras using a camera trap.

White-crested helmet-shrike *Prionops plumatus* These widespread birds occur in flocks in woodland and on the edge of Tanzanian Coastal Forests. Photo from Ruvu South Forest Reserve by Andrew Perkin



Black and white colobus *Colobus angolensis* These diurnal monkeys occur in several coastal forests north of the Rufiji River. They are leaf-eaters and the males' guttural calls are a characteristic sound of the northern coastal forests.





# Zanzibar's Coastal Forests: how much is being protected?

## Development of the protected area network on Zanzibar

*By Kirstin S. Siex, Said Fakh, Abbas Mzee, Ali Kassim, Abu Bakar, Miza Khamis, Shabani Imani, Almasi Rhamadan, Ali Kassim, Hilali Hakiba, Habib Abdulmajid, Tatu Omar Said, Salim Khamis, Said Juma, Mussa Bakar, Rashid Mkubwa Khamis, Kombo Juma Kombo*

**T**he archipelago of Zanzibar, consisting of Unguja, Pemba and smaller islets, is a core part of Tanzania but has a separate legal system and set of Ministries and Departments, including those managing conservation and protected areas. The Department of Forests and Non-Renewable Natural Resources (DFNRNR) oversees the development and management of the protected area network on Zanzibar, with oversight from a protected area board.

All regions of Unguja and Pemba, and in particular the remaining patches of coral thicket forest, are severely threatened by a very high human population density (400 individuals/km<sup>2</sup>), which is increasing at an estimated rate of five percent per year (three percent intrinsic and two percent immigration). The vast majority of Zanzibar's human population is dependent upon shifting cultivation and forest products, such as building poles, firewood, and charcoal. Due to the high price of electricity, even Zanzibar's urban population is heavily reliant on firewood and charcoal for cooking. Tree cutting to supply this demand continues to be a major threat to Zanzibar's wildlife.

Zanzibar is currently losing an estimated 1.2 percent of its forest each year. Shrinking forest

patches are rapidly diminishing any potential to maintain and restore connectivity. Luckily, despite the extremely high human population density and severe threats, there still exist a number of good quality, although fragmented, forest patches which harbour Zanzibar's wildlife. All of these remaining forests patches that are important to wildlife must be identified, protected, and linked by functional corridors in a comprehensive Protected Areas (PA) network of community and government managed forests; and effective conservation management for the PA network developed and implemented.

### The proposed Zanzibar coastal forest protected area network

The reserve network in Zanzibar traces back to the colonial period, with forests being set aside mainly for production forestry, including Jozani and Masingini. Over the past decade more emphasis has been placed on the conservation of natural forests, not only to conserve rare and threatened species, but also to provide visitor experiences for the tens of thousands of tourists who visit the islands, to protect key water catchments, and to maintain forests that provide critical wood supplies.

On Unguja, the remaining best habitat for Zanzibar's



unique wildlife and those which must be included in the PA network include: Jozani-Chwaka Bay National Park (JCBPN), Kiwengwa Pongwe Forest Reserve (KPFR), Masingini Forest Reserve, the “High Protection” and “Low Impact Use” zones of the community forests surrounding JCBNP (17 Communities) and KPFR (10 communities), and the Proposed Muyuni-Jambiani Forest Reserve.

These forests were found to be relatively well linked by a series of 5 corridors which were mainly across community lands, and overlapped the proposed Muyuni-Jambiani Forest Reserve. We also recommend the restoration of a 6<sup>th</sup> corridor to restore connectivity between Uzi/Vundwe Islands and Unguja Island, via mangrove forest.



Photo 1. Ground-water forest, Jozani-Chwaka Bay National Park (JCBPN), (K. Siex).



Photo 2. Mangrove swamp forest, Uzi Island (K. Siex)



Photo 3. Coastal thicket forest, Vundwe Island (K. Siex).

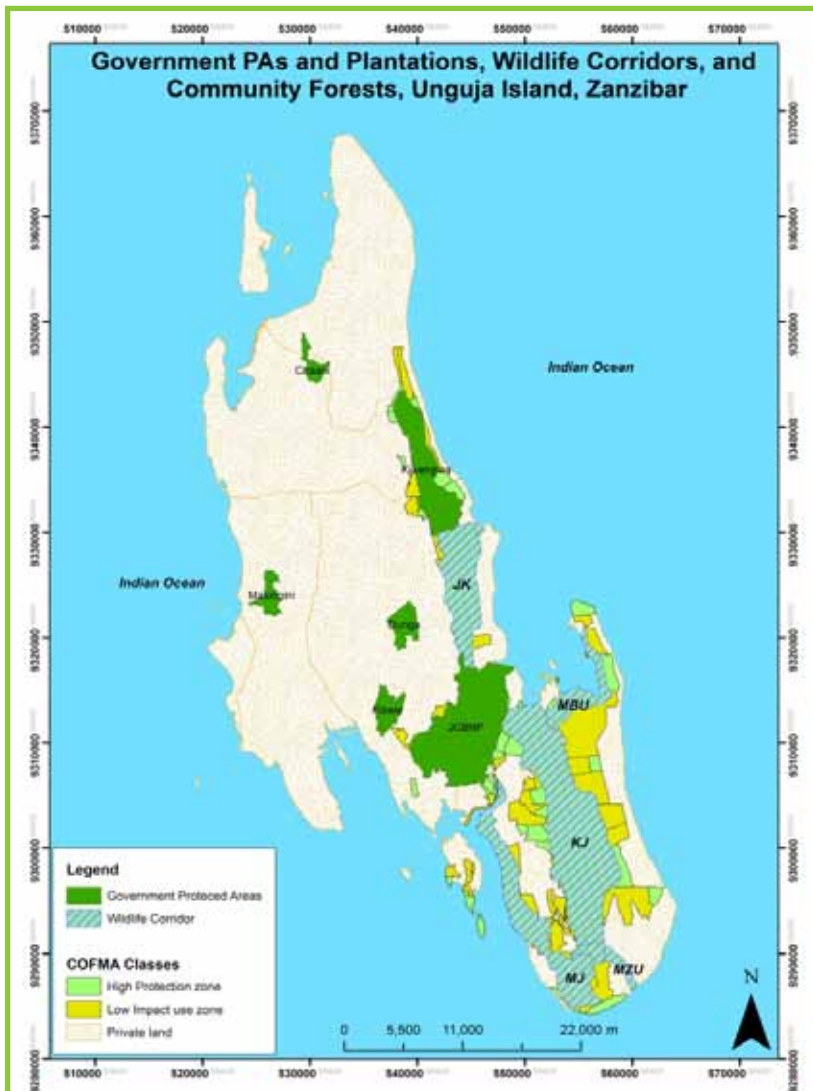


Figure 1. Government Protected Areas and Plantations, five Wildlife Corridors (JK, KJ, MJ, MBU, MZU) and Community “High Protection” and “Low Impact Use” zones, Unguja Island, Zanzibar.

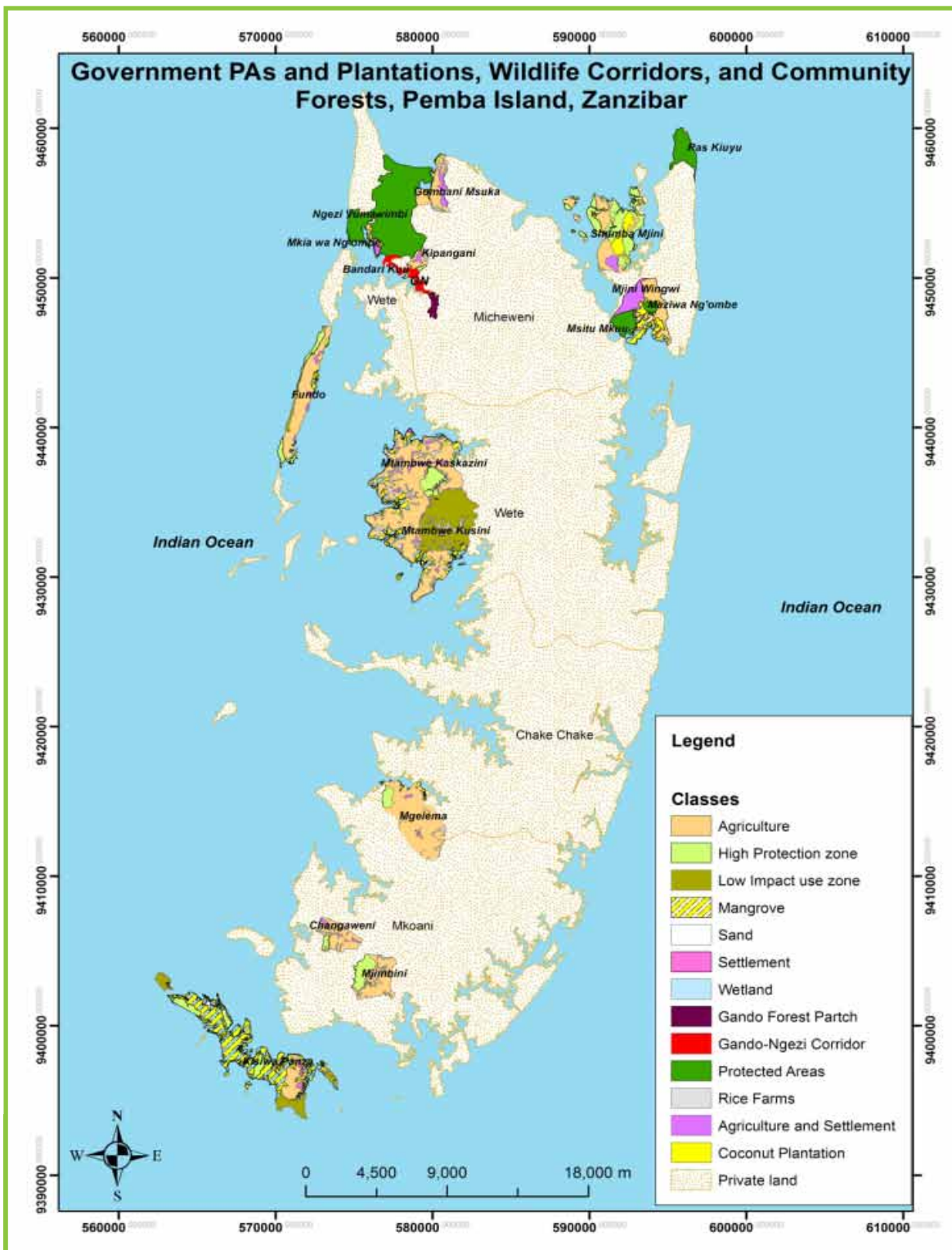


Figure 2. Government Protected Areas and Plantations, Gando-Ngezi Wildlife Corridor, and Community Forests, Pemba Island, Zanzibar

On Pemba, the areas of greatest importance for wildlife and those we recommend be included in the PA network include: the three government PAs of Ngezi-Vumawimbi Nature Reserve, Msitu Mkuu Forest Reserve and Ras Kiuyu Proposed Forest Reserve, and the “High Protection” and “Low Impact Use” zones of the 13 community forests. There are also a number of additional forest patches which need to be further studied to determine their importance to wildlife

including: Kwa Konondo, Ngulu, Makuwego, Kangagani, and Kideke; and the community managed forest patches of Fundo, Matambwe, Mgelema, and Mbiwi/Changaweni. Unlike on Unguja, most of these important areas for wildlife on Pemba are spread out across the island and are not well connected; none of the three government PAs are connected to one another by wildlife corridors. The only potential wildlife corridor found on Pemba is between



Ngezi-Vumawimbi Nature Reserve and Gando forest patch, and it is mainly via mangrove forest. Thus, additional survey work on Pemba is also recommended to determine if there is potential to restore connectivity (via enrichment planting) among any of the government PAs, community managed forests and unmanaged forests.

### Recommendations for success

Given the growing threats to the proposed Zanzibar PA network, swift action must be taken to completely protect the remaining forests and corridors before many of these connections are lost forever due to agriculture expansion and cutting for building poles, firewood and charcoal production. As the Zanzibar DFNRNR establishes the PA network we make the following recommendations: (1) as all of the proposed corridors completely overlap community lands and community managed forests are crucial for the continued survival of Zanzibar's wildlife, continuing to work with communities to design

and implement the PA network will be critical for success; (2) as new communities develop Community Forest Management Agreements (CoFMAs), we must ensure that the community zoning process produces zoning plans which concur with the plan for the PA network; (3) it will be necessary to explore more intensive management such as enrichment planting for the establishment/restoration of some corridors, mainly the northern section of the MJ corridor, the corridor between Uzi/Vundwe and Unguja, and any potential corridors on Pemba; (4) to ensure efficacy, the PA network plan must quickly move from paper to implementation including complete demarcation of all forests and corridors, sensitization of surrounding communities, and most importantly law enforcement to ensure the protection of the new PA network; and (5) it is also crucial that CoFMAs are properly implemented, the implementation audited, and management adapted where necessary to ensure success.



Photo 4. Clear cut thicket forest, Unguja Island (K. Siex)

# Establishment of locally managed reserves in Rufiji, Lindi and Kilwa Districts

By Isaac Malugu, Jasper Makala, Simon Mosha, Japhet Kashiagili, Adam Kijazi, Richard Komba, Peter Sumbi and Neil D. Burgess

Large areas of forest and woodland remain in southern Tanzania, and these areas have formed the focus of the current UNDP GEF investment into the development of the protected areas sub-system in Tanzania. The majority of the project's work has focused on working with communities on the declaration of village land forest reserves under their direct control, and in the improvement of management in local authority forest reserves and also in the Rondo forest in Lindi, which is one of the most important forests in terms of biodiversity along the

Eastern African coast.

As with many other projects in recent years, the UNDP GEF investment has adopted Participatory Forest Management as the main mechanism for project implementation, building from the guidance of the Forest Policy of 1998 and the Forest Act of 2002 (see box 1). The main aim of Participatory Forest Management is to establish village level forest reserves as a part of village land use planning, which is linked to efforts to give villagers control over their land, and allow local development activities to proceed (see Box 1).

**Box 1.** The 1998 Tanzanian Forest Policy promoted, for the first time in this country, community participation in forest conservation and management and created the legal space for village governments to protect hitherto unreserved forest within their area of jurisdiction through the establishment of Village Land Forest Reserves (VLFR), which are owned and managed by village governments under a system known as Community Based Forest Management (CBFM). The goals of the 1998 Forest Policy were later embedded in law through the Forest Act No. 14 of 2002 [Cap 323 R.E. 2002] (URT 2002), and in regulations and guidelines for CBFM (MNRT 2003). These make explicit reference to the development of forest management by-laws by Village Councils through the legal provisions provided for under the Local Government Act No. 7 of 1982 (URT 1982).

The Forest Act stipulates that Village Councils can delegate the responsibility of forest management to Village Forest Committees, which are now generally known as either Village Environmental Committees (VECs) or Village Natural Resources Committees (VNRCs). These committees are set up as sub-committees under the Village Council, but members must be directly elected by the Village Assembly (URT 2002). The importance of village government institutions in managing natural resources is augmented by their legal responsibility for managing village lands according to the Land Act No. 4 of 1999 and the Village Land Act No. 5 of 1999 (URT 1999a;b). Village Councils manage and adjudicate land on behalf of the Village Assembly, and managerial duties include the demarcation of land for allocation to individual villagers or for communal use.





**Lindi landscape**

The demarcation of new proposed VLFR covering 13,577.29 ha were completed in this landscape. Participatory Forest Resource Assessments in two villages were completed, management plans were drafted, and harvesting plans for five species were produced. The species concerned were the timber trees *Azelia quanzensis*, *Pterocarpus angolensis*, *Milicia excelsa*, *Albizia sp* and 'Mtuganjiwa'.

One of the expected outcomes from Lindi landscape is the upgrading of Rondo forest reserve into a Nature Reserve under central government management. The process for upgrading 14,000 ha of the current Rondo reserve started in 2011, and the upgrading now has the approval and endorsement from village councils, District council and Regional authorities of Lindi and awaits national gazettelement.

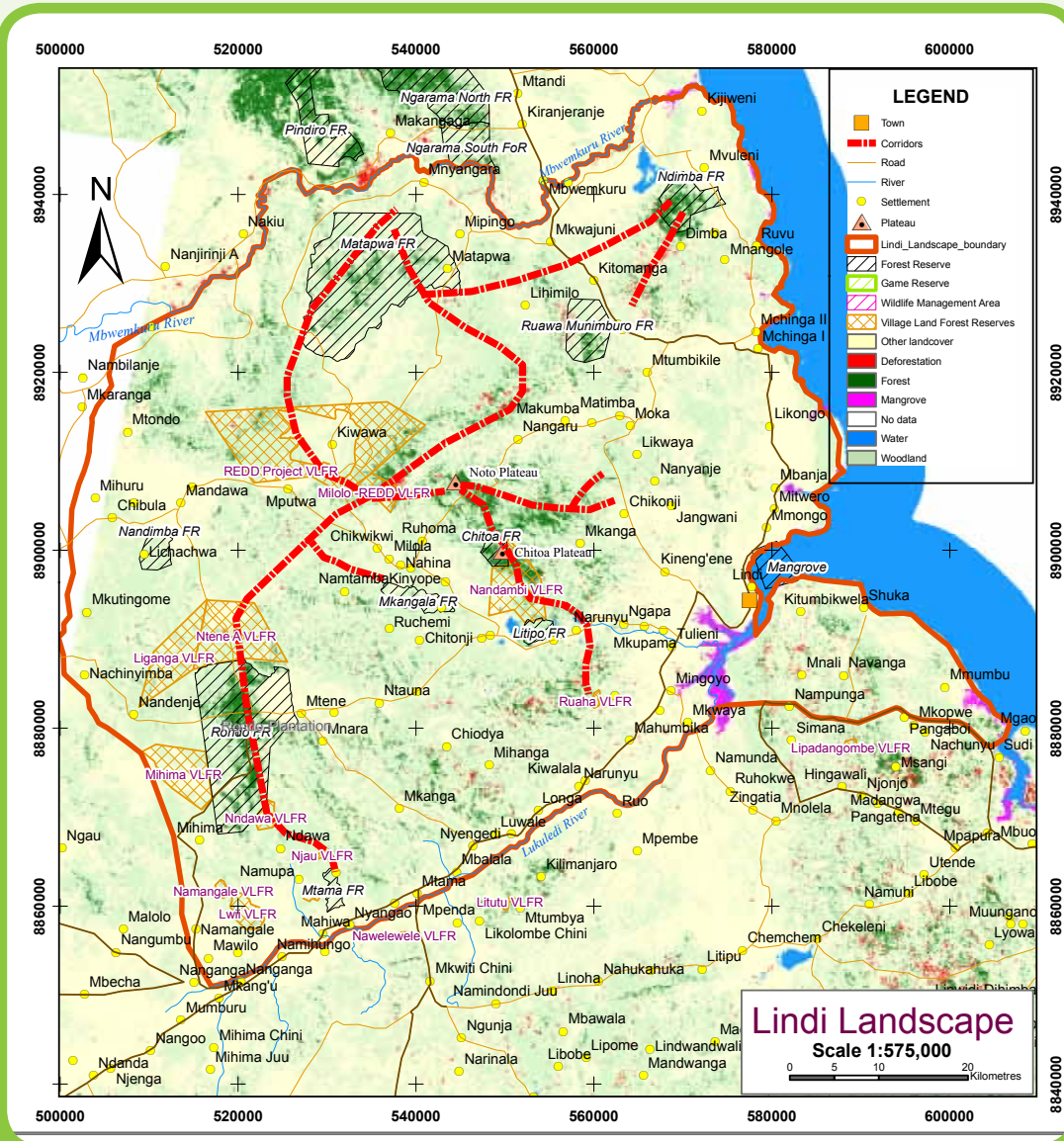
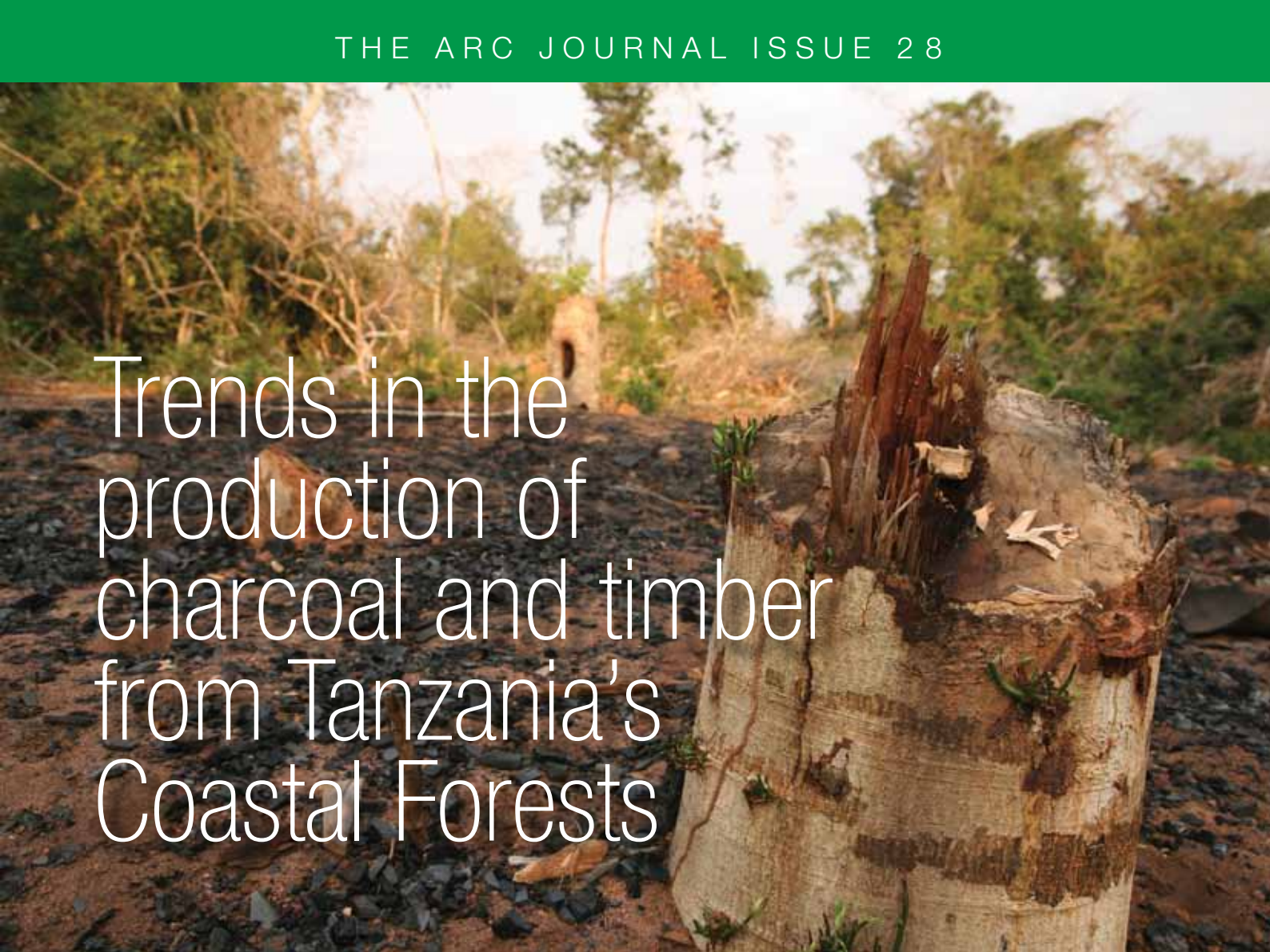


Figure 1. Forests, woodlands and various kinds of reserves under national, district and village management in the Lindi Landscape, southern Tanzania

In summary, the UNDP GEF funded Coastal forests project is focussing on the Protected Area sub system, and has been facilitating land use planning for demarcation of Village Land Forest Reserves (VLFRs) and Local Authority Forest Reserves (LAFRs). Since its inception, the project is working to develop community based forest management approaches in targeted villages on the margins of government protected Forest Reserves. These forest areas will allow local villagers to gain control over forest resources in their village lands and hence gain greater benefits from these resources. The benefits are planned to include the development of sustainable and certified forest products (FSC) from these forest areas. Advice and input to the development of the FSC certification and sales routes to Europe is being developed using co-financing from WWF Denmark, WWF Tanzania, Comic Relief (UK) and the Mpingo Conservation & Development Initiative





# Trends in the production of charcoal and timber from Tanzania's Coastal Forests

*Neil D. Burgess, Jumanne Abdallah, Kahana Lukumbuzya, Josephine Urock, Isaac Malugu, Peter Sumbi, Adam Kijazi, Simon Milledge, Marije Schaafsma and Jasper Makala*

The two greatest values and largest threats to the coastal forests of Tanzania come from the over harvesting of charcoal and timber. In extreme cases the use of forest and woodland to produce charcoal results in the complete destruction of the forest habitats, leaving only thicket and grassland behind. In the case of logging for high value timber, the harvesting is more selective and targets the most valuable trees. This short article traces the development of the trade in charcoal and timber over the past decades, and outlines the situation today. It also shows how the exploitation of biomass for charcoal and timber can be more sustainable and contribute positively to rural development.

## The Charcoal trade

A World Bank Policy Note (2009) highlighted that an estimated 90% of Tanzanian's energy needs were satisfied through the use of wood fuel. It singled out charcoal to be the largest source of household energy use in urban areas, with the major route and catchment for Dar being from southern districts (Table

1). Today, charcoal making is the greatest threat to coastal forests, with charcoal production extending more than 200 km from the city. In comparison to electricity, charcoal is readily available, affordable and easy to produce, transport, distribute and store. Charcoal making is the greatest threat for coastal forests from Dar es Salaam to Rufiji. In the period 2001 – 2007 the proportion of households in Dar es Salaam using charcoal climbed from 47% to 71%. Studies in 2005 showed that the forests around Dar es Salaam, which mainly lie within reserves, were being heavily degraded by conversion to charcoal and had lost considerable amounts of their biomass. Forests more than 50 km from Dar es Salaam were in better condition and more than 150km from Dar es Salaam the forests were used for logging high value timber (Figure 1).

In the mid 2000s around 80% of the charcoal destined for Dar-es-Salaam was sourced from an area of 20 km radius from the city. Charcoal is now being sourced from forests and woodland over 200 km south of Dar-es-Salaam. Charcoal trade to Zanzibar is also becoming more important from

Rufiji and southwards. Respondents in all villages surveyed in 2012 where charcoal making was encountered claimed that tree species suitable for timber or construction were not used in the production of charcoal.

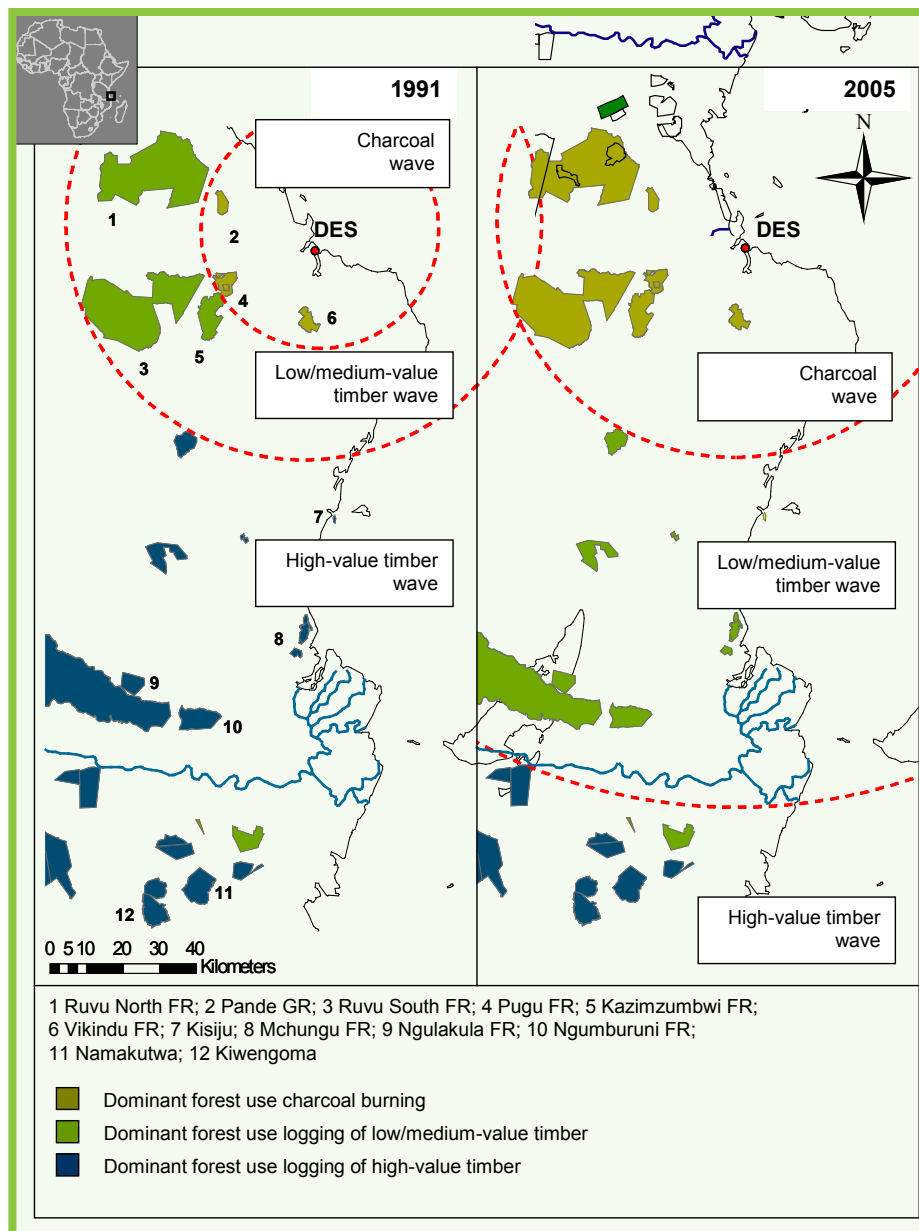


Figure 1. Spread of forest degradation south of Dar es Salaam from 1995-2005. Since 2005 charcoal production has spread as far as the Rufiji River, and logging of high value timber has spread all the way to the Mozambique border and into the northern part of that country (reproduced from masters thesis by Antje Ahrends)

Charcoal consumption is predicted to increase further due to the rapid population growth of Dar es Salaam's urban and peri-urban areas of Kibaha, Mkuranga and Bagamoyo. The study also found that timber was being harvested and converted into furniture pieces. Furniture is then transported while hidden in amongst other cargo and in this way, timber is harvested and traded illegally.

Charcoal entering Dar es Salaam from the South	2001		2007	
	Average Bags / Day	Percentage of Total	Average Bags / Day	Percentage of Total
Kilwa Road	1859	31%	3361	50%

Table 1. Actual recorded bags passing checkpoints along the Kilwa Road in 2001 and 2007 and percentages of bags entering Dar by the Kilwa Road out of the total bags entering Dar by all routes.





Photos of charcoal production and transportation in Ruvu South Forest Reserve with charcoal being transported by bicycle to Dar es Salaam at night and during the day. Photos by Andrew Perkin.

Despite the expansion in the charcoal making area of coastal southern Tanzania the trade remains largely confined to areas with reasonably easy access to the paved highway. Surveys in 2012 found no charcoal production in the locations not easily accessed from the highway. In Rufiji District all of the villages visited were involved in the charcoal trade and these activities are undertaken throughout the year. Farther away from Dar-es-Salaam the charcoal trade was often a dry season activity, during periods when the agricultural cycle is not active. The charcoal trade represents the forest based activity with the lowest margins. The price at the village level received for a 56 kg bag of charcoal is consistent throughout the southern landscapes, regardless of the distance to Dar-es-Salaam. This may indicate that charcoal traders are price fixing and that the communities in the landscape have little bargaining power over price. Kiln efficiency in 2012 was calculated as just under 20%, which has not been improved on over the last decade.

Data on illegal activities relating to charcoal harvest are difficult to obtain. Although surveillance at government check points is now increasing; most of the forest products harvested in the central and southern landscapes were illegal. In Coast Region there are 13 check points. In the 9 villages that were visited in Rufiji, Kilwa and Lindi Districts in 2012 there was no instance of charcoal production under a valid harvesting license. Charcoal bought by traders for transportation to urban centers is sometimes "legalized" after the fact by the trader who has purchased transit permits for charcoal

before the actual charcoal has been loaded in the villages. The charcoal that is purchased is then aligned with amount requested in the harvest license and transit permits. Charcoal transporters then show these permits when passing through checkpoints along the road network. Many traders can transport more than what is listed on their licenses by filling charcoal bags to more than the 56 Kg that is allowed by law. In the southern coastal villages many villagers complained at having been forced to sell charcoal in bags that were overflowing, so called "Lumbesa" bags. In this way, traders would transport charcoal that was as much as 25% over the required 56 kg per bag. Another method by which charcoal is transported illegally is by bicycle transportation. Since bicycle loads are allowed to pass without question at check points, many traders use this method of transport to circumvent checkpoints. Once the bicycle load was past the checkpoint they could then be loaded onto lorries and ferried onwards to the urban centers. The current study found that in a twenty minute period as many as 30 bicycles, carrying about 105 kg of charcoal each, passed the Nangurukuru – Kilwa Masoko intersection. This represents a large amount of illegally harvested and traded charcoal.

### The timber trade

The coastal forests and coastal woodlands contain a number of high value timber species that have been commercially logged over many years. Within the forest habitats the key species were formerly *Milicia excelsa* (Mvule), *Khaya anthotheca* (Mkangazi) and *Azelia quanzensis*

(Mkongo), but the first two are now fairly rare in the coastal area. In the early 2000s logging moved on to *Millettia stuhlmannii* (Mpangapanga), which is now also fairly scarce.

Surveys in 2012 in the southern landscapes show that about a dozen tree species are traded commercially. Six tree species were recorded as being traded as logs and these include *Millettia stuhlmannii*, *Baphia kirkii*, *Brachystegia spiciformis*, *Dalbergia melanoxylon*, *Sorindeia madagascariensis* and one tree species known only by its vernacular name of Mdamudamu. The tree species *B. spiciformis*, *M. stuhlmannii*, and *D. melanoxylon*, in addition to being traded as logs, are also traded as processed wood as planks or carvings. Other tree species traded as sawnwood within the landscape are recorded to be *Pterocarpus angolensis*, *P. tinctorius*, *Azelia quanzensis*, *Khaya anthotheca*, and *Milicia excelsa*.

One of the measures of the scale of the timber trade is the export of round wood from Tanzania. From 1992 to 2003 the scale of the export dramatically increased, with export to the Far East (especially China) forming a major part of this trade. Since 2003 the export of round wood has been banned and has declined greatly. Export of natural timber has now shifted over to sawn wood. According to Ministry of Natural Resources and Tourism export data, the exports of sawn wood to China increased to a high of 8,950 m<sup>3</sup> in 2007 and was 7,700 m<sup>3</sup> in 2011. The relative share of *Baphia kirkii* in sawn

wood exports to China has increased from 30 % in 2007 to 65% in 2011.

In addition to logging for export, exploitation also continues for use within Tanzania (and local export to Kenya, and offshore to Zanzibar). Market surveys in 2011 show that timber is being harvested in southern Tanzania, and transported across the border into northern Mozambique.

As the availability of the desired woodland species has declined so has logging moved to species like *Brachystegia spiciformis* (Mtondolo) and the exotic fruit tree mango (*Mangifera indica*). These are lower quality timbers. Furniture makers in Dar es Salaam and the surrounding villages are also now using the exotic species of *Eucalyptus* and pines from montane plantations for furniture making as the supply of hardwood becomes more expensive and difficult to obtain. Where the high value timbers are still being used, they are said by timber dealers and furniture manufacturers to be coming from northern Mozambique, or southern Tanzania.

Due to the increased scarcity, prices for high quality species have increased by 35% between 2009 and 2011, an increase that is higher than general inflation in Tanzania. Moreover, plank sizes have decreased over the same period, which indicates that pitsawyers have turned to harvesting smaller trees that were previously considered to be too small, but have now become commercially interesting.

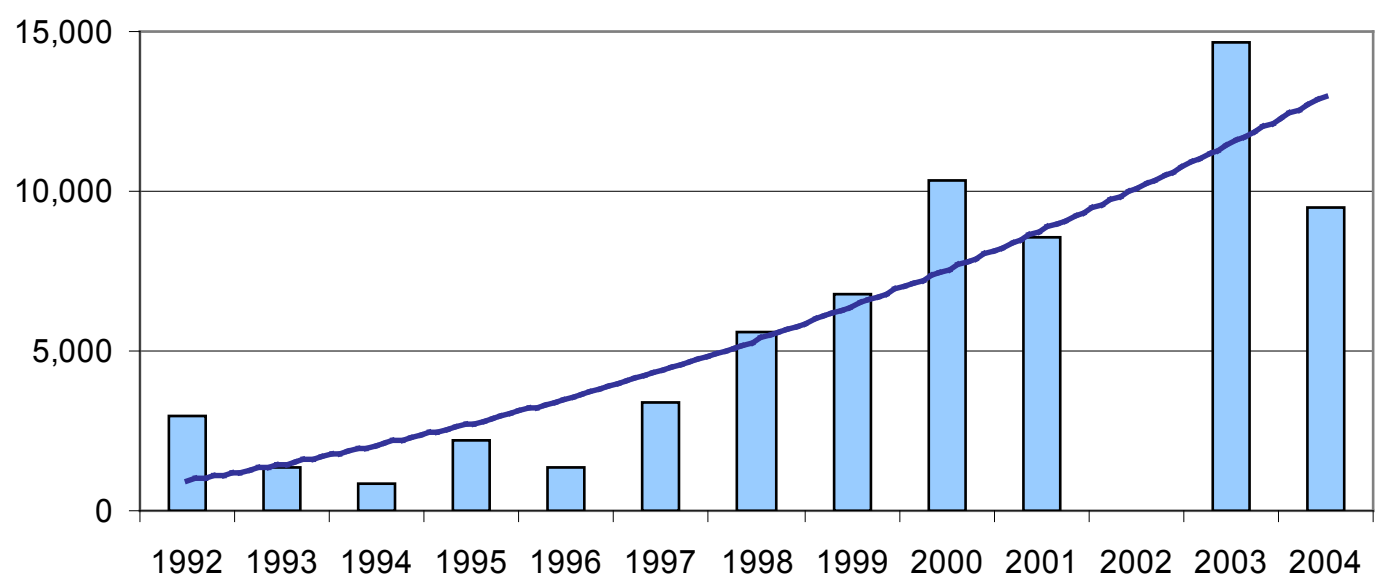


Figure 2. Volume (container loads) of timber exported from Tanzania in the period 1992-2004. Shows peak in 2003 before the ban on round wood export. Data from the exporters in Dar es Salaam are known not to match the importers records in China, with much more timber being imported into China from Tanzania than declared as exported from Tanzania.





*Photos – Round wood being moved on lorries from southern coastal forests to Dar es Salaam in 2003. This open trade has stopped. But planked wood from natural forests in southern Tanzania and northern Mozambique still enters the city in large volumes to supply the trade in hardwood doors, windows, and household furniture*



## **Future challenges and opportunities**

As charcoal use by urban people is not diminishing, then there are a number of possible solutions to the demand for cooking energy. One would be to improve the availability and price of electricity from hydropower, others could be the use of solar power, and others using liquefied natural gas. But part of the solution must lie in the forests and the charcoal production and use.

*Women are undertaking sustainable logging of Blackwood in Kisangji certified community forest, Kilwa*





*The Half Orange Kiln, which recovers up to 45% with 3-4 days of work*

Charcoal production is around 15% efficient in terms of capturing the original energy in the wood for further use, and can be increased to 45 % through better technology. Some of the proposed methods is the use of Half Orange Kilns (HOK) and Improved Basic Earth mould Kilns (IBEKs). Moreover the amount of charcoal required for cooking can be greatly reduced by improved cooking stoves. Working at both ends of the charcoal supply and use chain can dramatically reduce the use of this commodity, and hence reduce pressure on the forests. A number of pilot charcoal production projects are in operation, and improved stove programmes are widespread throughout Tanzania. The pilot Dar Charcoal project which is run jointly by WWF and CAMCO is being implemented in Rufiji and Kisarawe districts. The project is putting into practice the two kiln models (i.e. HOK and IBEKs). The performance has indicated positive results in terms of recovery and efficiency reaching up to 45-50%. Through this project

communities are mobilized into Charcoal groups, for easy market access and labour mobilization for charcoal making, while extracting and managing their forest resources.

Sustainable harvesting of timber seems to offer one of the most promising ways to make community level conservation work in the coastal forests and woodlands. Experiences from Kilwa (and now Lindi and Rufiji) show that communities can derive significant revenues from logging of high value timber species, especially if that timber is certified using international standards (e.g. Forest Stewardship Council). The FSC Group Certification scheme is a simpler scheme for small and low intensity production forests, such as those managed by communities. Communities in Kisangi, Kikole, Liwiti, Nainokwe and Nanjirinji in Kilwa district have earned more than TZS 60 million by end of 2012, from zero income before certification in 2009.



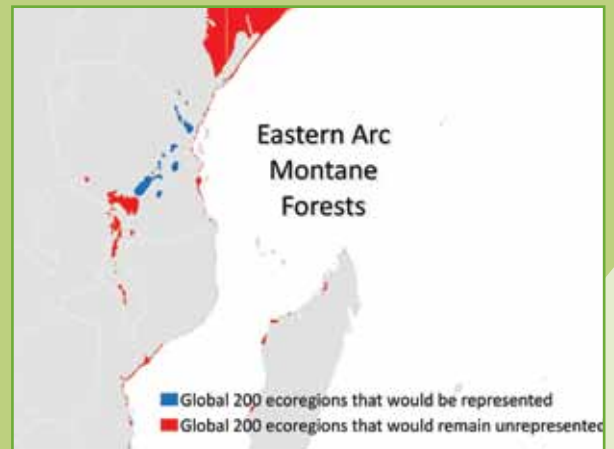
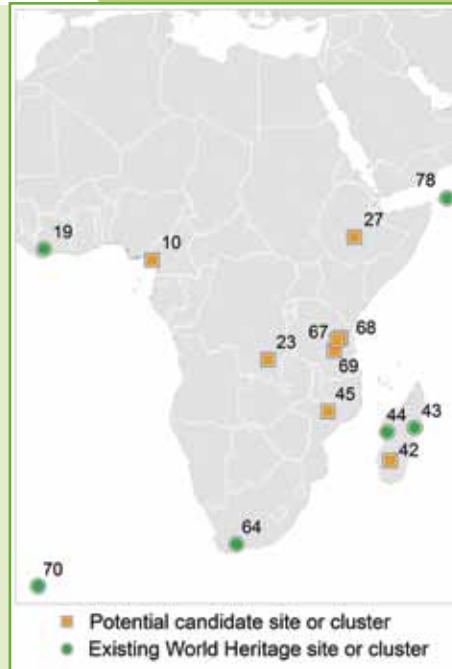
# World Heritage Gap Study – important results for Tanzania Eastern Arc

In a recent expert study for the UNESCO World Heritage Center, data on birds, mammals and amphibians have been used to identify sites of 'Outstanding Universal Value' that are not yet covered by a World Heritage site. The study can be downloaded from xxx.xxx

Within Africa and Madagascar there are eight gaps (see Figure 1), of which three are in Tanzania. All three of the Tanzanian sites are within the Eastern Arc Mountains ecoregion, which means that the *Eastern Arc Montane Forests* comes out as one of the 46 ecoregions that lack any biodiversity World Heritage Sites. At the site level, three Eastern Arc Mountain protected areas/clusters fell amongst the top 100 most irreplaceable protected areas for threatened mammals, amphibians and birds globally: in the Udzungwa Mountains (Udzungwa Mountains National Park/Kilombero Nature Reserve), Nguru Mountains (Mkingu Nature Reserve) and Ukaguru Mountains, with the Uluguru Nature Reserve also qualifying in the top 100 sites if the northern and southern parts are included together.

According to this study, there is potential for these areas to be considered under biodiversity criterion (ix and x) of the World Heritage Convention, and for a serial nomination approach due to their geographical proximity. The results of the study are indicative and by no means prescriptive. In addition, the study does not take into account stringent protection, management and integrity requirements of the World Heritage Convention. These aspects need to be considered separately.

It should be remembered that the Tanzanian government requested the Eastern Arc Mountains be added to the tentative list of World Heritage



Sites in 2006, and that a draft dossier that included nine proposed sites was prepared by the Ministry of Natural Resources and Tourism in 2011, but was withdrawn by the Tanzanian government in the same year.

This new study provides the grounds to re-open the debate on the benefits and values of the Eastern Arc Mountains as a World Heritage site on the UNESCO list. Towards this end, a group of interested stakeholders met in June 2013 in Dar es Salaam to re-visit the issue of the Eastern Arc World Heritage site. This group developed a number of recommendations on how the process might be revitalised:

- establish a task force containing representatives of different Ministries to provide feedback on the withdrawn Eastern Arc World Heritage application, in particular to assess if the proposed sites have values that the original team was not aware of (bearing in mind that all sites are all already gazetted as either national Forest Reserves, forest Nature Reserves, or National Parks which have their own legal framework);
- use this consultation process and the feedback on the existing dossier to update the existing text and develop a briefing text for senior politicians on the benefits (and costs if any) of this proposed World Heritage site;
- communicate the findings of this review to key political stakeholders – potentially including taking key people to see the nine component reserves in the proposed World Heritage site



Tanzania Forest Conservation Group

Shirika la Kuhifadhi Misitua ya Asili Tanzania

P.O.Box 23410.  
Dar es Salaam, Tanzania  
Tel: +255 (0) 22 2669007  
Website: [www.tfcg.org](http://www.tfcg.org)  
e-mail: [tfcg@tfcg.or.tz](mailto:tfcg@tfcg.or.tz)

### TFCG Committee

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Patrick Qorro  
Hon MP. H.D. Shekiffu  
John Massao

### TFCG Executive Director

Charles Meshack

TFCG is grateful to the following for their financial support for our work:

Accountability in Tanzania  
African Rainforest Conservancy  
African Rainforest Trust  
Deloitte L LP  
The Eccles Family Trust  
Gorta  
International Tree Foundation  
IUCN Netherlands  
McKnight Foundation  
Ministry of Foreign Affairs, Finland  
Ministry of Foreign Affairs, Norway  
Newman's Own Foundation  
Songas  
Swiss Agency for Development Cooperation  
Threshold Foundation  
Tusk Trust  
Critical Ecosystem Partnership Fund  
Museum of Natural History, Trento, Italy

### About the Tanzania Forest Conservation Group

The Arc Journal is published by the Tanzania Forest Conservation Group (TFCG). Established in 1985, TFCG is a Tanzanian non-governmental organisation promoting the conservation of Tanzania's high biodiversity forests.

### TFCG's Vision

We envisage a world in which Tanzanians and the rest of humanity are enjoying the diverse benefits from well conserved, high biodiversity forests.

### TFCG's Mission

The mission of TFCG is to conserve and restore the biodiversity of globally important forests in Tanzania for the benefit of the present and future generations. We will achieve this through capacity building, advocacy, research, community development and protected area management in ways that are sustainable and foster participation, cooperation and partnership.

TFCG supports field based projects promoting participatory forest management, environmental education, community development, advocacy and research in the Eastern Arc Mountains and Coastal Forests. TFCG works with 130 villages in 14 Districts.

To find out more about TFCG please visit our website [www.tfcg.org](http://www.tfcg.org).

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### The Arc Journal:

Newsletter of the Tanzania Forest Conservation Group

Editor: Nike Doggart

Founding Editor: Carter Coleman

This edition of the Arc Journal was financed by the Critical Ecosystem Partnership Fund through the 'Bridging the Knowledge Gap' project.

'The Critical Ecosystem Partnership Fund is a joint initiative of l'Agence Francaise de Developpement, Conservation International, the Global Environment Facility, the Government of Japan, the MacArthur Foundation and the World Bank. A fundamental goal is to ensure civil society is engaged in biodiversity conservation.'

The Arc Journal is also available online at [www.tfcg.org](http://www.tfcg.org)