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DEUTSCH-OSTAFRIKA - TANGANYIKA - TANZANIA:
AGENTS AND INTERACTIONS
IN THE MANAGEMENT
OF FOREST RESOURCES
1891 - 2000

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CONTENTS

<u>Introduction</u>		p. 1
<u>1. The forest resources:</u>	a. Identifying the forest resources	p. 4
	b. The utilization of forest resources	
p. 8		
	c. Forest-related discourses	p. 12
<u>2. Historical background:</u>	a. The German colonial period	p. 15
	b. The British colonial period	p. 18
	c. From Independence to the present	p. 22
<u>3. Case studies:</u>	a. Kondo	p. 26
	b. The Usambaras	p. 27
	c. Iringa	p. 29
	d. The Rufiji delta	p. 32
	e. Serengeti	p. 33
	f. Additional case studies	p. 35
<u>4. Discussion</u>		p. 37
<u>Conclusion</u>		p. 48
1		
<u>Notes & references</u>		p. 50
<u>Appendices</u>		p. -
<u>Bibliography</u>		p. 53

INTRODUCTION

The forest resources of present-day Tanzania are the focus of much attention from various directions. Peasants, city dwellers, foresters, state officials, NGOs, private firms, foreign national development organizations, researchers, the media and the general public all seem to be concerned about the development of forest resource management in one way or another. Conflicts arise between these stakeholders. The complexity of the reasons behind such conflicts is a central theme in this paper. A wealth of publications deal with different aspects of Tanzanian forest management from a multitude of viewpoints dependent on the various backgrounds and intentions of the authors. The diversity of the available information thus suggests the complexity of the chosen topic, and justifies an attempt to impose at least some order where chaos reigns.

It is my firm belief that the present state of Tanzanian forest management (“forest management” being defined as the management of forest resources by local people, private firms etc. as well as by the government) cannot be understood sufficiently if historically based interpretations are not attempted. Forests and woodlands cannot be regarded merely as static resources without any history of their own; forests and man have interacted for by thousands of years. Consequently the present state of any forest resource and its surroundings is a result of historical as well as strictly biological processes. Even the (extremely rare) formations of untouched natural forest (“Urwald”) have a history; a history of protection and/or negligence due to difficulties of access.

In this paper I shall endeavour to provide a concise account of Tanzanian forestry since the European colonisation in the late nineteenth century, isolating seemingly important agents and analysing their interactions. I hope to arrive at a fuller understanding of the often long-term processes behind some perceived problems of Tanzanian forest management whilst recognizing the extent to which local and temporal factors provide the complexity that often makes it somehow precarious to claim the existence of generalized processes.

In section 1 I examine the diverse character of Tanzania's forest resources. There are many types of forest corresponding to various geographical conditions, and some wooded areas are no means unanimously regarded as "true forest". I consider some estimates of national forest cover and the change of forest cover over a given period of time, being essential to the debate of deforestation. The forest resources are managed in many different ways, according to legal status. Some areas of forest are situated on public lands, some are forest reserves, some plantations, and some are found in highly protected national parks. The ways in which forest resources are utilized and thence their importance for society is scrutinized. At the end of this section I will dwell on what I term the "forest related discourses" within the literature on various forest related topics.

Section 2 deals with the general historical background of Tanzanian forest management: In what state did the forests of their new colony appear to the intruding Germans, and what happened since? The development of colonial forest management and the resulting conflicts between local people, settlers, foresters and administrators are viewed from the German period into the British period; finally I explore the developments of forest management since independence, through Ujamaa socialism, structural adjustment, and present liberalism, with due regard to the ever-growing importance of foreign donor countries and their organizations.

Section 3 contains different case studies, each being considered as relevant in disclosing one or more aspect/s valuable for fuller comprehension of the dynamics and complexity of Tanzanian forest management. The case studies are representative of many different localities/forest types and historical periods. The Iringa (Uzungwa & miombo woodlands) case study consist partly of the results of my own research in this area during a two-months stay at the DANIDA-supported MEMA project with periods of research in the Tanzanian National Archives in Dar-es-Salaam, partly on material obtained in Denmark. The other case studies are all based on available literature.

Section 4 contains a brief evaluation of the topic of deforestation, followed by a discussion of the central theme; agents and interactions in forest management 1891-2000, based on the evidence of the previous sections. Besides the assertion of the

complexity evident in the survey of the dynamics of forest management as provided by numerous agents and their interactions since colonisation, I emphasise the diversity of approaches and ideas to be found in the literature on Tanzanian forest resource management.

I conclude by giving a brief summary of the central themes and related findings contained in this paper:

1. To understand the present conflicts regarding forest resource management in Tanzania, the historical backgrounds must be examined.
2. When the conflicts are examined from a historical perspective, processes of great complexity emerge - thus extreme caution should be observed when generalizations are attempted.

1. FOREST RESOURCES OF TANZANIA

a. Identifying the forest resources

Many different types of forest resources are to be found in Tanzania. Usually the forests are divided into four broad categories¹:

1. Closed forests: 1.400.000 ha.
2. Woodlands: 42.891.000 ha
3. Mangroves: 115.000 ha.
4. Plantations: 150.000 ha.

- representing about 50 percent of the total land area of Tanzania (88.600.000 ha.).

There is a lack of recent national-wide, reliable data on forest cover and relative distribution of forest types; therefore the figures of the table above should be regarded as a broad outline only. The forest categories are explained briefly below. It must be mentioned that the classification system used is indeed very basic; for my purposes, however, it should be adequate (I will elaborate when necessary in specific cases).

1. Closed forest:

The closed forests are divided into montane/submontane closed forest and lowland closed forest. The prevailing types are the high- altitude rain forests, occurring in scattered formations on mountain slopes in areas with abundant precipitation and short dry seasons. These highland closed forests are found at Mt. Kilimanjaro, Mt. Meru, in the Usambaras, the Ulugurus, the Uzungwas and elsewhere (see Appendix C). When relatively undisturbed, such moist forests can consist of several more or less distinct layers (trees of different species/maximum heights). Some of these forest areas are almost permanently cloaked in mist (“Nebelwald”). The montane/submontane closed forests are again divided into four subcategories, characterized by certain dominant species:

- a. *Ocotea-Podocarpus* forest (occurring at Mt. Kilimanjaro, W. Usambara, and, without *Ocotea Usambarensis*, on Mt. Meru, in the Mbulu Highlands etc.)
- b. *Juniperus* forest (Mt. Meru, Mt. Kilimanjaro, W. Usambara, on drier NW-facing slopes)

c. Bamboo thicket (Mt. Meru, Mt. Rungwe, Iringa Highlands, Ulugurus etc.)

d. *Cassipourea* forest (Mt. Meru, Uzungwa etc.)

The lowland closed forests are often consisting of low- growing stands of semi-deciduous trees and can be found on the lower slopes of mountains, merging into higher-altitude rainforest in the Ulugurus, the Ngurus, the Usambaras etc.

Lowland Bamboo occur in clumps in miombo woodland (see below). It also occurs as “groundwater forest” (in areas with a very high groundwater table, as in the Kilombero Valley, and “gallery forest” (closed forest along rivers and watercourses)².

The term “closed forest” in itself refers to the merging tree canopies, creating a high degree of cover in comparison with the woodlands.

2. Woodlands:

More than ninety percent of Tanzania’s forested area is covered by savanna woodland. The woodlands show a varying degree of tree cover, and many terms are used to make according distinctions, such as “closed woodland”, “open woodland” and “wooded grassland”³. A common term for most woodland is “miombo woodland”. “Miombo” is a name used by the Wanyamwezi people for the *Brachystegia* trees so very common in the woodlands, often being dominant or co-dominant with species such as *Julbernardia* and *Acacia*. The miombo woodlands usually features more or less scattered trees of low stature (12-18 m.), and the ground is covered with grasses, herbs and (often thorny) scrubs. These woodlands occupy terrains from almost sea- level to 1600 metres above sea-level with annual rainfalls between 500 and 1200 mm. and one rainy season mostly. They are widespread on Tanzania’s central plateau and are part of a greater “miombo zone” in eastern and southern Africa. Tree species of the miombo woodlands are fire resistant to some degree, and fires occur frequently either induced by humans or naturally. Termite mounds are often found in valleys in the miombo woodlands, harbouring a more succulent vegetation of trees such as *Pterocarpus* and *dalbergia* presumably due to a higher level of nutrients in the soil created by the insect activity⁴.

3. Mangroves & coastal forests:

Mangrove forests occur along the coastline of Tanzania, on the islands and in river deltas such as the Rufiji delta that harbours the greatest concentration of mangrove in Tanzania. The mangrove trees thrive in swampy conditions; their roots are immersed in salt water. "Coastal forest" seems to be a recent term not to be found in the classification systems. Perhaps it should be placed under "closed forests" rather than here? - it is described as "...evergreen or largely evergreen closed canopy vegetation >8 m. tall ... forming part of the Zanzibar-Inhambane regional mosaic ... subject to a monsoonal climatic regime, and growing on Mesozoic or post-Mesozoic rocks generally within 50 km. of the coast and below 600 m. altitude ... all mangrove-dominated vegetation and deciduous woodland is excluded"⁵.

4. Plantations:

Approximately 150.000 ha. of the Tanzanian forests resources are plantations, mostly for industrial use. The greater part of the plantations are stocked with softwoods, mainly pines, but also cypress. The preferred hardwoods are teak and eucalyptus. None of these trees are indigenous. Most of these plantations are located in humid mountaneous areas, such as the Sao Hill plantation at Mufindi, which is by far the country's largest plantation. There are black wattle plantations for tannin extraction in Njombe and rubber tree plantations in Morogoro and Tanga regions. Some small plantations/woodlots for fuelwood use also exist⁶.

5. Forest cover estimates:

There is a general agreement on the fact that processes of deforestation are evident in Tanzania. However, the rate and extent of deforestation is much more difficult to estimate, since there is a lack of reliable data on the extent of forest cover both past and present. Also, there are different definitions of "forest"; a forest is defined as such through an estimate of the percentage of tree crown cover in an area, but the exact percentage of crown cover needed to qualify as "forest" is not agreed upon by scientists - thus the estimated extent of forest cover in an area varies according to the used classification system.

In general, assessments of Tanzanian forest cover builds on the FAO estimates published in 1981 and various local estimates⁷. Satelite surveys and aerial

photographing are the preferred methods in estimating forest cover, combined with ground forest inventories, an arduous money- and time-consuming task. When it comes to estimating the changes in forest cover, various methods are applied: calculations of annual forest loss rates from a given starting point (such as the FAO estimate); comparisons of aerial photographs of the same area from different points in time; investigating accounts (written or oral) of the vegetation in an area throughout its history. Often, the forest loss of an area is estimated with reference to the vegetation zone in which it is situated (the “original” vegetation, undisturbed by human activity, dependent only on climatic and edaphic factors), and correlated with population growth. The following dramatic example on forest loss estimations is based upon extrapolations of population increase combined with estimations of forest being felled per capita⁸:

Year	Area of remaining forest (km ²).			
	1980	2000	2020	2040
Tanzania:	14,4009120	4345	1100	

Of course, any such estimates must be regarded with sound scepticism; this one, for instance, based on the aforementioned FAO estimates⁹, takes no account of afforestation schemes or eventual preventive measures to come. However it affords some indication of a general direction in which the problem of deforestation may evolve if preventive measures are not regarded or if they fail.

b. Utilization of the forest resources.

1. Legal status of the forest resources:

The forest resources of Tanzania fall within various legal categories. Considering plantations, some are controlled by the forest authorities, some are privately owned,

some are owned by institutions and yet others by the districts. As for the natural forests, the main concern of this paper, a basic overview follows¹⁰:

Forest Reserves (production): 11.400.000 ha.

Forest Reserves (protection): 1.600.000 ha.

Forests in National Parks & Game Reserves:
2.000.000 ha.

Public forest lands: 27.000.000 ha.

The 540 Forest Reserves (see Appendix B) are divided between central government forest reserves (10 million ha.) and local government forest reserves (3 million ha.). The Production Forest Reserves were gazetted mainly for the production of timber, poles and fuelwood, whereas the Protection Forest Reserves are intended to maintain water catchment areas, protect soils from erosion, for research etc. Most of the Protection forest reserves are catchment forests of the closed forest types, situated in mountainous areas with abundant rainfall where major rivers originate. Such forests store water, regulate the flow of streams and thus prevent soil erosion (see App. D)

There are large tracts of forest in the National Parks and Game Reserves (see App. A), under the administration of TANAPA (Tanzania National Parks) and the Wildlife Department, serving purposes of tourism and some “white hunting”. Woodland is predominant. The Uzungwa Mountains National Park, gazetted in 1992 to be protected due to its unique biodiversity and the only forest reserve to receive National Park status in Tanzania (It was formerly a part of the West Kilombero Scarp forest reserve) is located where the Uzungwa Mountains slopes toward the central plateau, containing different forest types corresponding to the altitude, from woodlands to montane rain forest.

The remaining areas, more than 27 million ha., are situated on Public Land and will be referred to as public forest lands. Generally, they are under very little or no control from any authorities and are utilized freely by local people.

2. Forest authorities & legislation:

The highest authority concerning forest resources in Tanzania is the Forestry and Beekeeping Division under the Ministry of Lands, Natural Resources and Tourism, and the Wildlife department and TANAPA of the same ministry.

There are also forest authorities on regional, district and sub-district level, connected to the Natural Resource authorities on their level. The Vice- Presidents Office has some influence on the Regional and District Forest Authorities through the National Environment Management Council.

The Forest Policy of 1953, passed by the British colonial authorities has been amended often, and the present guidelines to forest resource management are provided by the Tanzanian Forest Action Plan of 1989 and the Revised Forest Policy Document leading to the Forest Policy of 1998 which is in the process of being legislated.

3. The utilization of the forest resources:

The forest resources of Tanzania are of great importance to Tanzanian people in many respects. Here I use a broad definition of the word “utilization”, even including practices such as near or total clearing of a forest area for other purposes.

Energy:

The use of fuelwood is estimated to cover more than 90 percent of the total energy consumption in Tanzania. The term “fuelwood” covers both firewood (usually branches and twigs obtained in forests) and wood processed into charcoal. Firewood is the dominating energy source for cooking and heating in rural households. Usually, the firewood is collected by women; dead branches and twigs are preferred. The production of charcoal requires great amounts of wood that is processed into charcoal in kilns; it serves a mainly urban demand as the charcoal is considerably easier transported into the towns and cities than the firewood needed to provide the same amount of energy. The annual use of fuelwood is between 1 and 3 cubic metres per capita. Numerous small industries such as brick burning, fish smoking, village metal works, lime and cement making demand fuelwood. Industries such as tobacco and tea estates often use considerable amounts of fuelwood for the drying (curing) processes¹².

Construction and furniture:

Timber and poles are extracted from the forests for construction use or for making furnitures or artcraft both for domestic and foreign markets. In forest reserves concessions are issued to private firms, allowing felling in a certain area in a fixed period. Parastatals are also involved in the extraction of timber from forest reserves. Some of the timber, mostly valuable hardwoods but also other species are exported to other countries. Ideally, the felling in forest reserves is controlled by the forest department, but illegal felling for the local markets occur frequently, as the forest authorities lack the resources to monitor the reserves adequately. The illegal felling, and also some legal operations is generally carried out by a form of pit-sawing of the chosen valuable tree species, requiring the construction of a platform from the poles and branches of other nearby trees¹³.

As the National Parks and Game Reserves are better staffed than the forest reserves, illegal cutting in those areas is more difficult to get away with.

The public forest lands cover most of the need for construction materials for houses and furniture of local people. People also use wood for art objects for commerce such as the ebony Makonde carvings.

Non-wood forest products (NWFP):

Also termed non-timber forest products (NTFP) these terms refer to the variety of useful things besides timber that people obtain from the forests: edible plants, animals, honey and fungi are collected, herbs and bark with medicinal properties are sought for, and much of the vegetation can be used for many other specific purposes. Often the collected items are marketed locally or even further away¹⁴.

Hunting:

The forests are the habitat of numerous animals hunted by man for protein supplement and prestige. The use of fire in order to chase out the animals, or to create grassy spots where the animals can be caught whilst grazing is by no means uncommon. Another hunting technique seems to be night-hunting with torches; when the glaring eyes of an animal are seen, the torch is thrown at in order to deprive it of its night vision, thus making it considerably easier to kill¹⁵.

Grazing:

The forests provide the nourishment for most livestock; cows and goats are herded into forest areas to graze and browse and often leave forest areas with trees without leaves and shoots up to some height, and without much undergrowth. The goats are considered specially harmful, since they are prone to devour almost anything that is in their way, damaging roots and tubers as well, whereas the cattle just nip gently at the top of the grass.

Clearing:

Total or partial clearing of forest lands is undertaken for various reasons. The preeminent purpose of clearing, generally being recognized as the single most important agent of deforestation in Tanzania, mostly on public lands but also (illegally) in forest reserves, is clearing for agriculture. Methods of shifting cultivation are very common, requiring new lands to be opened up for agriculture frequently. In the ideal shifting cultivation system, a given area of land comprising fields and former fields in varying stages of fallow supports a given number of people indefinitely (land is cleared for cultivation and cultivated for some years until the amount of nutrients in the soil has decreased enough to make the land unsuitable for growing crops - the land is left to fallow and new land cleared - after 10 to 25 years (dependent on soils and climate) the initially cleared area is under dense vegetation and has recovered - it is cleared for agriculture once again). However, when population increases the fallow periods must be shortened and new land cleared. Usually, the method of clearing is to burn the vegetation and clear it manually afterwards. Often trees of value to the farmers are left untouched (if possible - burning the vegetation is a method difficult to control). Partial clearing is often undertaken by setting fire to the undergrowth in order to propagate the growth of new grass for grazing livestock. The clearing of woodlands close to human habitation is often regarded as beneficial by the farmers, as insects, snakes and other vermin shelter therein. This is particularly important regarding the control of tsetse flies that are widespread in miombo and other woodlands, carrying the nagana disease which is fatal for cattle, and sleeping sickness which affects man. Clearing of forest lands are also undertaken in order to establish industrial plantations and farms growing tobacco, coffee, tea, cotton etc.

Tourism:

Most of the National Parks and Game Reserves include large tracts of woodland, giving shelter to many of the spectacular animals of East Africa. Sights, photographs or indeed trophies of these animals are coveted by the safari tourist, generating equally coveted foreign exchange for the state.

Research:

Stretches of forest are reserved for scientific purposes, often in connection with educational institutions. The Amani institute in the East Usambara mountains is an example of such an area, founded during German colonial rule. The Uzungwa Mountains National Park is intended partly as a biodiversity research area.

Other utilizations:

The protection of forest areas for water catchment and soil protection purposes has been mentioned. It is believed that these indirect uses of forest resources are invaluable; if short-sighted utilization of such areas were to flourish, environmental degradation with catastrophic consequences for the livelihoods of people might ensue. Finally, the use of certain forest areas for various religious purposes (sacred groves) must be mentioned.

c. Forest related discourses

When treating the topic of forest resource management in Tanzania, various approaches are found in the literature. I identify two separate discourses in environmental thinking and relate them to the various approaches of the literature, whilst recognizing the dangers inherent in any overly simplistic classification attempt.

1. The ecocentric discourse:

One characteristic of this discourse is the perception of forests not merely as a resource to be used by humans in one way or another. Contrastingly, forests are considered as having an inherent value apart from the instrumental values perceived by other approaches. This value is provided by the flora and fauna of the forests, linking up (in what I term an “extended ecosystem”) with the subsistence of numerous scientists; botanists, zoologists, entomologists, ecologists, as well as environmental

organizations. Areas with unusual diversity in the flora and/or fauna (biodiversity) are the topmost priority of such scientists, explaining the predominance of the (relatively small) rainforest areas in conservation literature. Since almost all human activity tend to influence ecosystems and their biodiversity, ecocentrics generally recommend strict protection measures and improvement of local conditions to relieve pressure on resources. Local people are often considered to have only short-term, destructive strategies of land use (if not being considered in harmony with nature at a sustainable hunter-gatherer level, cf. pygmies and bushmen); land shortage due to population growth and deterioration of lands make local people encroach on forests, clearing, poaching and stealing timber. Cold capitalism and “development” are often regarded as threatening Nature¹⁶.

2. The anthropocentric discourse:

Natural resources such as forests are regarded as resources to the benefit of humans. People’s livelihoods should be improved through the protection of forests, and local people should be drawn into the management of forest resources, as they are regarded to possess valuable knowledge deriving from their long-term relations to the forest resource. Customary uses of forest resources should not be prohibited. People and forests are not seen as strictly separate entities; mutual interactions have shaped a common history. The top-down approach of government forest management schemes are violating the rights of local people, and strict protection of forest resources, often initially expropriated from customarily owned land in reserves and National parks are creating land shortage and thus threatens people’s livelihoods. Anthropocentric discourse concerning Tanzanian forest resource management is found undiluted among some social scientists, anthropologist and historians¹⁷.

3. Practical compromise in between theoretical extremes:

Although the above-mentioned discourses can be discerned in most of the works upon which this paper is based save the most technical ones, they seldomly appear in their extremes. A massive corpus of literature is associated with the foreign donor institutions, their interactions with the Tanzanian administration, NGO’s and their numerous projects devoted to problems of environmental degradation and poverty,

requiring a multi-faceted approach. Navigating between research-based results and recommendations, political and economic restraints of Tanzania and the donor-countries as well as the eccentricities of “world opinion”, all intermingling, requires practical compromises. Besides, even in “independent” literature, traces of ecocentrism mingles with anthropocentrism , suggesting complexity over duality¹⁸.

2. THE HISTORICAL BACKGROUND

a. The German Colonial Period

The mainland of present Tanzania, including the kingdoms of Ruanda and Burundi were officially declared as German colonial territory in 1891. The Germans named the colony *Deutsch-Ostafrika*. The initial years of the German presence were turbulent; the pacification of indigenous resistance held top priority. The procedure of imposing colonial administration was to establish outposts, attempt regulations on indigenous practices of land use and industry and drawing people into a monetary economy by the use of hut taxes, hoping to induce the natives to labour for the colonists in order to be able to pay their taxes. Some German administrators had an education in forestry, and dealt with forestry occasionally besides their other duties in the general administration. Forestry matters were initially dealt with by the *Referat für Landwirtschaft, Forstwirtschaft und Vermessungswesen*. Outposts were eventually established in Usimbe, Mohoro, Magrotto/Tanga, Wilhelmstal (presently Lushoto), Mhonda/Bagamoyo, Morogoro and Arusha/Moshi (see App.2). However, most of these post were short-lived, as there was a serious lack of forestry staff. In 1903 the forester Paul Otto Eckert were transferred to Deutsch- Ostafrika, the first official forester in the colony, implying a growing importance of forestry in the colony. In 1912 a seperate *Referat für das Forst- und Jagdwesen* were created, heading the present three *Forstämter* in Mohoro (Rufiji-delta), Morogoro and Wilhelmstal. Besides the growing number of German forestry personel, local people were trained as *Waldwärter* (forest wardens), wearing uniforms and being comparatively well paid. There were, however, still a lack of forestry staff to monitor the growing area of Forest Reserves, so *Jumben* (village elders) and *Akidas* (cooperative chiefs appointed by the Germans) were often induced to provide for such tasks¹⁹. The German management of forest resources has been described as “...a mixture of keen ecological interest and gross environmental neglect, high technical competence and a lack of elementary cultural understanding”²⁰. When German forest personel surveyed the forests, they often saw depleted and deteriorating areas, and attributed it

to indigenous practices deemed as *Raubbau* (implying “careless and detrimental resource use”). The shifting cultivation practices often left the impression that the local people burned and cleared one forest area, cultivated it until unproductive, then cleared another area, and would continue to do so indefinitely, thus depleting the forests. Also, the seemingly indiscriminate burning in the woodlands were regarded as highly destructive, and a prohibition of forest fires were issued as early as 1893. It was soon realised that this prohibition could not possibly be enforced (even where some degree of monitoring were possible, the prohibition was violated by local people using dried cow dung placed in the sun to act as a delayed incendiary device). In the early years, Europeans and South Africans (Boers) settled in the northern mountain areas, where the climate was found to be pleasant, and the prospects for farming promising. Under little or no supervision from the embryonic forest authorities they often cleared much forest land. Also the northern railway projects, needing great amounts of timber and fuelwood, took their toll in the forests. The forestry staff were aware of the importance of montane forests in water catchment areas, and of the need to secure forest resources for the use of the government, hopefully generating income through proper management. A forest conservation ordinance was issued in 1904, and the reservation of forest areas began. The reserves were to serve a dual purpose of conservation and production, and Eckert, supervised by the governor, Graf von Götzen intended to generate revenue by promoting an efficient timber industry. Some timber companies established themselves (such as Wilkins und Wiese, operating in the Usambaras, connecting their logging sites with the Usambara railway by a tramway), generally in the northern mountainous areas (Usambara, Uluguru, Unguru, Kilimanjaro and Meru) that were the main focus of German forest management due to their pleasant climate and relative proximity to the coast. There were three major markets for the forest products of Deutsch-Ostafrika: the local market for firewood, charcoal and construction timber; a regional market located in the periphery of the Indian ocean as far as India (every year, dhows would emerge at the Rufiji-delta, loading timber from the extensive mangrove forests); and the European market for exotic hardwoods. But the difficulties of transport and the lack of investment had been

underestimated, and the demand was lower than expected. The expected revenues failed to materialise, and Eckert resigned in 1909. The harvesting of wild rubber lianas in forests turned out to be one of the most profitable undertakings, since the demand for rubber had exploded following the invention of vulcanization in 1885. The supply of wild rubber diminished accordingly, and plantations of exotic latex plants were established around 1900, proving to be the most profitable forest-related industry until the market crashed in 1913. There were some successful attempts to establish plantations of teak, pines and other trees, and much silvicultural research was done²¹. When the efforts at promoting production seemed to have failed largely, the protection aspect of the forest resource management gained ground: "...the main task left to the forest administration was the creation of forest reserves by closing off remaining forested areas from human settlement and cultivation"²². Although Koponen makes this initiative sound as merely an effort to abuse local people, many reserves were gazetted in watershed areas from the point of view that they would be crucial to the fertility of the land and thus the livelihood of people in the future²³. However, many reservations were undertaken with regard to exploitation in the future²⁴. War broke out in 1914, and ravaged many areas of the territory, as the German commander Lettow-Vorbeck followed his strategy of defensive warfare in order to occupy as many enemy forces as possible, thus keeping them away from the crucial conflagrations in Europe. In 1918 Deutsch-Ostafrika was no longer German.

The German colonial period marked the beginning of European domination, and the foundations for colonial forest resource management were laid by the Germans, to be largely adopted by the British. The conflicts that arose when local people were deprived of their lands in favour of forest reserves and often forced to move from their homesteads were to continue under British rule. Indigenous practices had been judged to be harmful, and regulations issued accordingly. A deep resentment of foreign domination had caused rebellions, the most extensive being the Maji-Maji in 1905 - 1907, but Africans had realised that the Germans were militarily superior. Illegal activities (clearing, hunting etc.) in the forest reserves were ways of both adaptation, and protest, often simply continuing customary land use in spite of colonial wrath.

b. The British colonial period

Following the Versailles treaty of 1919, the former Deutsch-Ostafrika was to be administrated by the British under a League of Nations Mandate. Concerning natural resources management, the Mandate agreement stated as follows: "...in framing the laws relating to the holding or transfer of land and natural resources, the administrating authority should take into consideration native laws and customs, and respect the rights...of the native population"²⁵. Bound by the mandate and with (comparatively) only limited economic interest in the new "Tanganyika Territory", the British had chosen an inexpensive administrative system based on the Nigerian system of indirect rule, with Native Authorities carrying out the local administration. According to the Land Ordinance of 1923, all land (except app. 1%, designated as freehold) was declared public (Crown) land, under control of the Governor, granting rights of occupancy to the Africans. Although the land was "leased back" to local indigenous control under customary tenure systems, the ability to alienate land if needed was thus secured by the government. Bearing in mind the Mandate prohibition of favouring the interests of immigrants over Africans and the troubles of sufficient labour recruiting recorded by the Germans, European settlement was generally not encouraged, with sisal and coffee production by Europeans as an exception. It was decided to make Tanganyika a "Black man's country", economically based upon peasant agriculture, requiring widespread introduction of cash crops²⁶. Regarding the management of forest resources, a conservator of forests was appointed in 1919, administrating the existing Forest Reserves, and a Forest Ordinance was passed in 1921. All German forest reserves were initially re-gazetted, but later some were de-gazetted and new areas incorporated. In 1925 there were a total of 212 reserves covering 3,707 square miles predominantly of montane closed forests²⁷. For some years, due to lack of resources, the actual demarcation and survey of forest reserves proceeded at a very slow pace. The 1921 Forest Ordinance prohibited activities such as cutting or removing trees or forest produce, firing, squatting, grazing and cultivating in the forest reserves. However, licences could be issued granting

rights to any of the above activities. Forest produce could be obtained freely by people living close to forest reserves providing that it was for their own use, but in 1928 a fee was imposed on the removal of certain, valuable tree species.

In 1935 Tanganyika was visited by the Director of the Imperial Forestry Institute, R.S. Troup, who subsequently issued a report containing recommendations for the future forest policy in the Territory. Ever since the beginnings of British forest administration, the primary goal of forest management had been the generation of revenues, and Troup reaffirmed this position²⁸. Timber from forest reserves would generate income through concessions and royalties, and the forest resources would contribute to growth in other sectors such as railways and mines. A ten-year plan to demarcate and reserve new forest areas was adopted, and funding increased (mainly by the Colonial Development Fund). The free issue of forest produce to local people was regarded by Troup and other forestry personnel as wasteful since they meant a loss of potential revenue. The administrators, however, realised that an abrogation of “free issue” rights would cause political problems as further dissatisfaction among Africans would ensue. Some small forest areas had hitherto been declared as Native Authority Forests, to be managed by local people. This was seen by Governor Cameron as a way of making forest administration compatible with the principles of indirect rule, and doing so cheaply, by ultimately handing over the administration of all forest reserves to the Native Authorities, with the Forest Department in an advisory role. But the category of Native Authority Forests now came to be considered as the solution to the schisma concerning free issue by administrators as well as the scientific foresters led by Troup.

By promoting the establishment of Native Authority Forests (both in existing forested areas and as plantations), a spatial segregation of the forest resources would emerge, with the Forest Reserves left to be exploited by the Forest Department and concession- holders exclusively, and the Native Authority Forests providing the necessities for domestic consumption of Africans. As the areas of Native Authority Forests increased, the need for free issue should then gradually cease²⁹. All potential revenue from Native Authority forests was for the Native Authority Treasury; but

native trade in such forest produce was definitely not encouraged. Contrarily, since all forests was after all on public land, valuable tree species, wherever occurring, were reserved for the State!³⁰

The establishment of Native Authority Forests never succeeded on such a large scale as had been imagined (at the time of Independence in 1961, Tanganyika forest estates covered 106,366 km² state forest and 11,409 km² of Native Authority forest)³¹, free issue was consequently not eliminated, and the value of timber imports was still larger than the value of exports in the late thirties (only in 1928 had the revenue for timber concessions exceeded the expenditures of the Forest Department, and the economic depression thenceforth obliterated the achievements). But during the Second World War, export boomed as timber was needed for various martial purposes as well as for sleepers for the construction of railways in Iran. Since it is estimated that only 25% of the total timber output during the Second World War came from the Forest Reserves, most timber must have come from private logging operations on public land by European companies³². In 1947, status was made concerning British forest management in Tanganyika since their arrival after the First World War: "...the post-war situation had not advanced much beyond the German's accomplishments. Under British occupation, the proportions of land in forest reserves was increased only slightly, from 1.09 per cent to 1.3 per cent. Training of African foresters was deemed inadequate, and reserves were remote, scattered and small, their boundaries ill-defined"³³. Investments were needed and new markets had to be found.

Tanganyika was now supposed by the Colonial Office to become the main supplier for Imperial timber needs in the Indian Ocean. Therefore, the government doubled the expenditure on the Forest Department and accelerated the reservation of forests in 1949. However, a new Forest Policy was adopted in 1953, recognizing the fact that most timber came from outside the Forest Reserves, and emphasizing the role of protection rather than production. The protection of watershed areas and other forested areas in order to prevent soil erosion and land degradation was a major objective of the new Forest Policy, and caused the coming gazettement of large areas of forest reserves, including the new practice of reserving vast woodlands. As the problematic

economy of Britain allowed relatively little investment in economically inferior colonies like Tanganyika, increased attention was now given to activities that would promote self-reliance whilst generating revenue. Numerous initiatives were taken by colonial administrators to increase cash crop production, develop infrastructure, improve agricultural practices and prevent environmental damage to the detriment of sustained productivity. This period has been termed a “second colonial occupation”, since the measures mentioned above led to a growing interference of administrators into the lives and livelihoods of Africans³⁴.

Besides the Forest Reserves, large areas of woodlands and grassland were laid out as Game reserves and National Parks, intended to protect the African fauna for purposes of tourism, hunting and scientific study. Many plantations were established, often on sites of logged natural forests (the export value of forest products of Tanganyika had risen from 120 000£ in 1946 to 580 000£ in 1959)³⁵. Some areas of woodland were cleared during tsetse-control schemes³⁶. In general, insufficient information is available concerning the management of the extensive woodland areas during British rule.

At the time of independence forest resources were situated within legal land categories as follows:

1. Forest Reserve: No settlement or human rights [free issue being a privilege], but varied possibilities of exploitation from complete protection to clear felling and exotic plantation, enacted by ministerial gazettelement
2. Native Authority Forest: Under Native Authority management.
3. Game Reserve: No human rights or utilization, enacted by ministerial gazettelement.
4. National Park: No human rights or utilization, enacted by parliament.
5. Public Land: Free utilization of forest resources, except certain valuable species.³⁷

c. From Independence to the present

Tanganyika became independent in 1961, and entered into an union with Zanzibar in 1964, giving rise to the name Tanzania. The country was headed by the TANU party with Julius Nyerere as president. Following the 1967 Arusha Declaration, the Tanzanian government adopted a policy of socialism and self-reliance - *ujamaa* (familyhood). The first years of independence saw a break-down of the often unpopular colonially imposed soil and watershed conservation schemes, with many people ignoring measures such as the prohibition of cultivation on steep slopes, control of bush fires and timber exploitation, often supported by politicians who denounced any colonial heritage³⁸. Estimations of Tanzania's "inherited" forest resources, indicating clearly the results of the above-mentioned British forest reservation-frenzy after the war, were made some years after independence by different researchers³⁹(see App.B):

1. Total forest & woodland area: 34 million ha. / 44 million ha. (39/50% of land area)
2. Tropical high forest : 1.6 million ha. (2% of land area)
3. Reserved forest area : 13.1 million ha. (15% of land area)
4. Plantations : 42,000 ha. (0.045% of land area, 87% softwood).

Evidently, there was (and still are) great uncertainty concerning the total forested area. According to the policies of the government, a programme of villagisation and decentralisation was implemented from the late sixties. People moved away from the traditional scattered and often impermanent settlements into "ujamaa villages". This villagisation effort "...was meant to provide rural people with modern amenities such as water, sanitation, schools, housing, social centres and the like, while facilitating the introduction of modern agricultural inputs, tools and practices, along with better marketing and cooperative organisation"⁴⁰. Ideally, the movement into ujamaa villages was voluntary, but often coercion was resorted to by zealous government officials.

The number of people in the ujamaa villages varied between 1200 and 3000. An average village of, say, 2500 people would include a cultivated area of some 600 ha⁴¹. Some of the included land were ear-marked for collective cultivation (in the final stage of ujamaa development collective agriculture was supposed to assume major

economic importance, enabling the village to register itself as a cooperative society, entitled to own property and make by-laws; eventually communal land use would be the norm).

The intention was to move all rural people into ujamaa villages, and as “only” 1500 villages were established in 1971, the scheme was accelerated, aiming to conclude the process in 1976⁴². As a part of the general decentralization process, the Forestry Department was split into many units at regional level under the control of regional development authorities in 1969, and most forest reserves came under district administration following the 1972 decentralization reform (however, some catchment reserves came back under Forest Division administration already in 1976).

Gradually, it became obvious that the schemes of the government created certain environmental problems. The villages required wood for construction and fuelwood, and these requirements were obtained from the surrounding area, from which hitherto only little or moderate extraction had taken place, often causing degradation of forest resources. Since land use assessment and planning had often been erratic, lands that were unsuitable for more intensive uses often were degraded by concentrated cultivation and grazing⁴³. Although villagisation brought some social and economic benefits to rural people, it often disrupted customary production, tenure and social systems. Many villagers “who could not follow the logic of moving to a village to be near services and markets that they used only occasionally instead of continuing to live near their crops and animals that they had to tend daily”⁴⁴ were opposed to villagisation. In 1975, nearly 7000 villages existed, accommodating about 9 million rural people⁴⁵. The global economic depression in the late 1970’s brought about worsening terms of trade (steep decline in world market prices for agricultural products on which the country depends for almost all of its foreign exchange earnings) for Tanzania, and the villagisation programme, already stalling, ground to a halt, with some people moving back to their former settlements.

Already mentioned in the Arusha Declaration, village afforestation programmes were introduced in areas with accelerating soil erosion and lack of fuelwood (such as Dodoma) in the seventies. In 1980, a National Afforestation Programme was

implemented, promoting national village afforestation; every village should become self-sufficient in fuelwood, timber, poles, fodder, and the planting of trees would also improve soil conditions and water supply, to the benefit of agriculture (annual planting of 100 trees per household was estimated as sufficient). Although the programme has involved many institutions of Tanzanian society (schools, churches, the army etc. beside the Forest Division and its representatives at village level), it has not even nearly achieved its goals⁴⁶.

As the economic crisis intensified resulting in gradually deteriorating infrastructure, health care, education and administration, IMF loans were negotiated, and a structural adjustment programme was implemented in 1982, prescribing liberalisation, tight budget and monetary policies, increasing the efficiency of parastatals and so forth⁴⁷. Along with the restructuring of the economy went a gradual transition from the absolute dominance of CCM (the former TANU) which culminated in the first multiparty elections in 1995.

In the 1980's the need for new forest resource management policies became apparent. In the revised Forest Policy Document (FORPOL) of the late eighties, the Forest Policy of 1953 were criticised for a lack of objective guidelines at implementation level, no emphasis of interdependence with other sectors, no emphasis of need for community forestry and the importance of wood for rural fuel, no emphasis on the role of forestry as a rural employer and no promotion of people's participation in forestry. FORPOL and the Tanzania Forest Action Plan of 1989 were precursors to the new Forest Policy, formulated in 1998 and in the process of being legislated. Some key elements of these recent policy documents are⁴⁸:

- * The enhancement of forest sector contribution to national economic development, especially in the key linkages to agriculture and water.
- * The involvement of local people in forest based rural development activities.
- * The conservation of ecosystem and biological values.

Foreign donor organisations such as DANIDA, FINNIDA, NORAD, SIDA and GTZ have been playing an ever increasing role concerning the management of forest resources in recent years. Since the implementation of forest management projects are

often dependent on donor capital and technical assistance, the scope of the projects and to some degree the formulation of forest-related policies are influenced by such organisations.

Public policies since Independence is often regarded as factors behind the apparent continuing deforestation in Tanzania⁴⁹. The experiments of ujamaa socialism seems to have caused deforestation; the recent liberalisation apparently also leads to depletion of forest resources; the connected factor of population growth and the correlated clearing of forests for agriculture and other purposes however is often identified as the most important factor leading to depletion of forest resources⁵⁰.

3. CASE STUDIES

a. Kondoia

Situated in central Tanzania and covering 1.4 million hectares, Kondoia district comprises miombo forests in the highlands and bush/grassland in the lowlands. At present about one fifth of the highlands support miombo woodlands, remnants of a more extensive vegetation. Kondoia is often regarded as a classical example of deforestation and eventual desertification caused by the pressure of increasing populations and their livestock. Examined closely, a more complex picture emerges. The first evidence of unsustainable exploitation of forest resources (the local Rangi population is believed to have exerted pastoral and agricultural land uses protective of soils and trees) dates from the 1850's. The diversion of a caravan route from the coast to the ivory-rich interior due to Masaai raids initiated clearings of forest areas for grain cultivation, supplying the caravans, and increased use of charcoal for iron-smelting to provide tools and utensils for trade. In the 1890's the rinderpest epidemic killed up to 90-95 % of the cattle⁵¹. Simultaneously, the German pacification efforts started, to continue for long in this district. During the First World War, the district turned into a battlefield as Lettow-Vorbeck and his Schutztruppe fought against the British; when retreating, the Germans adopted "scorched earth" tactics, causing further environmental damage. Due to the virtual extinction of cattle and the ravages of war on the population (some of which appears to have fled to the highlands), abandoned lowland areas soon became covered with bush growth, creating a habitat for tsetse-flies, hitherto unknown in this district. After the war the British administrators implemented schemes to control the spread of tse-tse flies (clearing large areas of bush, thus hoping to resettle local people and their cattle in the lowlands unthreatened by tsetse) and to prevent soil erosion (reforestation and terracing in the highlands). These efforts seem to have slowed deforestation in the highlands and accelerated deforestation in the lowlands.

After Independence, repeated droughts struck the lowlands of Kondoa in the 60's and 70's, forcing many peasants to move once again to the highlands. Soil erosion worsened, deforestation increased, and food shortages occurred. Along with villagisation, a Land Rehabilitation Programme (HADO) was implemented, supported by Sweden. Ironically, this programme was in many aspects similar to earlier colonial efforts, emphasising cattle destocking, contour banking⁵³, shelter-belt planting, agro-forestry and village woodlots and adopting a top-down technocratic approach with little real participation. In some badly eroded areas, people and their livestock were simply evicted; the vegetation cover on such deserted land restored itself more rapidly than expected. A need for genuine popular participation was recognised in subsequent HADO planning for the period of 1986-1995, realising that narrowly technocratic approaches (such as eviction) might just spread the problems to other parts of the district and incur popular wrath and resistance.

(based on Barraclough).

b. The Usambaras

Divided into the East- and West Usambaras these mountains are situated in north-east Tanzania. They form a part of the Eastern Arc mountains, also including the Ngurus, the Ulugurus and the Uzungwas. The montane forests of these areas are regarded as particularly rich in biodiversity. There is evidence of human settlement in E and W Usambara dating back about 2000 years. Even in areas of present high forest vegetation in E Usambara, hitherto regarded as undisturbed by man, pottery has been found: "...contrary to the views of many biologists who regard many of the East Usambara forests as surviving in their original states into the present century, it is likely that few areas of forest have escaped disturbance by man at one time or another during the past 2000 years"⁵⁴. The Usambaras are currently inhabited by Washambaa and Wambugu who established themselves several hundred years ago. For W. Usambara, the relationship between Washambaa and Wambugu before colonisation seems to have been one of mutual support. The Wambugu were primarily pastoral people; they grazed their cattle in forest glades (presumably created by fire) and

controlled herd size through ritual slaughter of animals and exchanges with the Washambaa cultivators (whose system of multistoreyed vegetable gardens with numerous crops bore resemblance to the forests it replaced, also in its capabilities of water retention and protection of soil erosion) for vegetables, grain and iron implements. In the years before German colonialisation, intermittent warfare and slave raiding by caravans of coastal Muslim people (Waswahili) disturbed the area. Rinderpest decimated the herds, and Maasai started raiding for cattle. Many Wambugu and Washambaa withdrew into higher and more inaccessible parts of the mountains. With reduced herds, the Wambugu increasingly became dependent on cultivation, clearing forest areas to grow maize and pumpkins. The pleasant climate and the proximity to the coast of the Usambaras attracted the Germans, and large areas were leased to European settlers regardless of African rights. Coffee was planted (with little success), and later tea and rubber and oil palms were introduced. A botanical research station was placed at Amani in E. Usambara. Some logging operations were also undertaken, and forest reserves were established. Local people had no access to such reserves, and as the labour requirements of settlers mounted, and compulsory labour service was imposed.

The British converted some of the German estates to forest reserves, and cleared some of these areas for the plantation of exotics. Tea estates were established. Often areas of involved in indigenous systems of land use were incorporated into reserves (as fallow lands with much vegetation appeared “unutilized” to colonial foresters), creating land scarcity among local people. In 1935, all grazing of cattle in forest reserves was prohibited. The reservation of forests continued; the maintenance of a good “tea climate” through the protection of hydrological processes was emphasised. After Independence, some access for cultivation and grazing in forest reserves were admitted to the growing population⁵⁵, and the activities of sawmills increased in both W. and E. Usambara, causing much deforestation. In E. Usambara, the Sikh Sawmills, who had been operating in the area already before Independence, and subsequently became a parastatal, carried out ever increasing logging in reservations of submontane forests. These operations were badly executed, caused much deforestation and erosion

and ceased in 1986. The support of FINNIDA to these operations generated much criticism, and FINNIDA has subsequently engaged themselves in conservation efforts at Amani and elsewhere in order to “make penance for past sins”. Conte makes the following remark about the legacy of colonial forest reservation and plantation “The conversion of the forest to a source of commodities ultimately rendered it useless for grazing because clear felling and replanting eliminated forest glades. In addition, plantation forestry also reduced the variety of plant species and contributed to microclimatic drying. The subsequent relegation of the Wambugu to public land on the margins of their former range forced them to begin a shift away from pastoralism which, by the end of the colonial period, would leave them completely dependent on agriculture. This transformation has left central Usambara with the chronic hydrological and meteorological problems of a deforested landscape”⁵⁶.

(based on Hamilton, Conte, Barraclough)

c. Iringa

Iringa Region situated in the Southern Highlands incorporates areas of both montane and submontane forests (in the Uzungwa mountains), and miombo woodlands. The main ethnic group of the area is the Wahehe, who united to form a powerful military chiefdom in the middle 19th century under the famous chief Mkwawa. The Germans had difficulties pacifying the Wahehe; several battles were fought before the death of Mkwawa in 1898. As the presence of strong forces were envisaged in the *Bezirk* Iringa, the region remained under military administration. The military station at Iringa under *Hauptmann* Nigmann established a few forest reserves, mentioned by the former *Oberjäger* Pietsch, who undertook the first documented forestry review mission in the area in 1905. The following year, a *Stabsarzt* Meixner travelled in the area, mentioning areas worth reserving; “von der bedeutung....die diese Bestände für die Regulierung der Wasser und Feuchtigkeitsverhältnisse besitzen. Es ist zu fürchten, dass diese Bestände wie anderenorts der Unvorsichtigkeit der Eingeborenen beim Wildbrennen zum Opfer fallen könnten”⁵⁷. Further travelling (in the Uzungwas) were undertaken by *Oberleutnant* Brentzel in 1908, whose report mentioned further areas

worth reserving for purposes of timber utilization and soil protection; he gives a vivid account of the necessity of watershed protection based on his experiences in Kilimanjaro and Meru, and observes rapid deforestation even on steep slopes; the deforestation (Waldverwüstung) is brought about by clearing for cultivation and wildfires caused by the use of fire when collecting honey: “Der Neger lernt allmählich den Wert des Geldes schätzen, und so regt sich bei ihm ein grösserer Erwerbstrieb; er legt zahlreichere und grössere Schamben an und sucht fleissiger als bisher nach Honig”⁵⁸. Brentzel’s report was included in a letter by Nigmann requesting the assignment of a forester to the region in order to undertake further reservations. In 1910, a *Förster* named Simon was assigned to the region; he undertook several journeys to estimate the condition of forests, finding, among other things, that the collection of wild rubber lianas in the Niam-Niam reservation (which was surrounded by “wertlose myombo”(valueless miombo)) by natives was about to exhaust the supply, and that the rubber collectors (employed by Waswahili tradesmen) set fire to the grass in the dry periods to ease the access. In 1912, Simon was transferred to Morogoro, where he reported, rather agitated, to the head of the *Forstamt*, that the military station in Iringa used the forest reservations for their own purposes, felling timber indiscriminately for the construction of houses and the manufacture of furniture, and even destroying small trees (by building shelters for the felling-crews in forests), the capital of the future, in the process! - whereupon the head of the *Forstamt* Morogoro pleaded that the Military Station should be subordinated to the *Forstamt*, and that the military station should pay fees for the felled trees. This was followed by a lengthy exchange of letters at higher levels, apparently without any significant outcome⁵⁹. After the war, the British forest administration surveyed the German reserves in Iringa Region, and degazetted four reserves (among them Niam-Niam) that had been “destroyed by the Wahehe’s shifting cultivation”⁶⁰. Widespread forest destruction was reported in 1923, and in the late 1920’s, several forest areas were gazetted as reserves. In 1930 it was noticed that prohibitions of forest destruction issued by Iringa Native Authority were not observed. In the following years Native Authority courts began to take action against destruction of forest, and in the period of

1933-1938 at least 340 fined convictions for forest destruction were recorded⁶¹. By 1939 it was recorded that the past 16 years had brought about a gradual improvement in “native attitudes towards forests and forestry”; Native Authority Reserves had been established by planting, however: “It will take time entirely to stop the clearing of forest for planting crops, for the native realizes the value of fresh ground for his maize crop to be followed by a crop of “ulezi”[bullrush millet] from which he makes his beer”⁶². It was estimated that 100000 acres had been added to the forest reserves, and that the free issue from forest reserves amounted at an annual value of only 500 Shs. Concessions for exploitation of *Ocotea Usambarensis* had been issued in two forest reserves. After the Second World War, tobacco growing by settlers was encouraged in the area around Iringa, and at least at one occasion tobacco growing was allowed inside a forest reserve⁶³. The growing of tobacco by Africans increased drastically after Independence, and large areas of miombo woodlands near Iringa was cleared, both for cultivation and curing of coffee⁶⁴. Additionally, production of charcoal through the Forest Industries Project (FIP) for export to arabic countries took its toll in the 1970’s and 80’s. Iringa region experienced increasing loss of vegetation cover, soil erosion and loss of soil fertility⁶⁵. A HIMA (Hifadhi ya Maendeleo - Environmental Protection) project, supported by DANIDA was established in the region, dealing with sustainable agriculture, anti-erosion measures and watershed management. In the late 1990’s, the MEMA project, also supported by DANIDA was established, dealing more particularly with the management of the miombo woodlands and the catchment forests of the region on a participatory basis.

Several causes of present deforestation (of varying degrees of impact) in Iringa District can be isolated: pitsawing for valuable timber, removal of wood for charcoal production, brick burning, tobacco curing, cooking, the smoking of fish (widespread near the Mtera Dam), and for construction, furniture and artifacts. Bushfires, often spreading wildly, are believed to be a central cause of deforestation; it is lit for many reasons: clearing for agriculture, control of pests and snakes, hunting, promotion of new grass growth for livestock grazing, smoking out bees in honey collection etc. .

(based on research in Iringa and the Tanzanian National Archives)

d. The Rufiji Delta

The delta of the Rufiji River about 150 km. south of Dar-es-Salaam harbours excessive mangrove forests that has provided timber for markets on the coast, Zanzibar (the Sultan of Zanzibar, after giving up his territorial rights on the mainland in 1890, still retained unrestricted user privileges in some mangrove forests in the Rufiji delta) and even further away for centuries. The Germans, who established tanning-bark factories in the area and extracted some timber themselves found that parts of it was ruthlessly exploited⁶⁶. The population of the Rufiji Delta has not increased substantially, as populations have elsewhere, and in the 1980's it declined. In the 1970's and 80's, the extraction of wood for timber, construction poles and charcoal increased, catering for markets in Dar-es-Salaam and the Gulf states. Forest destruction ensued due to indiscriminate and wasteful practices by local people meeting the demands of the market. It is assumed that these practices differed from customary practices of careful forest management and sustainable extraction (obviously, the German experiences are not taken into account here), and these practices are explained by the apparent break-down of local farming systems increase of social differentiation during Villagisation. The resettlement of flood victims in the Delta initiated villagisation and put strains on customary tenure; the widespread cashew-nut production was impeded by the concentration of local people in villages long distances away from the trees that had to be tended - many young men who were now superfluous for the cashew production and farming moved to Dar-es-Salaam. While the markets for charcoal and timber exploded in rapidly growing Dar, the forest division lacked resources to monitor the forest reserves in the Delta, and a course of destructive extraction of mangrove wood was embarked upon by local people: "Remaining villagers found mining forest resources, and particularly those on government lands, the easiest way to gain their livelihoods. Customary rules governing forest exploitation were simply forgotten in this situation of new lucrative markets, insecure forest tenure and social disruption"⁶⁷. Apparently, local authorities

were persuaded into lax attitudes toward forest exploitation by public officials profiting on the operations.

(based on Barraclough and Schabel(2)).

e. Serengeti Woodlands

The so-called Serengeti- Maras ecosystem situated in northern Tanzania and stretching over the border of Kenya is comprised by two National Parks, the Tanzanian Serengeti National Park and the Kenyan Maasai-Mara National Park. Both national parks are an important source of earnings based on the tourist industry; subsequently, the government attach great importance to the protection of the parks. The ecosystem has areas of *Acacia* woodlands and *Croton* thickets. Serengeti- Mara was once the home of Maasai pastoralists, but in the late 19th century they were stricken by cattle disease, first bovine pleuropneumonia, then rinderpest, causing the virtual extinction of their cattle herds, upon whom they had depended. It is estimated that 75% of the population once living in the area had died in the early 1890's from the resultant famine, followed by epidemics of smallpocks. The area was thus left virtually devoid of human influence. Many wild species were also affected heavily by the rinderpest, only gradually developing immunity to the disease. The elephant population declined rapidly around the turn of the century due to hunting for ivory, the barter of which for cattle often being the only means of subsistence for remnant Maasai. In the early 1900s, the Serengeti-Mara was described by travellers as an undulating, open, grassy country with some stands of *Croton* thicket and scattered *Acacia* trees. However, 30 years later, the area had changed drastically; the formerly open plains were now covered with widespread *Acacia* woodlands and belts of thornbrush (*Croton* thicket), and inhabited by numerous leopards. In 1937 the Tanganyika Serengeti was declared a game reserve, and a decade later it became a national park, as a necessity of preserving its "pristine woodlands" were recognized. Despite the loss of many hosts, the tsetse flies had survived in the area, and with the increasing vegetation cover and the gradually recovering wildlife, it began to spread. The Maasai in the National Parks were aware of the threat, and in affected areas

grazed only sheep and goats (not being affected by the tsetse-spread nagana cattle disease). The widespread presence of tsetse-flies was not unanimously lamented: “the tsetse fly stands guard of this area, and even today it is virtually a glimpse into Africa as it was before the white man ever crossed its shores” (Royal National Parks Report 1946)⁶⁸. However, areas neighbouring the parks were also badly affected by the tsetse fly, and measures to eradicate the flies (such as mechanical bush clearing and eradication of hosts near settlements) were undertaken in the following decades. Indeed, the tsetse flies declined; but this was due to the decline of woodlands and thickets since the 1960’s. This decline was attributed to 1. Increase in fire frequency; and 2. Increase in elephant density. Years of very high rainfall had promoted grass growth, making the area more susceptible to fires during the dry season; such fires were lit for various reasons, such as hunting, honey gathering, and to improve grazing pastures and clear tsetse infested bush by the Maasai. The elephant population in and around Serengeti-Mara had increased in the 1950-60s and many elephants were forced into the parks by competition from the thriving human and cattle populations in the surrounding area (human life had been protected and extended as modern medicines had become available, and cattle were vaccinated against bovine diseases). The numerous elephants altered the landscape drastically by browsing and destroying trees, whilst fires destroyed much woodland and thicket. As a result, by the 1980s, the Serengeti-Mara were reverting back to grasslands with only scattered woodland and thicket. Overgrazing outside the park is presently diminishing the standing crop of grass, so that little burning is done; this in turn provides for the re-establishment of woody plants (“bush encroachment”), creating more habitats for the tsetse flies, measured in an increased incidence of nagana in cattle. At present, the Serengeti-Mara ecosystem seems to be locked in a grassland phase, although the increasing herds of grazing wildebeest may provide the impetus for a process of bush encroachment similar to the one described above.

The finding that a “change is an integral part of the Serengeti-Mara ecosystem, and that the ecosystem is, in fact, dynamic”⁶⁹, is regarded as being of great influence to the management of related ecosystems, as managers must now realise that not all

ecosystems are “climax systems”⁷⁰; accordingly decisions must be taken regarding the expediency of maintaining a dynamic ecosystem at one stage or another.

(based on Dublin.)

f. Additional case studies

Neumann, in his study of the Arusha National Park, emphasises aspects somewhat different from the ones emphasised in the Serengeti study. Conflicts of conservation versus customary rights are examined. As opposed to the administration view of “encroaching peasants”, a concept of “encroaching National Park” is advocated; the eviction of local people from the park and the prohibition of customary uses of the park threatens the livelihood of the Meru peasants and has created resistance ever since the establishment of the park. Meru peasants are regarded to possess a much superior knowledge of the natural history and ecology of the park, and their practices of resistance are directed not at conservation itself but at the ill-conceived policies of implementation⁷¹.

Monson, in his account of forestry and food policy in the Kilombero valley 1920-1940, tells of colonial foresters trying to put an end to the felling of valuable tree species on the slopes of the Kilombero Escarpment for making canoes; the canoes were used by the Wandamba for the transport of rice and other goods to the market at Ifakara. As the tree species for construction of canoes were also coveted by the forest department for their commercial value (the establishment of a saw mill at the river had been proposed), restrictions were imposed on the felling of these trees. These restrictions, and the establishment of forest reserves, led to the concentration of felling in few non-reserved areas, contributing to increasing deforestation.

Hosier analyses the environmental impact of charcoal production in three areas: Shinyanga, Dar-es-Salaam and Mbeya, and reaches the conclusion that the contribution of charcoal production to forest degradation depends on the post-harvest management of miombo woodlands; only in clear felled areas where the undergrowth had been removed was soil crusting experienced; where selective harvesting of mature trees of preferred species for charcoal had been carried out, and the understorey not

disturbed, far less soil disruption occurred (this was the case in most sites surrounding Dar-es-Salaam). In sites of former harvesting without clear cutting and undergrowth clearing miombo regrowth occurs. Coppicing practices and the use of fertilizer in harvested areas would secure the future supply of wood for charcoal in many sites⁷².

4. DISCUSSION

Agents & interactions in the management of forest resources 1891-2000.

The case studies have shown that a multitude of agents, human as well as non-human, have interacted to form the present state of the forests and their management in Tanzania. Before embarking on an identification of seemingly important agents, this present state of the forests and their management must be considered with regard to what appears as the central theme, namely the issue of deforestation. *Deforestation* seems to be a somewhat cloudy term applied at will to cases of total forest clearing, “impoverishment” of forest areas (the reduction of species diversity by harvesting of valuable species, be it for timber, charcoal or other purposes), selective clearing (often for agriculture, leaving some species of value (fruit-bearing trees, trees for medicinal uses etc.), clearing for establishment of plantations, firing of areas reducing the vegetation to fire-resistant species and so forth. The term *deforestation* carries sombre connotations of impending disaster; if all the above-mentioned situations are implicit when estimating the rates and impacts of deforestation, the estimates will certainly appear sombre and forebode disaster. In the Usambara study, the multi-storeyed vegetable gardens of the Washambaa showed a structure similar to the forest they replaced, and a similar capacity of water retention; the establishment of plantations on cleared forest lands might be able to re-establish functions of water retention, checking soil erosion⁷³; Hosiers study of charcoal harvesting shows that selectively harvested miombo woodlands show little or no sign of erosion and soil crusting. Pitsawing and other selective felling will bring about a temporary reduction of crown cover, and perhaps trees of other species than the felled trees will thrive in the light and bring about a change in the composition of the vegetation; perhaps this implies *impoverishment* ; regarding it as *deforestation* seems somewhat exaggerated. The problems inherent in defining deforestation can be elaborated, when the Usambara case study is examined; areas of secondary forest on formerly cultivated lands lying fallow as a part of shifting cultivation systems were often incorporated

into forest reserves by colonial foresters. Thus, when including such areas, the areas of “undisturbed forest” were estimated as much larger than was actually the case.

If long-term estimates of deforestation builds upon such dubious estimates, the resulting calculations of deforestation rates will appear more drastic. Furthermore, the dynamics of ecosystems, as shown by the Serengeti study, must be taken into account; an area of predominating woodlands and thicket comes to be regarded by colonial official as a remnant of the “original” wooded African wilderness, despite the fact that it was but on a stage in a dynamic process of reversion from grassland to woodland and back again, created by both human and non-human influences.

The forest cover estimates of FAO from 1981 (taking account of forests on fallow land and mentioning them separately, as opposed to some colonial practices) are still the most elaborate estimates undertaken in Tanzania; the collection of their data took place in the late 1970s. Since then, only localized or preliminary studies have been carried out. Obviously, if more accurate estimates of the long-term rate deforestation in Tanzania were to be calculated, it would require extensive up-to date forest cover assessments and numerous local studies of past vegetation dynamics, as well as a clear concept of the term *deforestation*.

Agents.

Numerous agents influencing the management of forest resources can be identified. In the historical background section and most of the case studies the existence of conflicts between local people and the state, be it colonial or post- independence, have been disclosed. Thus, the main (and apparently often antagonistic) actors on the forest management stage could be identified as 1. Local People; 2. The State. These agents are, however by no means always to be regarded as separate, individually coherent entities. When adopting an arbitrary classification such as *State* (defined as the state apparatus) as opposed to *Local People* (defined as people living in the vicinity of, and interacting with, forest resources), it must be recognised that evidence pointing towards a greater complexity is at hand.

It has been mentioned that diverging interest may occur within the state apparatus in the case of *Militärbezirk* Iringa and *Förster* Simon; Troups recommendation that free issue be abolished caused anxiety among British colonial administrators; forest staff chose to ignore widespread felling in the mangroves of Rufiji.

Also amongst the local people some lack of unity in purposes occur: *Jumben*, the heads of local societies, often guarded the borders of forest reserves against “encroachment”; local people were fined for forest clearing by the local people of the Native Authorities; and local people continue to do their duties as forest guards. Thus, if regarded as antagonists, local people and the state encroach on each others positions; loyalties of some local people are obtained for the state; and loyalties of some forest officials may, indirectly or directly, be secured for the local people.

Besides the recognized main agents, or indeed groups of agents; the state apparatus and local people, others play important roles, such as the European settlers in the colonial period, people of Tanzania in general, with their needs for fuelwood, construction materials and the like, private companies and merchants (both foreign and national) dealing with timber extraction and cash-crop plantation, the organizations of foreign donor states, international organizations (such as the various UN-organizations: IMF, FAO etc), non-governmental organizations of various persuasions, and all kinds of scientists.

Non-human agents influencing forest resources, often in interactions with human agents, include diseases, vegetation dynamics, climatic and soil conditions, wild and domesticated animals.

Interactions.

In the case of Kondo, the government’s ways of dealing with soil erosion included coercion, and government practices bore a striking resemblance to British colonial practices (that were indeed believed to create a new pattern of deforestation); top-down technocratic approaches towards local people were applied. The initial embarkation on the process leading to present deforestation and soil erosion was brought about by the interactions of caravans and local people, bartering grain and

implements for the production of which forest resources were utilized; the agency of disease (rinderpest) and, additionally, destructive warfare then transformed the local economy and ecology creating room for the vectors of other diseases (the tsetse flies, often harbouring various trypanosomes causing sleeping sickness in man and nagana in cattle, now inhabited the spreading bushlands where cattle had once grazed). Climatic factors (repeated droughts) as well as tsetse-flies forced local people into the highlands, causing renewed deforestation.

In the Usambaras, interesting dynamics of state/local people interaction were observed; before the colonisation, disturbances related to diseases (rinderpest) and long distance trade (caravan raids) trade caused the livelihood strategies of two hitherto interdependent ethnic groups to change; further adaptation occurred when colonial governments imposed restrictions of land use; the pastoralist Wambugu gradually adapted and became peasants; the lands of which they had been deprived often became degraded by unsound practices adopted by the colonial state, European settlers and, eventually a parastatal company supported by a donor organization. Also, the population growth and the subsequently increased clearing of forests in reserves (a practice partly sanctioned by the government after independence in this area), contributed to deforestation.

In the Iringa study, light was shed on early colonial conflicts within the government; one branch (the military administration) utilized forest resources, initially sequestered from any management by local people, for their own purposes, degrading the forest in the process; this practice was strongly objected to by colonial foresters eager to impose management by their own branch upon forest resources. Headmen (*Jumben*), approved by colonial government were occasionally relied upon for guarding of forest reserves against “encroachment”- it seemed that they were unable to control the extraction of rubber lianas, carried out by their own people, financially induced by Waswahili tradesmen. The burning of forests and woodland by local people for various purposes were regarded as ignorant destruction from the very start of colonialism; such practices were prohibited, although a general enforcement was problematic; in areas where the management by fire was deemed necessary, the

government imposed their own fire-management schemes⁷⁴. The courts of the Native Authority fined local people for any practices of clearing and firing within forest reserves, as seen in the Iringa case. The Native Authority reserves were established by the government; their establishment owed much to the conflicts between colonial foresters and administrators on free issue. Government desire for cash crop revenues and industrious European settlers introduced the cultivation of coffee in Iringa, supplying the factories of the East African Tobacco Company in Dar-es-Salaam and Nairobi, much to the detriment of surrounding miombo woodlands; this process was accelerated after independence by the increasing farming of tobacco by local people.

The role of donor agencies of foreign countries, NGOs and scientists is evident in post-colonial Iringa Region; DANIDA has long been present in the region, supporting sustainable land use and watershed management projects economically and by the presence of trained staff; the establishment of the Uzungwa National Park owes much to the activities of several scientists and conservation NGOs in the area for the last thirty years⁷⁵. It was observed on a field trip to the Nyang'oro woodlands on a range of hills in the northern part of the region, that forested areas on public land are not necessarily prone to greater degradation and deforestation than forest reserves; this area showed few signs of utilization when venturing some distance away from the Iringa-Dodoma road and the settlements at Mtera dam, whereas the Kitapilimwa forest reserve (gazetted in 1952 for production use) near Iringa Town has been heavily degraded, presumably due to fuelwood demand. This also adds to Hosier's claim that the relative distances to forest resources influences the degree of utilization.

When the Rufiji case study is scrutinized, it is found that deforestation is not always correlated with population growth; the population of the area has remained constant or even decreased, whilst deforestation has increased. In this area recent deforestation is probably more a result of interactions of economic incentives, impoverished local people and shortcomings in the management of forest reserves induced by the possibility of short-term economic gain. The basis for this process seems to have been laid by the state-induced villagisation effort; the free market dynamics of the deforestation in the mangroves could be attributed to the increasing

government devotion to liberalisation, a devotion in turn imposed by the structural adjustment programmes that were adopted in the process of securing new IMF loans.

As for the Serengeti case study, interactions of disease, wild and domesticated animals, climate, vegetation and human influence created dynamics of changing vegetation throughout the history of this ecosystem. The area appears once to have been of predominant grassland, probably promoted to some degree by the burning of grass to provide for fresh growth for the grazing of the cattle herds belonging to populations of pastoralist maasai. The agency of disease (rinderpest, later also smallpox) virtually destroys the maasai economy and leads to massive depopulation, as well as increased die-off in many species of wild animals. Under less influence from grazing animals, the vegetation gradually changes into the bushland perceived by colonial officials as virgin bushland, a surviving representative of the immaculate African landscape, and is taken under the guardianship of the colonial state. Animal (elephant) and human (burning) agencies, however, gradually mar the air of the once so succulent maid...

My chosen secondary case studies each exemplify additional interactions; The strict protection of an area (the Arusha National Park) valuable for the state in terms of revenue from tourism implies the ostracism of local people and the extinction of customary uses of the reserved area; people react by exercising their claimed customary rights in defiance of the park authorities. As the potential impact of local people's utilization of the area is deemed beforehand as harmful, the authorities form a paramilitary corps to protect the Park, a measure that might lead to further escalation of the conflict.

The Kilombero valley example shows that the British colonial authorities had little understanding of the function of the regional economy; foresters lamented the felling of trees for canoes; the canoes were regarded as much too large for private use, and heavy royalties were imposed on the utilization of trees for such canoes. As the canoes were utilized for the transport of rice to other markets, they indicated an established cash crop economy (as promoted by the authorities); most colonial officers were either not aware of this, or simply did not care, as the revenues that could be

derived from the establishment of a saw mill processing the valuable tree species, also being used for canoes, were top priority. The ensuing reservation of relevant areas forced local people to intensive timber felling in the remaining areas on public lands, thus contributing to deforestation.

Finally, the study of charcoal management reveals that although fuelwood extraction, and wood extraction for the production of charcoal especially is regarded as one of the main reasons of deforestation in Tanzania (since the growing population requires growing amounts of fuelwood; the most rapid rate of population increase is found in towns and cities, where charcoal is the preferred fuel) the harvesting of charcoal is not always as detrimental to the environment as imagined; selective harvesting leave behind forest areas capable of regeneration; if properly managed, such forest areas could yield sufficient supplies of wood regularly. Concerning the utilization of forest resources for charcoal production, many forested areas are excluded from the “danger zone” as they are too distant from the markets for charcoal; transport expense would surmount any income.

Approaches and ideas.

The heterogeneous corpus of literature contains some approaches and ideas that might elucidate aspects of the complex topic of forest resource management.

Concerning the topic of deforestation, the importance of historical evidence and ecosystem dynamics when estimating deforestation rates touched upon in the Serengeti and Usambara cases has been recognized and elaborated by Fairhead and Leach in their studies of deforestation in West Africa; one of their more remarkable conclusions concern the connection between the often very pessimistic estimates of deforestation calculated by international organizations, and the interests of forest authorities; “Continuity in administration and analysis has gone hand in hand with the persistence of certain specific policy and programme approaches. In many countries, colonial forest codes (which...incorporated particular analyses of forestry problems) have been retained until very recently.... Inherited forestry codes brought with them inherited assets, whether in forest reserves or listed timber tree. In their continued

presence, these assets, in effect, constantly instantiate the original reasons for their acquisition...For forestry administrations to relinquish the analysis linked to these assets would be, in effect, for them to relinquish claims to the resources. The analysis is thus strongly implicated in the real politics of control over valuable resources and revenues. As Roe has argued, crisis narratives- in this case about deforestation- are a “primary means whereby development experts and the institutions for which they work claim stewardship over land and resources they do not own”...”.⁷⁷. This lengthy extract, although based on studies of West Africa, and perhaps somewhat exaggerated regarding the sinister schemes of development experts and forestry administrations, nevertheless relates to some similar characteristics worth considering when examining the relations of Tanzanian forest administration, development organizations and forest resources. Despite the change of political and economic systems under which it has operated, there seems to be a remarkable continuity concerning the policies and agency of Tanzanian forest authorities ever since the beginning of colonial times, with the exception of a temporary change during ujamaa socialism, where control over most forest reserves were shifted to district authorities, and thus to a more localized form of management. Indeed, when examining the discourse of colonial forest authorities concerning, say, watershed management, it appears very much like the currently adopted approaches. Likewise, the forest policy of 1953 seems to have served the Tanzanian forest authorities well until recently. All the same, it must not be forgotten that the management of forest resources by the state is partly directed at long-term goals such as maintaining the fertility of the country; the discourse of watershed management may not have changed simply because the importance of watershed management has proven itself on several occasions. In spite of all criticism, it cannot be denied that deforestation do occur; that local people are often instrumental in bringing about deforestation; that deforestation is often succeeded by environmental degradation, threatening the livelihoods of local people, and thus; that local people, possessing superior customary land use skills or not, like all other people, are prone to adopt short-term and degrading practices in times of crisis⁷⁹.

That local people have often been forced into such current situations of crisis

due to processes of state intervention in the management of forest resources, however, must not be kept out of sight, as future management should avoid past malpractice.

The tradition of Tanzanian environmental history is considered to comprise two opposing extremes; the “Merrie Africa” and the “Primitive Africa” approach. The “Merrie Africa” approach “...sees stable precolonial communities as having lived in harmony with nature before suffering depopulation, ecological disasters and economic exploitation under colonial rule”⁸⁰, whereas the “primitive Africa” approach “...depicts precolonial Tanzanians as having inhabited a hostile environment in perilous proximity to famine, epidemic and demographic reversals before achieving somewhat greater security in the colonial period”⁸¹. As with the Anthropocentric and Ecocentric discourses, these are seldom found in their extremes in the literature, but most writings are influenced by one or the other of these approaches. In this paper, the “Merrie Africa” approach surfaces most evidently in the Rufiji case, where the “ruthless exploitation” of mangroves mentioned by German foresters at the turn of the century is either being ignored or simply not known of by the author. A tendency towards idealising local people and their customary uses of natural resources can be found in other case studies, especially those deriving from Barraclough’s volume. The “primitive Africa” approach is often found, at least implicit, in documents and writings from the colonial period, where the beneficial influences of colonial natural resource management are stated, as opposed to the detrimental practices of indigenous people. Such approaches have been encountered from German colonialists in the Iringa case study. When emphasised even further, the elaborations of “native careless and detrimental practices” combined with statements on the perceived general limitations of the minds of natives regarding long-term planning, borders on outright racism.

Traces of ecocentric and anthropocentric attitudes are found in various places in this paper. When examining both independent and colonial forest management, phrases belonging to an ecocentric discourse can be discerned; such as “encroachment”, “poaching” and “theft of wood”. However, the purposes of colonial forest officers appear more anthropocentric than ecocentric, as protection of the environment for its

own sake is definitely not stated as regularly as protection or production for the sake of the “country” (be it Tanzania or the United Kingdom in practice...).

Anthropocentric discourse, then, is often evidenced in this paper; in its most undiluted forms, it is found among historians, anthropologists and social scientists such as the ones in the Maddox volume, Neumann, Fairhead&Leach and others.

Some such historians and anthropologists advocate a new approach towards the history of resource management in Tanzania; their project is to scrutinize “how economic institutions, political and gender relations, intellectual leadership and moral imperatives may have been involved in the process of environmental adaptation”⁷⁶. They stress the ability of local people to adapt when confronted with restrictions and changes imposed by government, and emphasise the need for localized historical studies, in doing so, they place themselves in opposition to both the “Merrie Africa” and “Primitive Africa”, both of which tend to disregard the ability of Africans to adapt in a context of imposed colonial control over natural resources. Their argumentations found in this paper concerning the relationship between local people and the conservation measures of the state (cf. Conte on Usambara, Monson on Kilombero and Neumann on Meru) focus both on the features of imposed state control, wrecking customary systems of land use (such systems are also occasionally scrutinized to determine their origins), and the adaptation of local people (giving due regard to the heterogenous features of their societies in each case study) to such conditions. To attempt some degree of understanding of the dynamics of natural resource management, then, not only state/local people interactions but rather state/local people/ecosystem interactions throughout history must be explored, an assumption that seems reasonable, since it has been disclosed in this paper that ignorance of such dynamics may lead to erratic concepts of forest resource management both past and present.

CONCLUSION

In this paper, I have examined agents and interactions in the management of forest resources in Deutsch-Ostafrika, British Tanganyika and independent Tanzania from 1891 until now, with some excursions to the period antedating colonialisation.

I have described the forest resources and their management of today, given a general historical account of forest resource management, and employed case studies to illustrate further the varying aspects of forest resource management. Thenceforth, I have investigated the relevant topic of deforestation, isolated agents and their interactions in the management of forest resources, and examined some ideas and approaches in the relevant literature.

The primary, and by no means always individually homogenous, agents of the greatest importance have been identified, roughly, as the *State* (defined as the state apparatus, with special regard to the forest administration) and *Local People* (defined as people living in the vicinity of, and interacting with, forest resources). Regarding the interactions of these main agents, a remarkable continuity of the scopes and policies of forest administrations ever since colonialisation has surfaced.

However, many other agents, both human and non-human and often of crucial importance, have been seen to interact with the above-mentioned agents in processes bringing about the present state of forest resources and their management.

Approaches and ideas concerning forest resource management have been scrutinized, as they provide frameworks of some importance for the structuring of the complexity inherent in the chosen topic. Such approaches of relevance included the general ecocentric/anthropocentric discourse, some differing historically based ideas about natural resource management and a remarkable analysis of the topic of deforestation estimates.

Nevertheless, the great complexity which emerges when examining various processes of forest resource management, whilst giving due regard to the historical and often very localized origins of such processes, often defies attempts at making

generalizations. Thus the method applied in studying forest resource management must imply a sound scepticism towards generalizations regarding complex matters.

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1. et al p. Power 24 for the first three estimates, Ahlbäck p. 29 for the last one.
2. Ahlbäck pp. 29-30
3. Holmes
4. Ahlbäck p. 31
5. Burgess et al. p. 206
6. Ahlbäck pp. 41-42, 44, 46-47
7. Rodgers p. 296, Ahlbäck p. 28
8. Barnes p. 168
9. Barnes p. 171
10. Power et al. -table at p. 24
11. Power et al. p. 24, Ahlbäck p. 33-34
12. Johnsen p. 107-109
13. Pit-sawing: "Pit-sawing involves the felling of individual trees, cross-cutting the trunks, rolling the logs onto frameworks usually over pits and then sawing planks by hand with a big vertical saw operated by two workers, one above and one below the logs. Pit-sawing can...create large gaps and when conducted on a large scale can rapidly degrade a forest". - Hamilton p. 53
14. Campbell mentions a wide array of NWFPs derived from miombo woodlands on pp. 105-110; it is estimated that one square mile of miombo woodland can support 44 bee colonies producing 0.1 tons of beeswax and 1.3 tons of honey, being important currency earners in Tanzania, each year. - Campbell p. 109
The importance of leaves for consumption by rural households in Lushoto, Tanzania is mentioned; the menu featured no less than 15 species. -p. 106
15. Henrik Lerdorf, Technical Advisor, MEMA, personal communication
16. Adaptation of an overview kindly provided by Quentin Gausset
17. Same as above (other terms exist for related discourses: globalist/antiglobalist etc.)
18. Indeed, a "compromise discourse" might be introduced, comprising most literature...
19. Siebenlist pp. 1-3, Schabel(1) 200-201
20. Koponen p. 530
21. Schabel(2) pp. 136-138
22. Koponen p. 533
23. Schabel(2) p. 133, Siebenlist p. 4
24. Siebenlist pp. 6-12, Badermann pp. 607-608
25. Neumann(1) p. 48
26. Neumann(1) pp. 48-49
27. Neumann(1) p. 50
28. Neumann(1) pp. 51-52
29. Neumann(1) pp. 57-58
30. Neumann(1) pp. 59-60
31. Sangster p. 122 - converted from square miles.
32. Neumann (1) p. 52
33. Neumann (1) p. 52
34. Neumann (1) p. 54

35. Rodgers p. 187
36. Iliffe p. 270-272
37. Rodgers p. 288, Public Lands and Native Authority Forests added
38. Power p. 27
39. Lundgren p. 127, adaptation
40. Barraclough p. 83
41. Ahlbäck p. 16
42. Ahlbäck p. 16
43. Barraclough p. 83
44. Barraclough pp. 83-84
45. Barraclough p. 83
46. Ahlbäck pp. 69-71, 87 - lack of success due to insufficient supply of seedlings, lack of extension support and general coordination. However, an understanding of the need for afforestation has been created...
47. Ahlbäck p. 20
48. Rodgers 291-292
49. Barraclough p. 84
50. Barraclough p. 83 / Gibbon pp. 43-45, Barraclough p. 84/ regarding population growth, see Rodgers p. 299
51. Based on Barraclough
 52. Rinderpest: A fatal cattle disease often believed to have been introduced with infected cattle bought from India by the Italian forces in Somaliland in the late 1880s; see Iliffe p. 124
53. Contour banking: household trash is laid along the contours of cultivated hills; when enough soil has been deposited on the trash bunds by soil wash, a bank is formed on which crops can be planted. - one out of many anti-soil erosion measures. See Berry&Townshend p. 246
54. Hamilton p. 35
55. In Lushoto district, W. Usambara, the population increased from 128.000 in 1928 to 357.000 in 1988 - Barraclough p. 86
56. Conte p. 116
57. In Tanzanian national archives (TNA): “Akten des Kaiserlichen Gouvernement von Deutsch-Ostafrika - betreffend Forstwirtschaft Bezirk Iringa.”: 11. Pietsch 02/1905, 13. Nigmann 25/01/1906, 19. Meixner 03/11/1906: “von der Bedeutung etc.”: “[worth reserving] due to the significance of these forest areas for the regulation of water and humidity. It is to be feared that these forest areas, as in other places, could fall prey to the carelessness of the natives whilst burning”.
58. TNA, 25. 26/11/1908: “Der Neger...- The Negro gradually learns to appreciate the worth of money, and then becomes more enterprising; he establishes more and larger fields, and searches for honey more eagerly”.
59. TNA 41., 86.,109. of the “Akten...”
60. TNA, Forest Reserves Iringa vol.1 1927-1928
61. TNA, Iringa District Book, Microfilm 21. Offences were fined as follows:

Clearing forest:	778 Shillings
Disobeying anti-erosion measures:	186 Shs.
Burning:	149 Shs.
62. Iringa District book
63. Forest Reserve Register: Tobacco cultivation in the Iringa FR 1956-1960

64. Mr. Masam, Regional Forest Officer, Iringa - personal communication
65. Power p. 87
66. Schabel(2) p. 132, 136
67. Barraclough p. 89
68. Dublin p. 173
69. Dublin p. 177
70. Climax ecosystem: The perceived final and stable stage in the undisturbed development of an ecosystem.
71. Neumann p. 203-204. Concerning the rising tension between local people and park authorities, Neumann observes that: "Tanzania's National Park agency [TANAPA] has created a "paramilitary" unit, "governed by the paramilitary disciplinary code of conduct"... to defend its protected areas against local communities". p. 6
72. Hosier stresses that although the demand for fuelwood is increasing, this will not lead to overall deforestation, since many of the forests of the country are outside the effective transport radius of the urban woodfuel markets. The emphasis should be laid on the improvement of charcoal production efficiency and post-harvest management in those areas which are within effective harvesting and transport distance. -p.507.
73. Lundgren p. 178 - a pine plantation on cleared bamboo forest land in Uganda showed water retention properties similar to the original vegetation
74. TNA, Forest Reserves Iringa
75. Rodgers&Homewood pp. 285-303
76. Maddox et al. p. 2
77. Fairhead&Leach pp. 174-175
78. Some of the German statements of the value of catchment forests in Bezirk Iringa can be compared with watershed management phraseology in Power, showing remarkable similarities.
79. Monela pp. 42-43: "For example, due to destruction of forests in West Usambara, a total of 400 streams and numerous springs ceased to exist or became seasonal... Water levels in rivers which originate from areas like Uмба and Pangani have decreased. This has affected irrigation activities on the lowlands. Frequent floods and poor water quality are some other side effects... Although in an indirect way, deforestation influences the local climate by retarding water recirculation, lowering air moisture and reducing precipitation...the wide range deforestation in East Usambara has been accompanied by an increase in temperature in the area during the past 10-15 years. Studies on rainfall record from East Usambara indicate that it has become more erratic".
80. Maddox et al p. 2
81. Maddox et al. p. 2.

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