

## PLANT BIODIVERSITY HOTSPOTS IN TANZANIA

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This is the second in a series of articles which describes the overall biodiversity importance of Tanzania in relation to recently completed analyses of biological values of the world. In this article we look at the distribution of plant Biodiversity Hotspots in Tanzania, as defined by the large non-government organisation 'Conservation International'.

The term 'Hotspot' was first applied in 1988 when an English Professor (Norman Myers) wrote a paper which identified regions in the world where extraordinary concentrations of endemic plants are found. Expanding the analysis in 1990 the same scientist identified a total of 18 areas containing around 20% of all plants within 0.5% of the land of the world, including the Tanzanian Eastern Arc Mountains. The ideas contained in these two papers provided a stimulus to many conservationists - they believed that if they could identify those areas where endemic species were concentrated and then undertake effective work in the same areas - then much of the biodiversity of the world could be saved without requiring huge areas of land and unrealistic expense.

In order to further develop this idea, which is similar to that outlined for birds in the last article on Endemic Bird Areas (Miombo 22), Conservation International paid for a more comprehensive global analysis of plant Biodiversity Hotspots around the world between 1996 and 1998. This study made contact with 100 experts who assisted in the compilation of data on the centres of plant endemism globally, wrote descriptions of the different hotspots, and assisted in the production of the detailed maps of each hotspot.

In order to qualify as a plant Biodiversity Hotspot each proposed area had to have at least 1500 plants wholly endemic to it (approximately 0.5% of the worlds total known species of plants), and at least 75% of the original habitat needed to have been destroyed. Data backing up these claims had to be provided, ideally in the form of plant species lists for each candidate area. Through this process, twenty five plant hotspots have been defined around the world. Together these hotspots have been shown to contain 133,399 endemic plant species (44% of the known world total of around 300,000 plant species) and 9,681 endemic animals (35% of the total known species of vertebrate animals of the world). If effective conservation could be achieved in these areas then a large proportion of the plants and animals of the world could be saved within an area of 2.1 million sq km of the worlds remaining natural habitat, or about 1.4 % of the area of the globe.

Five of the 25 hotspots are found on mainland Africa and one covering Madagascar and nearby islands (Figure 1). In Tanzania there is a single plant Hotspot, which is narrowly shared with Kenya. This is the Eastern Arc and eastern African Coastal Forests Hotspot (Figure 2). It is described below, together with some notes on the conservation activities that are going on in the area.

## Eastern Arc and Coastal Forests Hotspot.

The hotspot is estimated to have originally included 30,000 sq km of montane and lowland forests and important upland grassland habitats, set within a much larger area of low altitude savanna woodlands and bushlands which have relatively low value for endemic plants and other species.

Current data show that the hotspot contains 1400 endemic plants and is therefore strictly outside the criteria set by Conservation International (Table 1). However, it was included in the Hotspots list due to the large number of new species that have been found in recent years, and also because it is a rather small hotspot the rates of endemism per square kilometre of habitat are extremely high. Indeed the density of endemic species in the remaining 2000 sq km of remaining good quality forest upland grassland habitat in this hotspot is the highest in the world. The extremely dense packing of endemics in the remaining habitats of this Hotspot also indicate the degree to which the plants in this hotspot are threatened as even a small additional loss of forest here can push more plants towards extinction and even make them extinct. As species of plants are still being discovered in both the Eastern Arc and the Coastal Forests then it is possible that species are becoming extinct before they are even known. This is one reason why so many of the Tanzanian Eastern Arc and Coastal Forest trees have been featured in a recent compilation of the tree species threatened with extinction globally (see <http://www.redlist.org> for downloadable information).

The most important parts of the plant hotspot illustrated in Figure 2 are the montane through to lowland forest patches. These are found in wetter areas where people have not cleared them over the past hundreds of thousands of years. Of secondary importance are the upland grasslands and boggy areas that are found on the Eastern Arc portion of the hotspot. There are also plant endemics on rocky areas, in rain shadow areas, and some of the coastal bushlands. The most important of the forested areas are those of the main Eastern Arc range (North and South Pare, East and West Usambara, Nguu and Nguru, Uluguru, Ukaguru, Mahenge, Rubeho and Udzungwa). In the Coastal forests portion of the hotspot the most important areas are the lowlands between the East Usambaras and the sea, the Pugu Hills outside Dar es Salaam, the Matundi Hills just south of the Rufiji River, several of the plateau areas inland of Lindi (Chitoo, Litipo, Rondo), the foothills of the Ulugurus (especially Kimboza forest) and the offshore islands of Mafia, Zanzibar and Pemba.

Tanzanian Government departments (Forest and Beekeeping and National Parks) hold control of most of the land supporting this biodiversity (in Forest Reserves and National Parks). They have particular responsibility for conservation of this hotspot, with the assistance of others where necessary. WCST is already assisting the government with the conservation of the montane forests of the Ulugurus (see previous issues of *Miombo*), the lowland forests of the Pugu Hills, lowland forests near Tanga and the lowland forests of the Lindi area. These are all priority areas for conservation of biodiversity at the global level. Other NGOs (World Wildlife Fund, Conservation International and the Tanzania Forest Conservation Group), and donor countries (Danish DANIDA, Norwegian NORAD, Finish FINIDA, German GTZ, British DIFID, and the Global Environmental Facility) are also assisting Tanzania to safeguard the forests and upland grasslands in this hotspot. The wealth of activity and

funding provides some optimism that these forests and their biodiversity will remain for future Tanzanians and others to enjoy, but there are problems at every forest site. These range from overharvesting of useful materials from the forest by local people and those looking for profit, to encroachment into the forest to provide land for agriculture and commercial plantations. With the current discussions taking place in the Ministry of Natural Resources on the privatisation and Joint Forest Management of the forests of Tanzania, care needs to be taken that the globally important nature of the forests in these areas are adequately considered.

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*Table 1. Species richness and endemism in the Eastern Arc and Coastal Forests Hotspot (derived from Lovett and Wasser, 1993; Lovett and P cs, 1993; Burgess et al., 1998; Mittermeier et al., 1999; Burgess and Clarke 2000).*

Hotspot	Vascular Plants		Birds		Mammals		Reptiles		Amphibians	
	Rich	End	Rich	End	Rich	End	Rich	End	Rich	End
Eastern Arc and Coastal Forests	4000	1400	585	22	183	16	188	50	63	33

Rich = Species Richness (number of species).

End = Endemism (number of species confined to that hotspot).

Figure 1. Distribution of the plant hotspots identified by Conservation International in Africa and adjacent areas.

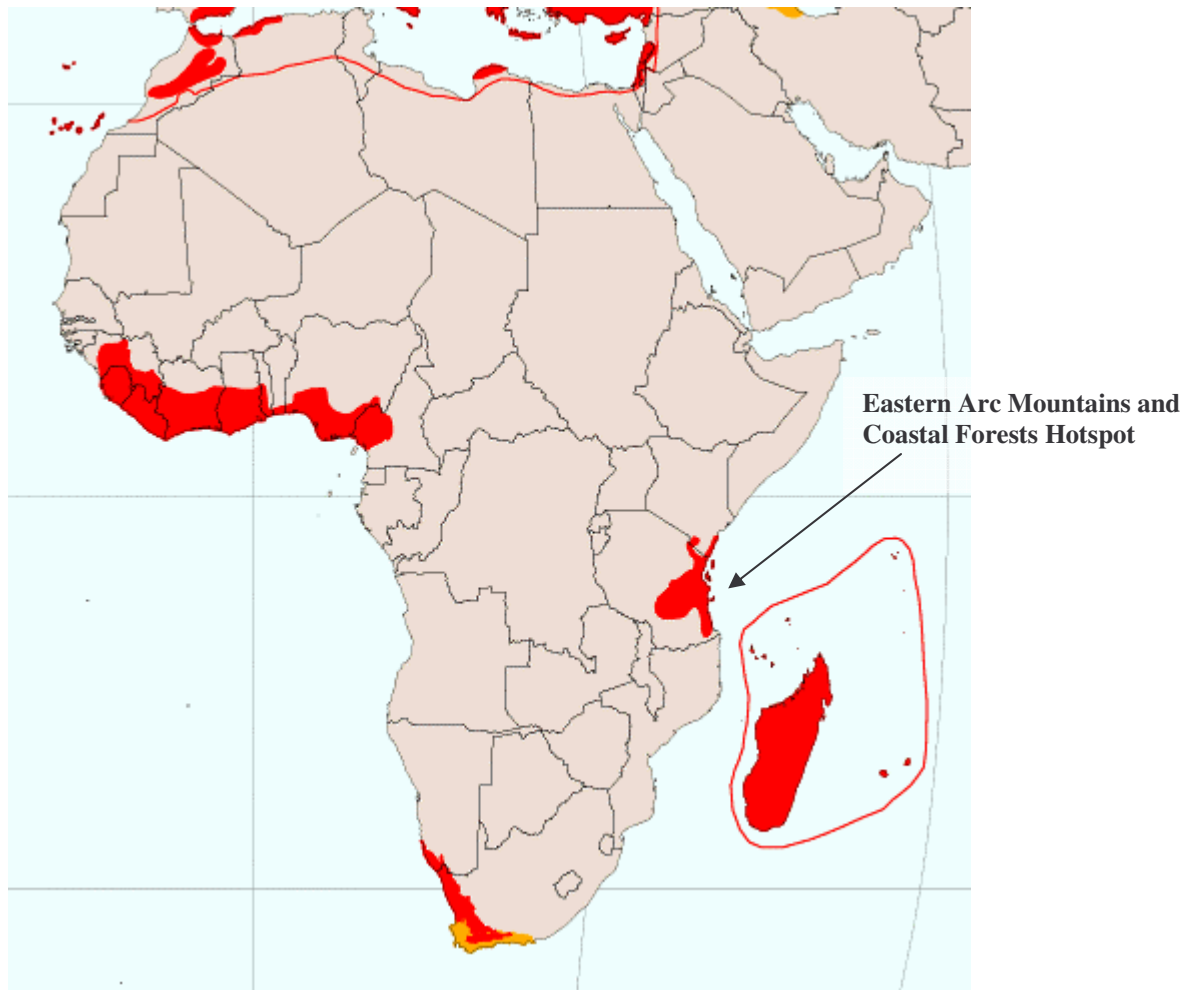


Figure 2: Geographical area of the Eastern Arc and Coastal Forests Hotspot (in black) in Tanzania and south-east Kenya

