

# Causes and Consequences of Anthropogenic Fire in Mulanje Mountain Forest Reserve, Southern Malawi:

Report Following 'Mulanje Fire Research' Expedition, 2001

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## List of Abbreviations and Acronyms

CBFiM	Community Based Fire Management
CCAP	Church of Central African Presbyterian
CTC	Catechist Training Centre
DANIDA	Danish International Development Agency
DFID	Department for International Development (British Government)
FD	Forestry Department
GEF	Global Environment Facility of the World Bank
IGA(s)	Income Generating Activity (Activities)
MK	Malawi Kwacha: Malawi's currency (at the time of collecting this £1 sterling was fluctuating around the value of 110 MK). 100 <i>tambalas</i> = 1 MK
MCM	Mountain Club of Malawi
MMCT	Mulanje Mountain Conservation Trust
MMFR	Mulanje Mountain Forest Reserve
NTFP(s)	Non-timber forest product(s)
RGS (IBG)	Royal Geographical Society (with the Institute of British Geographers)
Sp	Species (singular)
Spp	Species (plural)
TEK	Traditional Ecological Knowledge
UKC	University of Kent at Canterbury

## Chichewa Terms

Alendo	Visitors
Chikusa	Pile of ash after the burning of agricultural waste, good for growing pumpkins on.
Chilimwe (malimwe)	Dry season
Chirope	Animal vengeance
Chiuta	God / Deity
Dzinja	Rainy season
Kalulu	Hare ( <i>Lepus saxatilis</i> )
Khonje	Traps
Kuotcha tchire	To burn the bush
Kupala moto	"Buying the fire"
Kutenga mwana	"Warming the Child" Ceremony
Kuti Payere	"Clearing the place"
Madzi	Water
Maloto	Dreams
Mankhwala	Medicine
Masika	Harvest season
Matsenga	Witchcraft / Magic
Mbewa	Rodents (folk classification)
Miimu ya makalo	Ancestral Spirits
Miombo	<i>Brachyestegia</i> spp. Woodland
Moto	Fire
Mowa	Beer
Natita	Small bundle of grass for thatching (1.5 MK)
Nguluwe	Bush pig ( <i>Potamochoerus porcus</i> )
Nkhuni	Firewood
Nsiki	A type of building material

Nulala	Medicine given to dogs to make them good hunters
Nyengo	Seasons
Nyengo ya chisanu	'Season of coldness'
Sing'ajga wa zitsamba	Traditional doctor
Songwe	Sunbirds ( <i>Anthreptes</i> sp.) & Black mamba ( <i>Dendroaspis polylepis</i> )
Tsekera	Elephant Grass ( <i>Pennisetum purpureum</i> )
Uchi	Honey
Udzu	Grass (most commonly <i>Hyparrhenia</i> spp.)
Wotentha	Hot
Ziko lamene agofamene	world of the living dead
Ziko lameni tilimoyo	world of the living
Zikula akufa kale	world of the dead
Zitsamba	Herbs
Zumba	Rock Hyrax ( <i>Procavia capensis</i> )

## **Abstract**

Wild fires are recognised as a management priority for Mulanje Mountain Forest Reserve in Southern Malawi (MMFR). Based primarily on three months of anthropological fieldwork with three communities and MMFR staff, this dissertation: 1) analyses the way in which people interact with the forest reserve through fire; 2) presents local knowledge of, and attitudes toward, human-ignited wildfires; 3) highlights local economic and cultural dependence on fire use, and thereby, 4) assists in promoting co-management of MMFR. Field research provided information on the significance of fire in daily and ritual life, as well as the primary causes, consequences and changes in frequency of wildfires. Causes of wildfires in descending order of frequency reported by locals were hunting, carelessness with camping fires, clearing, practices of the Forestry Department staff, and malice. In contrast, forestry officials reported malice as a far more frequent motive for anthropogenic fire. Local communities understand well the consequences of fire for their own income generating activities, but feel little responsibility for such events in the forest reserve. Fire record keeping is ineffective, and no consensus on the direction of change in fire frequency exists among locals or forestry officials. It is concluded that the demise of traditional values and changes in the cultural significance of fire are affecting local use of fire in the reserve. Recommendations are made concerning priorities in fire research, education and conflict resolution.









# **1. Background and Introduction**

This dissertation is based on three months fieldwork in the Mulanje district of Malawi, targeting three villages on the perimeters of Mulanje Mountain Forest Reserve (MMFR) and the pine plantation-workers' village within it. The study examined local people's attitude towards, and perception of, the wildfires that take place within the Forest Reserve, the majority of which are believed to be human ignited. Throughout this report I do not make any attempt to suggest ways in which fire-management policies should be implemented or governed, as this is a highly specialised procedure reliant on deep ecological knowledge of the effects of fire on the biodiversity of the particular ecosystem in question. I do however suggest that such insight into the ecological effects of wildfires, and a policy that fires should be limited, is incomplete without the balance of cultural investigation into how fire is used locally, both productively and destructively, how fires may originate in the first place and how local communities perceive the influence of burning.

After a presentation of our results, I begin the analysis by looking at the significance of fire in daily and ritual life of rural Malawi, drawn together from discussions with key informants and available regional literature. With this in mind, the causes, consequences and changes in frequency of wildfires within MMFR, reported by our informants, are elaborated on and their significance discussed. It is with this information and analysis that I attempt to address the overall aim of the study; to assist in facilitating co-management of fire in the reserve area.

Prior to our analysis and discussion, we must first take a look at *our* historical perceptions of wildfires and their consequences. As I discuss below, many of the assumptions made by governments as to the innately destructive characteristics of fire may be unfounded. These assumptions themselves may be culturally imbedded and, arguably, imposed from the era of colonialism. This is followed by a description of the background to the present scenario for MMFR and the significance of this research.

## **1.1. Anthropogenic fire, and our attitudes towards it:**

Anthropogenic use of fire has developed as a dominant factor influencing vegetation and ecosystems as a whole. The influence of Neolithic fires in African savannisation and deforestation has been documented by pollen analysis and is estimated in Malawi to ca. 12,000 B.P. (Goldammer 1993).

In 1954 (A.D.) D.T. McLinden of the, then colonial, Nyasaland Forest Department commented on the necessity of the practice of early burning:

....(p31) to most parts of Africa, the word "control" has no meaning. The [rural] communities as a whole are apathetic towards fire and will not rouse themselves into any action where they cannot see the need for it...(p32) Even in more civilised communities the public have to be made conscious of the dangers which arise from careless use of fire....Here, in more primitive surrounding, the onus falls on the plantation forester....(p33) It is to this end that early burning is practiced, and wherever it has been practiced until a fire-conscious community more accustomed to restrictions has arisen, it had been proved to be a more realistic approach than any other.

That was almost 50 years ago, since when the colonial Nyasaland has undergone a series of changes to become the new Malawi, achieving independence and establishing its still-young democracy. Although our attitudes may, or should have, changed and the limits of what is deemed socially acceptable when making judgements on the attitudes and activities of the "natives", it cannot be denied that the situation described above is not entirely dissimilar to the present. Communities remain apathetic towards fire and in addition, at least in the case of MMFR, restrictions imposed by the Forestry Department have all but evaporated. So, even if the local communities were at any point

“more accustomed to restrictions” than those McLinden wrote of in 1954, they no longer are or need to be.

Such apathy can be demonstrated by an account of a personal observation of a specific ignition event whereby the gathering of many people waiting for a workshop to begin initiated the burning of the grounds in which the meeting was to be held (see Box 1.1)<sup>1</sup>.

**Box 1.1. Likulezi Project Case Study: Specific Ignition Event**

The event described took place on May 26<sup>th</sup> at the ‘Likulezi AIDS and Orphans project’ bimonthly meeting at their training centre where we were resident.

Some of the key members of the project were organising the day’s events while the 200, or so, volunteers were sitting on the ground in informal groups outside the courtyard. The crowd consisted of male and females of all ages and from several villages around the Likulezi area, some had walked as far as 25km that morning in order to attend the meeting. Most groups were separated into male or female only, although the majority were married couples. Within the space of an hour a fire was ignited in some thick undergrowth not far from the project building. The group that ignited the fire consisted of about 5 or 6 young men, although the process was obviously being elaborately discussed and advised on, involving a much broader audience. Eventually, a second area of ground cover, underneath a bluegum (*Eucalyptus*) plantation at the back of the house, was burning. I was told this fire had been deliberately and precautionarily directed *away* from the *Miombo* woodland. At first, there were several young men tending the fire, however, once the crowd was called all but a few moved to gather into the courtyard where the meeting was to take place. Both the meeting, and the fire, continued regardless of each other with nobody paying attention to the flames except one man who idly lit his cigarette on the burning embers. A small group of women remaining paid minimal attention to what was going on, but chatted and chewed sugar cane while the fire spread. This event took place very early in the dry season so there was unlikely to be sufficient dry fuel for the fire to do any significant damage to the trees and buildings, however it should be noted that there were some gardens close by in which unharvested crops were under threat.

There was mixed reaction to the event. It was not clear who’s initial idea it was to start the fire, but it certainly *was not* any of the project leaders, partly because they were all busy with other responsibilities and partly because they seemed baffled by the event themselves. The idea therefore came from within the volunteers waiting for the meeting to begin, although none acknowledged responsibility. The religious leaders at the Likulezi C.T.C. Mission, from which the training centre is rented, were extremely annoyed when they heard about the fire, as the land was not rightfully the project’s to burn.

On enquiring why the fire had been set, most people said it was to kill some buffalo beans that were growing there, while others said it was so that the watchmen could see approaching thieves and animals easily. The general consensus was to “clear the place” (*Kuti Payere*).

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<sup>1</sup> This is just one of several examples available. One European lady living in the area described how during the night a watchman had only alerted her to an approaching fire once the flames were ‘licking the house’, although he must have seen it approaching some time previously. The watchman’s actions demonstrates a familiarity with fire and a tendency towards being reactive instead of pro-active.

So where does the stark difference in attitude towards fire originate? Why did McLinden's local communities, or indeed Likulezi's, not see the need for action? In order to put these questions into context, let us now review our judgement on 'apathy' towards fire.

It is quite likely that what we today tend to regard as the only natural human reaction to fire is based to a large extent upon our own experiences with fire in modern society. The ways in which fire manifests itself to people have changed over time, as have the dangers it imposes and the fears it arouses. We are nowadays accustomed to strongly regulated and highly inhibited relations with fire. So much so that we may overlook the possibility that fears which strike us as 'natural' and 'rational' may be the result of the very process of domestication of fire. (Goudsblom 1992: 14).

In most of the forest-fire related literature a common scenario is found that is prevalent throughout the world (e.g. Masipiqueña *et al*, 2000 & Vayda, 1999). That is that scientist and governments mainly focus on the ecological effects of fire, which is viewed as a symbol of 'local peoples destroying their own future'.

Emphasis is laid on the wrong perceptions and lack of knowledge among forest users and, in general, there is little attention to the non-environmental reasons behind the burning process (Masipiqueña *et al* 2000).

In his book 'Vestal Fire', Stephen Pyne (1997) discusses the profound influence European colonialism has had on the history of fire-management by promotion of its own fire philosophy and iconography. This power to do so, he argues, forms part of the history of European imperialism and the imposition of its own environmentalist agenda, and developmental-policy desires on its former colonies. There is no doubt that the aims and desires of contemporary development policy are born from the European ideal of 'good environmental practice' which tends to view fire as environmentally degrading 'primitive technology', and fire-setting as 'ecological vandalism' and perhaps also 'a threat to the stability of social order'. As has been seen in the landscapes of the Australian bush and the North American plains alike, the landscape is a result of centuries of anthropogenic burning and the suppression of fire by new colonials in the attempt to conserve these areas of 'wilderness' against the will of the local population, has often led to their demise (Pyne 1993).

This phenomenon has been explicitly demonstrated in Fairhead and Leach's (1996) examination of deforestation in Guinea, West Africa. They argue that the dominant vision of deforestation that has shaped present day national environmental policies fundamentally misrepresents the relationship between forest and people. The forest-savannah mosaic of south-eastern Guinea was believed by French colonials to be relics of an original, dense forest that had been systematically destroyed through shifting cultivation and fire-setting practices. However, through their investigation it soon became evident that, in fact, it was the local communities' interaction with their environment, and applied fire-regime, that was enriching the soil and actually promoting vegetation and tree cover. This is an interesting comparison to draw; in stark contrast to Malawi where the nature/culture divide is fundamental (Morris 1995), Fairhead and Leach instead found a strong association between forests and settled communities, and between savannah and mobile and impermanent lifestyles. However, the case-study demonstrates Pyne's thesis successfully:

Certainly, other countries have a similar legacy of colonial science in shaping how environments came to be perceived (Fairhead and Leach 1996: 288).

On Mulanje, although there is insufficient data on the number of fires or the damage that they cause, there is a general consensus amongst officials that the detrimental effect and frequency of fires, coupled with other causes of deforestation, have increased in intensity. This may be correct, however, it is necessary and indeed interesting, to be aware of apparently 'Euro-colonial' attitudes when considering Mulanje's circumstances, especially when we see that in two of the three villages studied, the major consensus was that the number of fires had decreased in recent years.

## 1.2. Mulanje Mountain Forest Reserve

...Mount Mulanje remains a unique, diverse ecosystem, but time is running short. It will be an irretrievable loss to Malawi and Africa if the present slide towards degradation is not replaced by a constructive, caring management (Chapman 1990).

Mount Mulanje is situated in the far southeast corner of Malawi. It is the largest mountainous massif in the afro-montane archipelago (Location Lat/Long: 15°75'S 35°38'E). The massif itself is a huge syenite intrusion of 640km<sup>2</sup>, rising steeply and abruptly from the south-central African plains to form a broad plateau of basins and deep river gorges at 1800m, and steep rocky peaks that reach 2800m. The forest reserve (gazetted in 1927) is an ecological island of unique biodiversity as well as a critical water catchment area, alighting an estimated 400,000 people living in the Mulanje district (Davis *et al* 1994) as well as many more beyond, as well as tea and coffee estates below the southern slopes. Its rich and diverse flora and fauna include at least 30 endemic plants, and the Mulanje cedar (*Widdringtonia whytei* Rendle), a distinctive conifer and national icon tree of Malawi, which only grows to a full height of 40m tall on the mountain (Nyirenda *et al* 1996, Lawrence *et al* 1994, Chapman 1994).

However, Mulanje Mountain Forest Reserve (MMFR) is suffering from a situation approaching 'open access' to all who may wish to enter and utilise her resources, coupled by inadequate management capacity of the Forestry Department due to lack of labour, equipment and funding. The four major threats to the mountain regularly cited are (MMCT-PAD 2001):

- Unsustainable resource use stemming from high population density, pervasive poverty, and lack of awareness of and weak incentives for sound conservation practices;
- Agricultural encroachment on the lower slopes due to a combination of population pressure and insecure land tenure;
- Damaging bush fires due to an incomplete system of fire breaks and inadequate response capacity; and
- Invasion of alien species.

These are the management priorities for MMFR, however, the simultaneous goals of irradiating one of these invasive species, Mexican pine (*Pinus patula*), and improving fire control presents complications in management aspirations. At the same time, areas protected from fire provide opportunity for *Pinus patula* and *Widdringtonia whytei* (Mulanje Cedar) to establish in competition. The fast growth of *P. patula* gives it the distinct advantage over indigenous species and led Edwards (1982) to express his concern that such a fire protection policy could cause succession to closed pine forest rather than the intended indigenous forest. The alarming success with which pine has been invading grassland is particularly evident on the plateau of Sombani, where comparisons of aerial photographs from 1972 and 1992 demonstrate the advancement of the pine across the Sombani river and onto other areas of the plateau. Bone's (1995)

In contradiction to Edward's concerns, Bone (1995) explains how the cones of *Pinus patula* are serotinous, opening readily with heat. Seed released is thus concentrated in post fire periods, flooding the environment with progeny at a time when competitors are relatively scarce and nutrients are readily abundant. Solutions are obviously not simplistic:

Species of the genus *Pinus* are amongst the most aggressive indigenous and exotic tree invaders in the tropics. Fire-disturbed sites with exposed mineral soil, especially in tropical mountainous regions, are easily colonised by pines, which release large numbers of seeds after fire. Because of their ability to cope with water stress, pines are extremely competitive against broadleaved species on exposed shallow soil sites (Goldammer & Manan 1996:4).

Although the role that fire plays in pine dispersal is not fully understood, fire is likely to be one of the main reasons that pine has managed to invade so successfully on Mulanje (Bone 1995:22).

Furthermore, the relevant literature is full of assertions that periodic fires are essential for the ecology and regeneration of the Mulanje Cedar, and that fire acts as its natural rejuvenating agent. Where as, in fact, there is no experimental evidence to support these conjectures and all circumstantial evidence seems to indicate that mature Cedar is very sensitive and susceptible to fire (EDG 2000). Progressive new management approaches are being introduced, but it is clear that substantial scientific research is still needed before many of these management objectives can be tackled informatively, especially with regards to fire.

In recent years the government of Malawi has instituted a progressive policy framework and legislation, which provides for the implementation of a “co-management approach” (NFP 2000) partly as a consequence of agendas imposed on Malawi by donors. This allows neighbouring communities to participate in the management of protected areas, in the hope that in empowering the communities to have an influence, and giving them ownership over resources, they will take on responsibility for them.

### **1.3. Mulanje Mountain Conservation Trust**

In 1991, the urgency and magnitude of the problems for MMFR led a group of out-side stakeholders to constitute a Zomba (Malawi) based ‘Committee for the Integrated Conservation and Management of Mulanje Mountain’, the secretariat being the National Herbarium and Botanical Gardens of Malawi (NHBG). This committee subsequently led to the formation of Mulanje Mountain Conservation Trust (MMCT) in 1995. In 1996 MMCT became functional with funding obtained from the Global Environmental Facility (GEF) and the British Department for International Development (DFID) to prepare a project concept document. Between 1997 and mid-2000 a series of consultancies were commissioned to provide the appropriate knowledge with which to formulate a strategy for management and conservation of MMFR consistent with the new “co-management” framework (EDG 2000). This was coupled with MMFR being designated a ‘New Biosphere Reserve’ by the International Co-ordinating Council of UNESCO’s ‘Man and the Biosphere Programme’ in December 2000. The preparation phase officially ended in March 2000. When I left Malawi in July 2001, MMCT had been assessed and approved by a GEF appraisal team and was awaiting funding to continue with the implementation phase of the project (MMCT-PAD 2001). The goal of the board is to be entrusted with an endowment fund from the World Bank with which to fund the Forest Reserve, in accordance with the new model of “sustainable aid”. This will be decided following the initial three-year implementation phase.

MMCT is fundamental in the initiation and implementation of the new co-management scheme for Mulanje Mountain Forest Reserve. Its board members have therefore been regarded as key informants in this research.

### **1.4. Aims and Objectives of Research:**

Uncontrolled late season fires have a devastating effect on resources and management activities including timber and fuel wood production, bird and mammal populations, tourist activities and scientific research (Dudley 1999:45).

Fire management has been recognised as a significant priority for Mulanje Mountain Forest Reserve (MMCT-PAD 2001). However, there is presently insufficient data on the underlying causes and consequences of fires, as well as the implications of proposed solutions. There are many assumptions as to the origins of human-ignited fires on Mulanje, such as the relative contribution of ignitions by hunters and honey collectors, as well as those that originate from community activities on the lower

slopes of the massif and migrate up onto the plateau. However, as yet, these beliefs have been little explored. If the reserve staff is to manage fire, then it is vital that they understand more about the origin of these human-ignited fires, and the motives behind them

The overall aim of the research project was to increase our understanding of the relationship between destructive fires in Mulanje Mountain Forest Reserve and the uses of, and attitudes towards, fire by the local communities. Semi-structured interviews were conducted with communities on the lower slopes of Mulanje Massif, Forest Department employees and members of Mulanje Mountain Conservation Trust. Ethnographic data was also compiled on the uses of fire as a tool in domestic, agricultural, hunting and other income-generating activities (IGAs), through open discussions and participant observation with key informants.

### **1.5. Significance of Research:**

Planning for conservation management is increasingly an inter-disciplinary process, drawing on a variety of experts with a range of considerations including technology, economic values, political ideologies, religious convention and practical knowledge. In recent years the role of social sciences in conservation and development has become increasingly recognised (Orlove and Brush, 1996). Conservation management is now perceived as being as much a matter of managing people's interactions with the environment as managing the biophysical environment itself. During implementation of a developmental project it is therefore important to gain insight to aspects of local peoples' understanding of the way in they interact with their environment.

It is not only the fires started on the plateaux that are the problem: those on the lower slopes of the mountain are of no less concern. Firebreaks may be of minimal use in this environment and early burning may be the only answer. Complicating factors such as fires started by hunters and honey collectors will need to be addresses at the beginning [of co-management implementation] (Dudley 1999:45)

It is vital that all parties understand each other's expectations, perceptions and problems. In this case, I believe that by understanding the basis of local peoples' thoughts and actions with regard to fire, a fairer exchange of ideas, problems and possible solutions can be facilitated with those parties that have more power and control over the likely course of future events in the forest reserve. Co-management implies an equal role, but this is not possible if some parties remain ignorant or misinformed about the doings and motivations of another. The problem in this context is that there are few means of acquiring information about all partners, hence the need for a comprehensive study of fire from the local perspective.

Anthropogenic fire is a ubiquitous disturbance factor in both space and time, however it can have positive as well as negative consequences ecologically, economically, and socially. Nevertheless, forest management authorities often perceive local communities as the problem rather than a potential partner in mitigating unwanted wildfires. People who live in a locality where fires regularly burn should have knowledge of the effects of fires, positive and negative, and the suitability of the local fire regime for the ecology of the local habitat-types. This domain of fire knowledge should be considered part of their "traditional ecological knowledge" (TEK), along with their knowledge of ecological processes, the properties of medicinal plants, and other non-timber forest products. Our research has tried to broaden our understanding of traditional fire knowledge by investigating not only how fires originate, but also how those responsible perceive their influence and, furthermore, how these anticipated effects of burning may play a role in local decision-making and their own explanations for those choices.

To be implementable and effective, fire policies must be developed at the scale in which fire is utilised. In most cases this is at the local scale. Too often policies made at national scales are ineffective due to inadequate consideration of the economic or cultural dependence of the fire user (Kauffman et al 1993)



## **2. Method**

### **2.1. Study Areas:**

Mulanje Mountain Forest Reserve spans the two districts of Mulanje and Phalombe, in which 825,000 people live, at a population density of 185 people/sq. km. The number of farm families living around the mountain is estimated to be 37,000 in 85 villages, the average land holding being 0.4 hectares. Mulanje is considered a maize-deficit area that contains approximately 66% of the poorer households of the population. Poverty is therefore a particularly important factor in resource use (Sambo 2001).

The original settlers around Mulanje Mountain were the Mang'anja who also extended to Thyolo and Chikwawa (Lowore & Lowore 1999). Since the later part of the 19<sup>th</sup> century the area has been subjected to influxes of people from elsewhere, particularly Lomwe from Mozambique.

The majority of our fieldwork time was spent in the area surrounding Tchuchilla trading centre adjacent to Tchuchilla river on the north-western slopes, which demarcates the border between Mulanje and Phalombe district. This gave us the opportunity to conduct interviews with key informants from several villages in both districts and those resident on the private land of Tinyade Estate, which used to farm cash crops but now rents its land to local smallholder agriculturalists. Two of the villages focused on for our research were Chole and Phunduma. These two villages were practically adjacent and yet provided us with an interesting comparison. Chole is a relatively recently formed settlement (approximately 1964) following a re-demarcation of the forest boundary that reduced the size of the reserve due to increasing population pressure (an oral history of Chole is included as Appendix 1). Chole reaches higher up the slopes of the Massif than any other settlement in the area and sits directly adjacent to the forest reserve with easy access to both Tchuchilla Plateau and Chambe basin. Furthermore, Chole has been identified for the Pilot Co-management scheme (EDA 2000). Phunduma is also close to the perimeter of the forest reserve, however, it has both a well-used road and a strip of private land, approximately 1km across, between it and the boundary. In addition, Chole is situated in the district of Mulanje while Phunduma, on the opposite banks of Tchuchilla River, is in Phalombe district. The two villages are therefore subject to different Forestry Department regulations (see Figure 1.3).

The group-village chiefdom of Songwe (meaning both 'songbirds' and, the deadly snake, 'black mamba'; Morris 1998) was our third study village on the south-eastern slopes of the massif, close to the Mozambique border. Songwe and its counterparts (Limani, Mandala and Panesi) are enclosed by tea estates with Phwazi estate on their western side and Chisambo estate on the eastern<sup>2</sup>.

The relationship between the Forestry Department and the communities around Songwe is particularly poor. This is primarily due to reclamation of land previously cultivated, but within the forest reserve boundary. The events frequently recounted to us were that people started to cultivate within the boundary between 1971 and 1975. Some even told of the then President, Kamuzu Banda, becoming aware of their poverty and granting permission for them to grow crops there. It was commonly agreed that it was not until 1986, more than ten years later, that the land was reclaimed and Eucalyptus trees were planted to prevent further encroachment. The narrative behind the Forestry Department's reclamation was varied. Some insisted that there was no prior warning and crops were slashed despite them being close to maturation. Others agreed that warnings were given but villagers defied them out of necessity. There had been a recent incident of one families crops being slashed

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<sup>2</sup> Tea and coffee estates once surrounded Mulanje, but more favourable rainfall and climatic conditions on these southern facing slopes have advantaged the continuation profitable tea.

when they were found growing sweet potatoes beyond the line of eucalyptus trees which was bound to influence the political orientation of the community as a whole.

Our two research areas provided a stark contrast from each other. On the north-eastern slopes (Chole and Phunduma), due to the land available to rent, people generally have more land available to cultivate however the lack of industry means high unemployment, and many people rely on the forest reserve to either supplement their income and provide basic needs. On the southern slopes (Songwe) the extensive tea estates provide seasonal work for many residents but result in a lack of land to grow enough food to meet basic nutritional requirements and nowhere to expand other than in the direction of the forest reserve. Furthermore, the extensive eucalyptus and pine plantations around the border of the forest reserve, established to discourage encroachment, have reduced availability of many of the non-timber forest products available to the local population.

## **2.2. Research Questions**

Our main research questions were as follows:

- How is, and was, fire used in the daily life of communities surrounding Mulanje Mountain Forest Reserve?
- What are the causes of wildfires according to local communities, reserve staff and documented Forestry Department records?
- What is the reported general trend in fire activity today compared with the past according to local communities, reserve staff and Forestry Department Records?
- What are the consequences of burning in the forest reserve and in the village according to local communities?

## **2.3. Preliminary Study**

Our semi-structured interview format presented in Appendix 2 was designed on the basis of a one-week base-line study, from Friday 11<sup>th</sup> to Friday 18<sup>th</sup> May. This constituted open-ended and free-flowing discussions with members of the local communities in which we were initially working, during which commonly occurring and relevant topics were identified. These consultations also gave us the opportunity to test the sensitivity of potentially controversial topics. The interview structure that emerged was then refined to obtain more precise and comparable information of relevance to our research and addressing our original research questions.

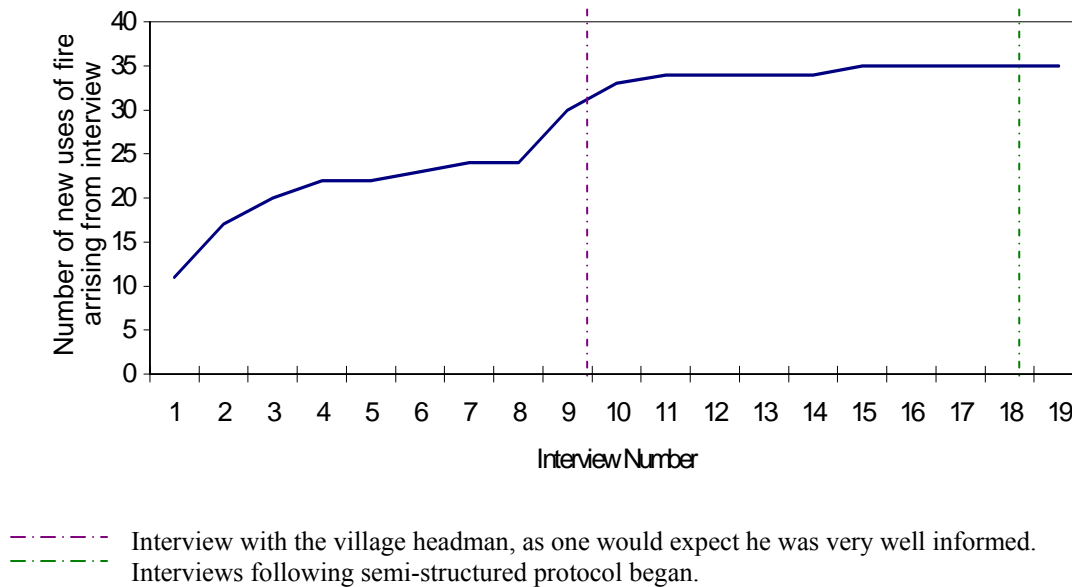
Figure 2.1 overleaf demonstrates the effectiveness of our base-line study with reference to the question “what are the uses of fire?”. This question is chosen as representative because, at this initial stage, it was through this line of enquiry that more sensitive topics were approached. The graph shows that by the end of the base-line study (represented by the green line) the initial steady increase in the occurrence of new topics relating to ‘uses of fire’ had levelled off, indicating that the information obtained so far was sufficient on which to base a structured interview. The cumulative frequency analysis is based on the principle of a species-area curve used to design sample-plot methods in ecological studies (Magurran 1988).

## **2.4. Data Collection**

It was important to conduct a range of interviews with individual men and women, with groups (usually these were family groups, but occasionally single sex groups were also interviewed) and with key informants from ‘Focus-on-Interest’ groups (Lowore *et al* 2000c). Community interviews followed a semi-structure while key-informant interviews constituted free-flowing and open discussions. Semi-structured interviews lasted from 45 minutes to 1½ hours and covered to following

topics; personal information; informants reliance on the forest reserve; observations of changes within the forest reserve and reasons for these changes; uses of fire within the village and within the forest reserve; causes of wildfires within the village and within the forest reserve; changes in frequency of wildfires and reasons for these changes; effectiveness of current fire protection mechanisms and pre-existing mechanisms for community fire management.

**Figure 21: Cumulative Frequency Graph of New 'Uses of Fire' Arising During Base-Line Study**



The protocol of questions given in Appendix 2 constitutes the guideline to our community interview structure. Considerable tact was necessary when discussing illegal issues such as hunting and unlicensed logging. It was essential that every question was asked from each informant but the specific order of questions was variable. The use of direct observation and triangulation with in-depth interviews from key interest groups also helped to substantiate oral testimony (Lowore *et al* 2000a).

**Table 2.1: Sources of Information**

Source	Number of Informants	Number of Interviews
<b>Interviews</b>		
Community semi-structured interviews:		
Chole	36+	18
Phunduma	36+	18
Songwe	50+	18
Key informants:		
Hunters	14	16
Charcoal makers	1	4
Community natural resource committee	3	4
Mulanje Mountain Conservation Trust Members	4	4+
Pine-plantation workers (Chambe)	8	7
Forestry Department officials	1	3
Forestry guards	3	4
Forestry-hut caretakers	3	4
Regional anthropological experts	3	8+

## **Other**

Academic literature  
Chancellor College library facilities, Zomba  
MMCT Resource Centre, Mulanje  
Mountain Club of Malawi newsletter articles  
Unpublished government documents

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Table 2.1 above shows our sources of information, including all formally recorded interviews. In addition to these formally recorded interviews other casual discussions continued to take place, both with additional informants and with previously interviewed informants. These inevitably contributed to the investigators' understanding of the total situation.

Figure 2.2 in Appendix 3 represents my own analysis of our interview technique by schematically showing the flow of conversation during interviews and how the sensitive issue of 'wildfires' was approached.

### **2.5. Downfalls and improvements**

An initial setback in our fieldwork was that it took place at the very beginning of the dry season, before the wildfire season had reached its climax. Although it was very frustrating to be leaving the field at a time when the wildfire season had just begun, I believe that conducting our fieldwork while our topic of interest was *not* immediately relevant actually benefited our enquiry to a certain extent. The most apparent benefit was that informants were more willing to accept that we were not there as investigators against them and were therefore more free and open to talk about fire-setting, even to admit that they themselves set fires. If the fire season had been at its peak and we had been enquiring as to how and why specific ignition events had taken place, I do not believe our informants would have been so open.

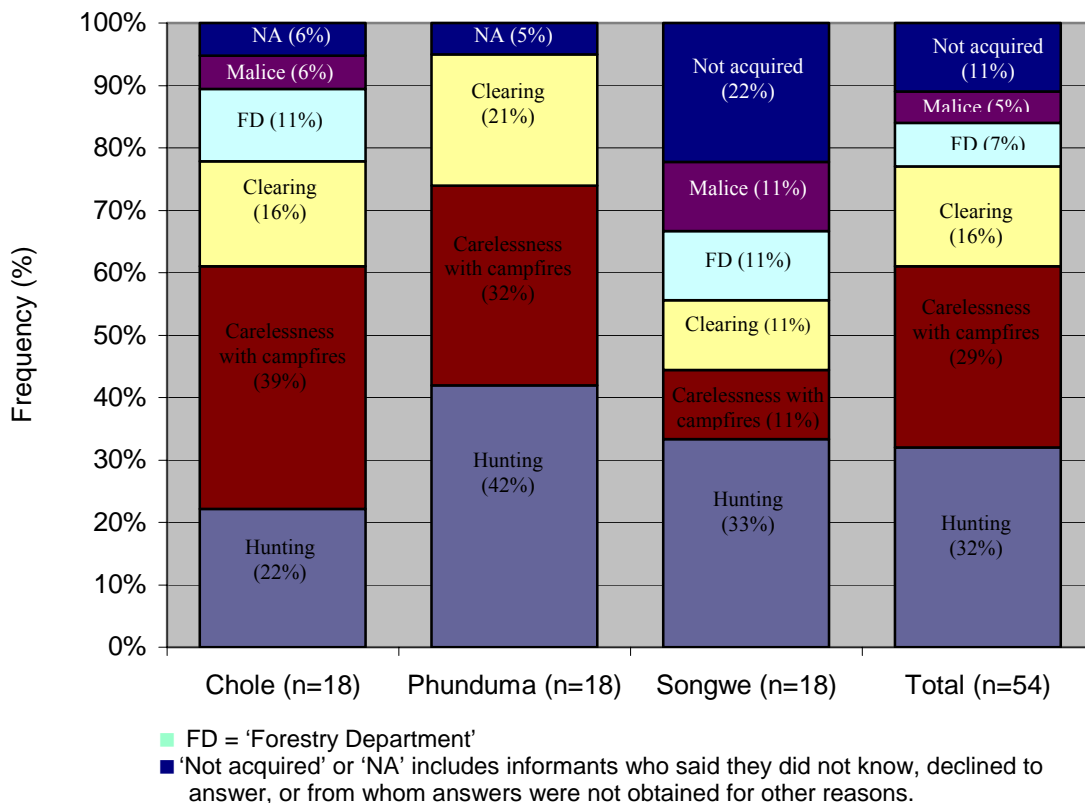
Working through interpreters was neither the most ideal situation. True anthropological fieldwork criteria states that the investigator must spend a significant amount of time in the field (the commonly accepted time-period is one year) and have an "intricate understanding" of the language (Barnard & Spencer 1998), of which unfortunately we had neither. However, the two official interpreters who worked with us were extremely competent at both conducting the interviews in an easy-flowing manner and relaying to us all that was being said with detailed accounts of those topics that were of particular interest to our research. Furthermore, some of our key informants had a strong enough grasp of English in order to make each other well understood, allowing valuable one-to-one communication.

### 3. Results

Table 3.1. lists the frequency of occurrence of all the possible causes of wildfire suggested by the informants. Any elaborations required are done so in the form of footnotes. Figure 3.1. shows the primary causes of wildfires identified by the informants. Some informants were not able to distinguish one primary cause only and gave two; these are also included. Answers that were given by only one informant or group interview are excluded, as they are considered a non-representative response (following Lykke 2000).

Carelessness with fires more frequently listed as a cause of wildfires than hunting in two of the study villages (Chole and Phunduma) (Table 3.1). However, when the *primary* causes of wildfires specified by the informants are compared, hunting became the most significant cause. Although these differences are minimal, these results could be viewed as a process of triangulation. According to our results, hunting and carelessness with cooking fires may be equally likely causes. However, given the controversy around wildfires, it is justified to expect that purposeful fires (whether they be for hunting, clearing or malicious arson) are more common than suggested by the results.

**Figure 3.1: Primary Causes of Wildfires within the Forest Reserve According to the Informants**



**Table 3.1 Causes of Rogue Fires**

Causes	Frequency (%)			
	Chole (n=18)	Phunduma (n=18)	Songwe (n=18)	Total (n=54)
<b>Carelessness<sup>3</sup>:</b>				<b><u>76</u></b>
Smokers	33	28	11	<b>24</b>
Cooking fires (...of illegal users)	61 (50)	67 (39)	28 (28)	<b>52 (39)</b>
<b>Hunting (fire as a tool)</b>	33	50	44	<b>43</b>
<b>Clearing the place</b>	27	33	11	<b>24</b>
<b>Forestry Department<sup>4</sup></b>	22	11	28	<b>19</b>
<b>Malice</b>	6	-	17	<b>7</b>
<b>Rodent hunters</b>	6	6	11	<b>7</b>
<b>Honey collecting<sup>5</sup></b>	6	6	11	<b>7</b>
<b>Deterring wild animals</b>	11	17	-	<b>6</b>
<b>Charcoal making<sup>6</sup></b>	6	-	-	<b>2</b>
<b>Creating firewood</b>	6	-	-	<b>2</b>
<b>Grass sellers boosting demand</b>	-	6	-	<b>2</b>
<b>Illegal logging (fire as a tool)</b>	-	-	-	<b>-</b>
<b>Don't know/declined to answer</b>	6	6	22	<b>11</b>

<sup>3</sup> When illegal activities, such as hunting and unlicensed logging, were specifically mentioned (For example, ‘the cooking fires of hunters’ or ‘unlicensed loggers smoking’) the results were additionally recorded under “...of illegal users” as well as the careless activity. Answers cannot therefore be included under “illegal users” without also being in one of the two other categories. Out of the 76% of informants who mentioned carelessness with either cooking fires or smoking as a cause of wild fires, 39% percent specified that it was the cooking fires or smoking of those conducting illegal activities. This demonstrates how regularly ‘illegal users’ are blamed for fires even when it is not speculated to be as a *direct* result of their activity i.e. hunting and logging.

<sup>4</sup> Clearing firebreaks and prescribed early burning, maybe getting out of control.

<sup>5</sup> We heard of several methods of honey collecting based on the same principle whereby fire was used to deter the bees. These ranged from bees being smoked out of their hive by means of an ignited ‘fuse’ made out of platted natural ropes (*sisal*) -the intention being to actually scorch the bees- to setting a fire around the base of the tree and, if necessary, cutting down the tree. There seemed to be little concern to preserve the hive intact to allow for subsequent honey collections.

<sup>6</sup> We accompanied one particular charcoal maker on four occasions who talked extensively about his work and demonstrated the entire preparation and combustion process. Charcoal is an important industry as it provides an alternative fuel source through the rainy season, when dry deadwood is scarce, and through the cold season, when people wish to have fires within their living quarters that produce less smoke. I am convinced charcoal making is *not* a primary source of wildfires, however, it is undoubtedly a major contributor to the loss of living trees (as fresh wood is essential for the combustion process). This is starkly evident in other areas of Malawi where the industry is well established, such as Balaka.

**Figure 3.2. Documented Causes of Plantation Fires in Forestry Department Records**

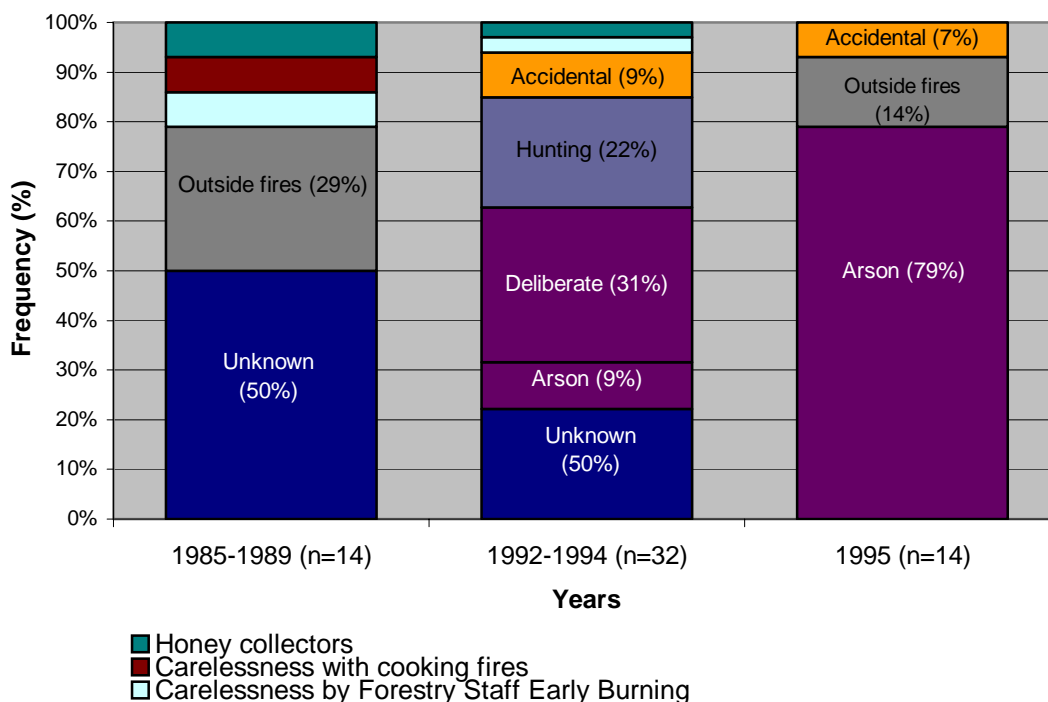


Figure 3.2. Shows the causes of destructive fires documented in the Forestry Department records that we acquired from the MMCT Resource Centre (reproductions of the full record collecting are supplied in Appendix 4), while Figure 3.3 shows the documented number of fires and area burned per plantation year from the same records. Several points should be noted before attempting to make comparisons of these records with the responses of our informants:

- These records are from forest plantations only (predominantly *Eucalyptus* and *Pinus* spp.), *not* indigenous woodland. “Outside fires” therefore refers to fires that have crossed a firebreak into the plantation from either adjacent agricultural gardens or adjacent forest reserve.
- The data is combined from records of numerous plantations around and within MMFR. These plantations represent various species, geographical orientations and sizes. Furthermore, the fire history records from different plantations are not standardised making combining their data problematical.
- The records are grossly incomplete. For example, there are fire events recorded for the period between 1980-1985, and yet no record of the area burned (see Figure 3.3). It is, therefore, unclear whether years assumed as having experienced no fires are, in fact, lacking figures due to poor data collection. Furthermore records date no later than 1995 and therefore do not reflect the immediate political climate. Analysis of their content should therefore be treated with extreme caution.
- The “Unknown” category, documented in the Forestry Department records is *not* equivalent to the “not acquired” category in our data.
- The difference between causes documented as “Arson” and “Deliberate” are unclear. It has been assumed that they both refer to malice, and have therefore both been allocated the same colour code.

Such ‘hard facts’ as these are extremely circumstantial and largely dependent on the political climate and thoroughness, and indeed personal opinion, of the log keeper. Hence, we should be aware of the problems of access to relevant data, of interpreting the available data and of relating these

documentary sources to the material from community interviews and participatory observation (Pitt-Rivers 1978).



**Table 3.2 (a&b): Effects of wildfires on the mountain, negative (a) and positive (b)**

<b>Table 3.2 (a) Negative effects</b>	<i>Frequency (%)</i>			
	<b>Chole (n=18)</b>	<b>Phumduma (n=18)</b>	<b>Songwe (n=18)</b>	<b>Grand total (n=54)</b>
Destroys natural resources in general	39	33	67	<b>46</b>
Destroys resources directly utilised	44	44	44	<b>44</b>
Destroys animal habitats	6	6	17	<b>9</b>
Particularly bad for cedar &/or pine	11	17	-	<b>9</b>
Usually not a problem for the forest / Only a problem if in gardens	-	28	-	<b>9</b>
Destroys fertility	11	11	-	<b>7</b>
People get too hot and smoky	11	-	6	<b>6</b>
Game migrates further away	-	-	11	<b>4</b>
More erosion (Destroys ground cover)	-	11	-	<b>4</b>
Dries/hardens ground	-	11	-	<b>4</b>
Reduces water availability	-	-	6	<b>2</b>
Threatens gardens adjacent to border	-	6	-	<b>2</b>
Fails to answer	17	17	11	<b>15</b>

<b>Table 3.2 (b) Positive effects</b>	<i>Frequency (%)</i>			
	<b>Chole (n=18)</b>	<b>Phumduma (n=18)</b>	<b>Songwe (n=18)</b>	<b>Grand total (n=54)</b>
“clears the place” ( <i>Kuti Payere</i> )	28	50	28	<b>35</b>
Creates future firewood	11	39	11	<b>20</b>
Hunters can catch animals	22	22	6	<b>17</b>
Promotes new grass growth	11	17	6	<b>11</b>
Mushrooms	22	-	-	<b>7</b>
Destroys pests (e.g. thorns, buffalo beans and snakes)	6	6	6	<b>6</b>
Prevents more rigorous/ destructive fires later in the season	6	-	6	<b>4</b>
Some trees grow better after fire	6	-	-	<b>2</b>
The Forestry Department can see better to catch people	-	6	-	<b>2</b>
Used in honey collecting	6	-	-	<b>2</b>
Good when (must be) used carefully	-	6	-	<b>2</b>
No positive effects	11	6	44	<b>20</b>
Fail to answer	11	11	17	<b>13</b>

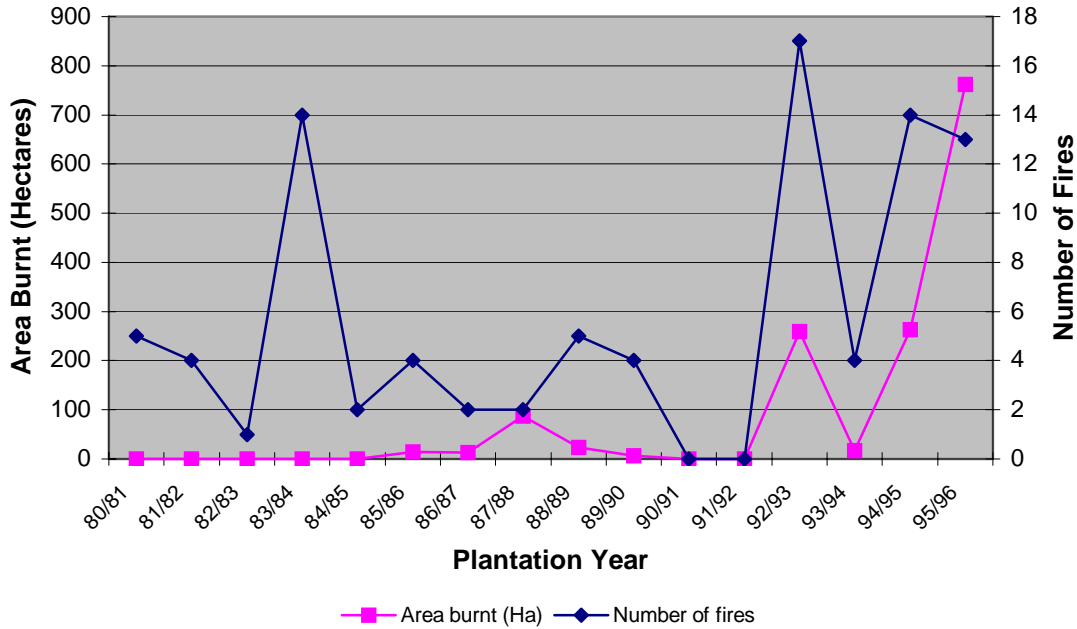
**Table 3.3: Informants' Anticipated Consequences of Burning: Factors in Rationality**

	Pros	Cons
<b>Hunting</b>	<ul style="list-style-type: none"> <li>Maintains grassland pastures; Clears away old, unpalatable grass and promotes new fresh growth that attracts game.</li> <li>Increases visibility; Clears grass so animals easier to see and catch. Can run freely without fear of snakes and can see forestry guards coming from afar.</li> <li>Labour-saving; Directs animals towards waiting hunters and dogs.</li> </ul>	<ul style="list-style-type: none"> <li>Destroys food source for game, which then leave the area.</li> <li>Kills animals.</li> <li>Puts both men and dogs are in danger.</li> </ul>
<b>Firewood Collecting</b>	<ul style="list-style-type: none"> <li>If little dry wood (such as early in the dry season) then creates dead/dry wood.</li> </ul>	<ul style="list-style-type: none"> <li>If excess of dry wood (such as late in the dry season) then destroys the immediate and potential firewood.</li> </ul>
<b>Grass thatch collectors</b>	<ul style="list-style-type: none"> <li>Fires clears away old grass and may promote fresh new growth for next year.</li> </ul>	<ul style="list-style-type: none"> <li>If burns too early, destroys grass before been able to collect.</li> <li>If burns too late risks dryer, more vigorous and destructive fires.</li> </ul>
<b>Food gathering activities</b>	<ul style="list-style-type: none"> <li>Fire is 'good' for mushroom collecting</li> <li>Fire is used in honey collection.</li> </ul>	<ul style="list-style-type: none"> <li>Destroys wild herbs, fruit and vegetables collected for food and medicine.</li> </ul>
<b>Agriculture</b>	<ul style="list-style-type: none"> <li>Labour saving tool</li> <li>Quick return of slow decomposing plant material to the soil (eg sorghum stalks)</li> <li>Controls crop pests such as termites</li> <li>Deters dangerous and crop-raiding wild animals</li> </ul>	<ul style="list-style-type: none"> <li>Reduces soil fertility</li> <li>Promotes leaching of nutrients by destroying ground cover.</li> <li>Promotes Erosion by destroying ground cover.</li> <li>Kills micro-organisms in the soil</li> </ul> <p><i>(From one informant who learnt from a friend who worked as an agricultural-extension worker)</i></p>
<b>Rodent Hunting</b>	<ul style="list-style-type: none"> <li>Clears away ground cover so burrow entrances are easy to find and block</li> <li>Fire drives rodents into burrows where they can then be dug out</li> <li>Heat and smoke weakens animals making them easier to catch</li> </ul>	

Tables 3.2 (a) & (b) lists informant responses to the effects of wildfires within MMFR, which are separated into negative (a) and positive (b) effects. Table 3.3 expands these responses to consequences within both MMFR and the domestic domain and groups them according to specific, and sometimes conflicting, income generating activities. Generally, agriculture and rodent hunting take place within the gardens, while other activities take place outside of the domestic domain, usually within the Forest Reserve. All effects listed are those immediately relevant to that income generating activity only and interactivity conflicts are elaborated on elsewhere in the text. It is interesting to note, however, some of the contradictions in responses within the activity. For example, under different circumstances, wildfires may increase or decrease the availability of firewood. The risk that any fire may get out of control accidentally is common to all activities that use contained fire as a tool, for

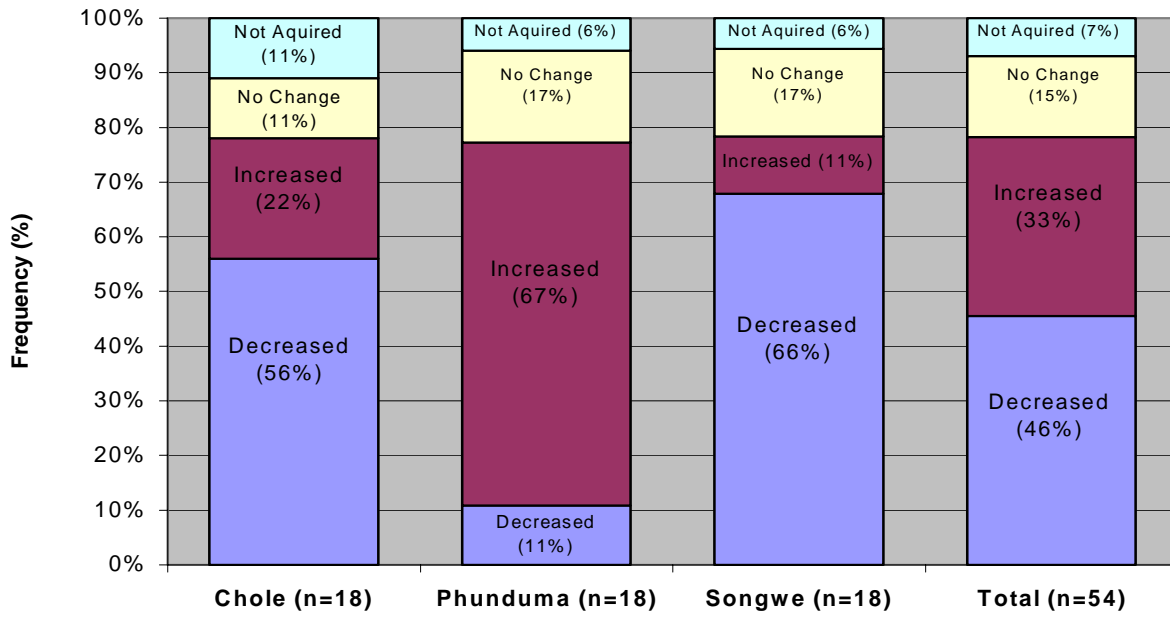
example, charcoal making and pot firing, these activities are therefore noted, but not included in the table.

**Figure 3.3. Forestry Department Records of Number of Fires and Area Burnt per Plantation Year**



As explained previously, Figure 3.3 above shows the documented number of fires and area burned per plantation year from Forestry Department records, while Figure 3.4 below shows informants opinions of the changes in the number of fires that they have experienced in their lifetime. Interestingly, a significant majority said that the number of fires had decreased in both Chole and Songwe. This is contrary to the general consensus of Forestry Department and MMCT officials obtained from interviews. In Phunduma, on the other hand, the vast majority of informants said that the number of fires had increased. This is unusual considering that Chole and Phunduma are practically neighbours (see Figure 1.3(a)). The reasons given for the changes in number of fires are given in Table 3.4. Explanations for this discrepancy are not immediately apparent, but possibilities are raised in the discussion.

**Figure 3.4: Changes in the Number of Fires According to the Informants**



**Table 3.4: Reasons Given by Informants for the Changes in Number of Fires**

Village	Chole	Phumduma	Songwe
<b>Fires have increased because...</b>	<ul style="list-style-type: none"> <li>• There is a population increase</li> </ul>	<ul style="list-style-type: none"> <li>• There is population increase</li> <li>• There is more pitsawing nowadays</li> <li>• There is more hunting nowadays</li> <li>• Youths have less respect these days</li> <li>• There is no longer any prescribed burning</li> </ul>	<ul style="list-style-type: none"> <li>• There is a population increase</li> <li>• People are more careless</li> <li>• People burn out of frustration</li> </ul>
<b>Fires have decreased because...</b>	<ul style="list-style-type: none"> <li>• There are more guards</li> <li>• Less forest to burn</li> <li>• Fewer guards but tighter security</li> </ul>	<ul style="list-style-type: none"> <li>• There are more guards</li> <li>• Floods destroy the ground cover so there is less to burn</li> </ul>	<ul style="list-style-type: none"> <li>• There is tighter security</li> <li>• Forest is smaller so there is less area to hunt</li> <li>• Hunters know there are less animals so there is no point</li> <li>• There is more employment</li> <li>• There is less cedar and more bluegum that is fire-resistant.</li> </ul>

## **4. Discussion**

Figure 4.1 (reproduced from Kauffman *et al* 1993) schematically represents how humans use fire and modify fire regimes to achieve some desired product or positive benefit. As the report explains, a necessary prerequisite of fire management is the quantification of what is burned, when it is burned and how often. In addition, it must be understood *why* various peoples use fire. Cultural constraints and norms, as well as ecosystem characteristics, climate and human population density are all equally strong determinants of the pattern of anthropogenic fire. Rules and regulations are often ineffective when they conflict with economic necessity, traditional uses, or when enforcement is ineffective (Kauffman *et al* 1993), all of which are prevalent in the case of Malawi and MMFR.

### **Analytical questions and order of analysis**

In light of our findings presented in the previous chapter, our original research questions were modified to formulate the following analytical questions:

- Have there been any changes in the cultural significance of fire, uses of fire as a tool, and attitudes towards burning, that may explain changes in the fire regime of MMFR?
- What conflicts exist within communities over the consequences of burning?
- Are there any pre-existing mechanisms of community-based fire management on the lower slopes of MMFR?
- How can this knowledge be applied to the facilitation of co-management priorities for MMFR?

In the first section, daily activities and ceremonies in which fire plays a prominent role are presented in a temporal sequence following that of the human life cycle. The intention of this discussion is to gain insight into the current, and historical, significance of fire in Malawian culture. In doing so, changes in its significance are illuminated and explored. In the subsequent section, causes of wildfires—as presented to us by our informants—are discussed in detail. Trends are noted, observations described and comparisons made with the Forestry Department records and academic literature. The third section discusses contrasting uses and attitudes towards fire within the community. Consequences of burning for different income generating activities, and the conflicts that exist between them are examined. This is approached with particular reference to gender-determined roles and the symbolic opposition between the village/domestic and wild/forest reserve spheres. Finally, perceived changes in frequency of wildfires are examined and compared with the Forestry Department's records. Disparity between our study-villages is a common theme throughout the analysis.

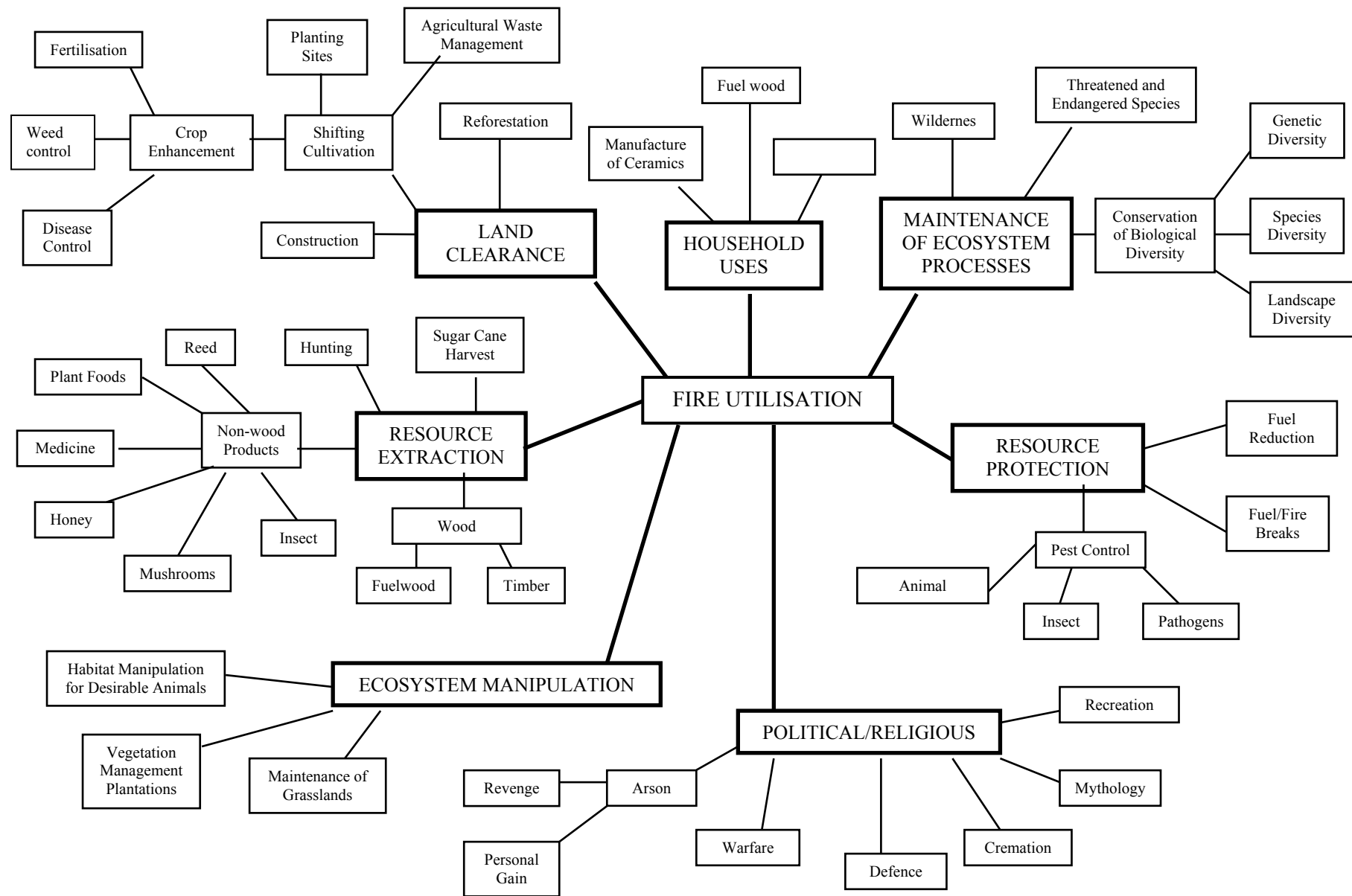


Figure 4.1: The Global Uses of Fire by Humans (Kaufmann *et al* 1993)





## **4.1. The Significance of Fire in Daily Malawian Life<sup>7</sup>**

### **4.1.1. Introduction**

A vast number of texts have described in intricate detail some of the following ceremonies I will describe. Many of these, however, chronicle what was ‘truth’ thirty-or-so years ago, since when the relevance of many traditions have fast diminished. Furthermore, several of these writings have been based on observations in other regions of Malawi. It is debateable how accurate applying studies of traditional Chewa religion to Mulanje district are, given that the area has been subject to mass migration over the past century, both from other parts of Malawi and particularly from Mozambique. The following accounts are therefore based on what we came across in our region, either through our own investigations or by Brother Makina’s research on our behalf. I have drawn on other available literature in order to clarify some points and to make comparisons and have tried to clarify which sources I am referring to as far as possible:

Ever since humans have harnessed the use of fire it has been of vital importance in sustaining human life. In Malawi, fire is a symbol of life and a symbol for activity in the sense that whenever people have gathered there has usually been fire. Fire can be interpreted in many different ways, and with the interpretations people have had on fire we have divided it into six parts examining the its role throughout the human lifecycle. These are: The significance of fire in Malawian creation myths; the ‘warming of the child’ ceremony (*Kutenga mwana*); male initiation ceremonies; fire in the home; the burning of the bush (*Kuotcha tchire*); and death in the family.

### **4.1.2. The role of fire in creation myths**

Although we never encountered any creation myths ourselves, one particular myth, associated with the Chewa and Mang’anja is worth relating because of its significant role of fire. There have been various renditions of the myth recorded, but all outline a common theme of an earlier period when there was a ‘primal unity’ between humans, animals and the deity (god) who lived together in a state of tranquillity and harmony, which was destroyed by the discovery of fire. The version given in Box 4.1 is a synopsis drawn from several sources (Morris 2000: 178, Schoffeels 1968: 196-8 ) (see cover illustration).

There are many interpretations of this myth (Schoffeels 1968, 1971, Boucher *various*), but the most important feature relevant to this argument is that it indicates the crucial role that fire plays in the cultural life of Malawi, both materially and symbolically. Fire is the symbol for destruction in the creation myth. It caused chaos, which caused animals to either scatter into the bush or seek refuge with humans. The myth also reflects the crucial parameters between Malawian socio-economic life, and between agriculture and hunting (Morris 2000). Fire could be seen as one of the basic components of the village-forest opposition. It denotes human life against that of animals because humans use it to burn their habitat and to make weapons to use against them. Both their mutual hostility and the difference of their habitat have been caused by fire (Schoffeels 1986). Fire is also said to cause the *chirope* or ‘animal vengeance’ to break out which is so dangerous to hunters if they do not hunt respectfully.

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<sup>7</sup> It is a moral obligation for me to allocate Brother Joseph Makina an equivalent authorship for this chapter, and it is a pleasure for me to do so. Brother Makina was a student of theology at the University of Malawi, from where he was posted to the Catechist Training Centre in Likulezi, where he now teaches social anthropology. He has a particular interest in the introduction of Christianity and its integration with traditional Malawian religion and values. It was entirely by chance that we came across Brother Makina, but he became an integral and valued part of our project. The nature of his occupation and his time spent in Likulezi has given him an in depth knowledge of the cultural practices specific to our area that we could only have touched on, and his willingness to share it with us enhanced our understanding dramatically. The general structure of the following analysis is his presentation following consultations with his informants on our behalf; the words and adaptations from the original are mine.

#### Box 4.1 The Role of Fire in Chichewa Creation Myth

*In the beginning there was the earth and Chiuta (God). The earth was then lifeless and without water, and Chiuta lived in the sky. One day the clouds built up, there was lightning, and it poured with rain. Chiuta came down to earth with the rain, together with the first man and woman, and all the animals. They alighted on a hill called Kaphirintiwa (literally meaning 'a small flat-topped hill' which tradition suggests is the Dzalanyama Mountains). Afterwards the ground on the rocks where they had landed, which was originally soft mud, hardened, and the footprints of the humans, and the tracks of the animals can still be seen there. For awhile, with the earth yielding abundance of food, Chiuta, humans and the animals lived together in peace and harmony. One day man inadvertently invented fire by twirling two sticks against each other, one soft the other hard. Everybody warned him to stop but he would not listen. At the end the grass was set alight and caused great confusion. Among the animals the dogs and the goats fled to man to safety and became domesticated, but the other animals fled away full of rage against man. The chameleon escaped via a tree and called out to Chiuta to follow him, but he replied that he was too old to climb. So the spider spun a thread and lifted him back up to the sky, thus God was driven from earth by the wickedness of man leaving chaos behind. And here he pronounced that henceforth man must die and join him in the sky and help create rain to quench the flames man had invented.*

#### 4.1.3. 'Warming of the child' ceremony

In contrast to the funeral ceremony, as I will come to explain, the 'warming of the child' ceremony (*Kutenga mwana*), or 'taking the child to bed' signifies the acceptance of the child into the world of the living. In Malawian cosmology there are three 'worlds'; the world of the dead (*Zikula akufa kale*); the world of the living dead (*Ziko lamene agofamene*). That is people who were close to us and have died and who we still remember; and world of the living-living (*Ziko lameni tilimoyo*). That is the world as mortals know it which is 'hot' (*wotentha*), a world of sexual activity.

When a child is born, he or she is said to be in '*chikuta*', until the umbilical chord drops off. *Chikuta* is a delicate state when the child is not yet considered a member of the 'hot', or sexual, world. During this time the child must remain indoors by the fire and must not be touched by anybody except close relative who are 'cold' (meaning they are abstaining from sexual activity). Although the mother is 'cold' in the sense that she is sexually inactive, she is said to be 'hot' just after giving birth. This means that if she were to resume sexual activity it would be considered dangerous to the husband and the child. Some of our informants also claimed that a woman must not use a fire for some time after giving birth as any food she prepared would be dangerous to eat. Traditionally, the parents of the child were expected to remain sexually inactive until the child was ten months old. Nowadays, however, this time has reduced to little past the end of *chikuta* (Br. Makina, *pers.comm.*). During our fieldwork we came across one newborn baby who had undergone *chikuta*, and several informants who talked of the necessity of it. However, we did not encounter any reference to *Kutenga mwana* ourselves. This is not surprising as such ceremonies would be taboo conversation topics, especially with foreigners.

Once what is considered an acceptable amount of time has passed the 'warming of the child ceremony' takes place in order that the parents can resume their sexual relations. On this day the parents of the child and the mother of each parent gather and a fire is lit. Each stands on one of the four points of the compass around the fire. They would then pass the child from one point to another over the fire. This ritual represents that the child is being 'warmed' out of the cold world, by which we mean the world of the spirits, and into the 'hot' world of the living-living where there is sexual activity. The four points of the compass signifies that the child is being accepted 'worldwide' as a full member of the living world. Now that the child has entered the sexual world of the living the parents can now resume their sexual activity safely (Brother Makina, *pers. comm.*, Van Breugel 2001). If a

child dies after this ceremony has taken place he/she will receive full burial rights as any other member of the community (Van Breugel 2001).

#### 4.1.4. Male initiation ceremonies

Much happens during initiation ceremonies, which merits a study in itself and indeed has been the focus of many. For the sake of this argument I will limit this discussion to the role of fire only.

In male initiation ceremonies fire is crucial in that, from the day that the initiates go into the bush to receive their instructions, a fire is lit, and it must be kept burning until the last day of the ceremony. This is termed *Chizimba Cha Chinamuah*, meaning it is 'something that draws everything together'. The initiation master must ensure that the fire is kept burning throughout. If the fire is allowed to burn out, then it means the whole initiation ceremony has been disturbed and our informants referred to the fire having to be 're-bought' (*kupala moto*). This is a linguistic term not a literal meaning. By 'buying the fire' it is meant that, in order to re-ignite the fire, all the people concerned in the ceremony must be re-consulted, including the chief and the traditional doctor (*sing'anga wa zitsamba*). It is that process of consultation that is termed '*kupala moto*'. However, there are many people who are restrained by taboos while an initiation ceremony is taking place (especially those relating to sexual relations<sup>8</sup>). If compensation was, therefore, demanded for the inconvenience, then there is no option other than to pay, otherwise the ceremony will not be completed and the initiates will be in danger (Br. Makina, *pers. comm.*).

Many of our informants referred to the fire at initiation ceremonies, the need for it to be maintained and *Kupala moto* if it were to burn out. However, the ceremony was often referred to as 'what other people did' and we personally had no opportunity to witness any initiation practices ourselves. The details of its content were therefore obtained by Brother Makina and relevant literature (Boucher, *various*, Van Breugel 2001). How prevalent initiation ceremonies still are in Mulanje District is unclear. A further role of fire in male-initiation is at the termination of the ceremony.

On the last day the initiates leave the bush and return to the village the initiation-master, using the fire that has been kept burning, burns the hut in which the boys have been staying. As he walks away he must not look back, but must return immediately home to his wife and perform ritual intercourse. It is as if the fire that he has set and tended throughout the initiations is, symbolically, also burning within the initiation master. The ritual sex serves to extinguish, or 'burn out' that fire. For him not to do so would be to endanger himself.

A second version varies slightly in that the initiation-master is able to take some medicine (*mankhwala*) given to him by the chief, to help extinguish the fire. It is still preferable that he and his wife have sexual intercourse that night, but there is not so much of an urgency.

#### 4.1.5. Fire in the home

In most houses there will always be a fire burning, and in the house the fire is also very symbolic and very significant. Of course, fire in the home is for centrally practical reasons as well as for symbolic ones, providing a means of cooking food, warmth and light. But in addition, fire in the house indicates a presence of people and a presence of life and it is an element that should be continuously present. This is strongly reflected in the tradition that on the death of a chief all the fires in a village should be extinguished and a new fire lit and distributed to the villagers, as a sign that there is a new carer of the community (Morris 1998). In the home women are in charge of the fire and the duties associated with it (cooking, warming bathing water etc.). Female informants often explained to us that it was their duty to light the fire in the morning and keep it burning. They explained that if the wife was away, or sick, it would be acceptable for the husband to light the fire. Otherwise, if he was to do it himself, it would be considered strange and represent problems in the marriage.

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<sup>8</sup> For example, the chief and the parent of the initiates must abstain from sexual relations, except on certain days when ritual intercourse must be performed.

Fire in the courtyard is also an important part of everyday life. Cleanliness of the yard is very important and this is reflected in that, during the Banda era, prizes were awarded to those villages that kept their customary land in a good and presentable condition. It must be ‘smooth’ and clear from leaves and debris, which are swept into a pile and burned. One village chief was very proud of how ‘hygienic’ his village was kept as it indicated he was a good chief (group-village headman *pers.comm.*). However, a major problem for agriculturalists is that lack of fertile land and access to fertilisers have left the soil nutritionally exhausted. Still, despite attempted encouragement by agricultural advisors to utilise this potentially valuable resource by composting, many villages have failed to make the transition, preferring to continue their burning practices (agricultural extension advisor, *pers. comm.*).

In the past the fire was said to have had another significance in that, if there was a house that nobody was staying in and you lit a fire it was as if you were ‘warming up’ the spirits (*mizimu*) that were resident in that house. They had been acting as guards over the house while it was empty and by warming them it was somehow a way of thanking them for their presence (Br Makina, *pers. comm.*). This is, however, somewhat contradictory to the commonly cited perception of spirits which is that of whose presence to be discouraged at all costs. According to Breugel (2001), whose research was carried out in the 1970s, it was feared that spirits are unhappy when they are too close. The burial rites aim to make the spirit depart from the village, where they might cause trouble, and stay in the graveyard where they belong.

#### 4.1.6. Burning the bush

The symbolic burning of the bush (*Kuotcha tchire*), as with many cultural traditions, is no longer as significant as it once was. However, some of our older informants<sup>9</sup> indicated that they are not happy to see the bush burned “unnecessarily”.

One of the reasons for *kuotcha tchire* is for the sake of **protection**. In the past people were living in far more isolated conditions with many more wild and dangerous animals posing a threat. Burning the surrounding land therefore meant that those animals would not come near and would clear visibility so that occupants would be able to see danger approaching.

Secondly, burning of the bush was for purposes of **hunting**. As some hunters still do today, fire was used during communal hunts both to clear the scrub and maintain grassland pastures and to direct the prey towards waiting dogs and villagers armed with weapons to kill the fleeing game. Many accounts can be found of these communal events that used to take place by order of the chief. It was reportedly done by singling out a sizable tract of forest, setting it alight around its perimeter except for one side, thus trapping the animals inside with only one escape route (Morris 1998, Schoffeleers 1971). Some of our elder informants recalled such practices, although today traditional systems of communal hunts have all but died out. Yet the bush and the forest reserve continues to be burned for game. Village headman of Songwe described how in his forefathers time, before the area was going to be cleared by fire they would make offerings of maize flour underneath the Podza tree (*Anona senegalensis*) in order to appease the spirits who lived in the forest. If this were not done then someone in the village would become sick. The practice of making worship offerings under the Podza tree is still widely practiced in Songwe, although ‘introduced’ religions are also prevalent. In the one village there were C.C.A.P. worshippers, Roman Catholics, Seventh Day Adventists and a church of traditional African religion termed ‘Ethiopian’.

Finally, of primary importance, was the past belief that bushfires assist in the **making of the rains**:

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<sup>9</sup> By referring to “our informants” it is meant informants that we personally interviewed during our community consultations. All other “informants” should be assumed were those relayed to us via Brother Makina.

Our forefathers believed that if you want to have rainfall then rainfall can not come unless you help by creating the clouds (Br Makina, *pers.comm.*)

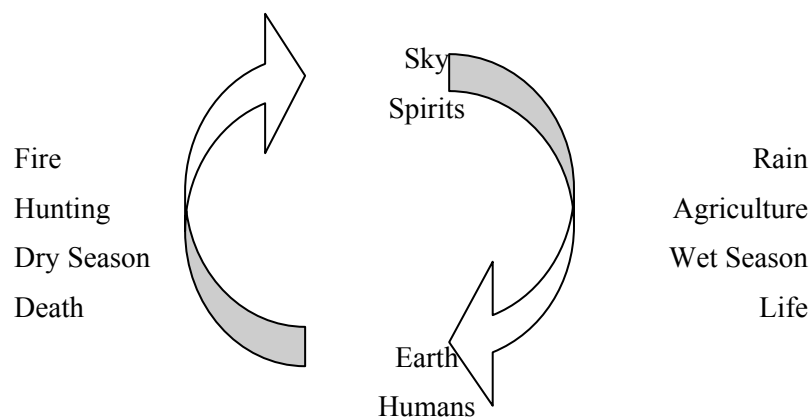
When the bush is burned people see the smoke go up and join the clouds. It is believed that the smoke assists in the formation of rain clouds that are vital to ensure that the rains come so that crop planting could begin. In the past when people were clearing their gardens, they would make sure that they did not burn immediately, but waited until the months approaching rainy season. If the rains did not come then the people would know something wrong had happened in their midst. The chief would call a meeting to discuss why the spirits may be saddened to have delayed their rains. The people would then be invited to check their way of life and decide on what could be done to appease the spirits.

Scientifically, we now know this is not true, but at least it was something they believed in and that it really happened... They would offer sacrifices, and usually on the day they are offering the sacrifices they would receive the rainfall and so that was the system that was formed... I have witnessed it even in my lifetime. So of course that is one of the reasons why burning the bush, may be of primary importance (Br. Makina, *pers. comm.*).

People therefore burn for the immediate purpose of clearing their gardens, hunting animals and (in the past) calling the rains, and for the ultimate purpose of obtaining food. It seems therefore as though in the Malawian cosmology the appearance and movements of the rains and the bush fires appear to represent a cyclic movement between sky and earth (Schoffeleers 1971).

Amongst our older informants, knowledge of such a significance of bush-fire was apparent. However, it was not a topic that seemed immediately relevant to most, and it was not in our inclination to push topics beyond a comfortable level. Among our young informants, traditional religious significance was clearly easily forsaken for other more pressing and practical issues.

This, according to Schoffeleers (1971) this cyclic interpretation is also associated with a similar movement of the spirits in which rains are associated with the decent of the spirits and the fires are the regarded as the vehicle of their return, represented in Figure 4.1. Hence, taking on a distinctly religious significance;



**Figure 4.2:** The cyclic movement of the spirits with fire and rain between sky and earth, representative of Malawian cosmology

They come down with the rains, make crops germinate, grow and mature, and when the bush fires up, return to the sky where they convert the smoke of the fires to rain clouds, thus completing the annual cycle. (Schoffeleers 1971:275)

Such an association, or even a memory of it, was not apparent to us during our field-work. This is reflective in the fact there are no known rain shrines in the Mulanje district at which the, distinctly Chewa, rain-calling ceremonies would take place. The last recorded ceremonial burning of the bush for religious rather than profane reasons took place at the Bunda shrine, approximately eighteen miles south of the capital, Lilongwe (Van Breugel 2001). However, this shrine is reportedly no longer maintained (Father Boucher, *pers. comm.*)

#### 4.1.7. Death in the family

One of the most significant uses of fire during death rites is the fire at funerals. During village interviews the uses of fire in funeral ceremonies was frequently mentioned after domestic uses, however, given the high population density and the high death rate of the area, this could equally reflect its frequency of use as well as its cultural significance. There is no embalming in Malawi, so funerals are usually held within days of the deceased passing away. At every funeral a fire is lit and, again, this has symbolic as well as practical uses. It is a sign to others that a person has died but also to signify that the deceased will never light fire again (Br. Makina, *pers. comm.*). Our informants frequently explained that the fire must be kept burning throughout the ceremony and traditionally should continue burning after the burial until all the immediate family of the deceased has visited the bereaved household. However, today, with many people travelling far and wide to work and live, it no longer always feasible.

Other practical reasons for the funeral fire are equally significant in terms of putting its claimed symbolic role into perspective. For example, funerals initiate the gathering of many people. Hence, fire offers warmth to the many who sleep outside and in the past, while people lived in more isolated conditions, the fire was also a source of protection from wild animals.

On a more symbolic level, as a mark of the final mourning rights to the deceased's relatives the house of the deceased is sometimes (but rarely in our experience) burned. The aim is to remove the constant reminder of the deceased, especially if the remaining partner wishes to take a new spouse. Furthermore, the burning represents that the mourning period should be over and discourages the deceased's spirit from returning to claim their possessions or any other favourite members of the family (Van Breugel 2001). During the night after the house had been demolished a person is allocated to come and burn the remains. Once he has set alight to the pile he must not look back, neither must any children sleeping near by wake up and look at the fire. It is believed that if they do the deceased's spirit will return to invite them to go with him/her or that at some point in their life they will go blind. This report is more supportive of the connotation, mentioned previously, that ancestral spirits are feared and should be discouraged and may also support Schoffeleers thesis (1971) of the cyclic movement of the spirits with rain and fire.

#### 4.1.8. Conclusion

In this section I have discussed the predominantly practical significance of fire in the domestic domain and have looked at the contrast of that in the wild domain of the bush. We have seen that, with regards to life, a fire is a sign of presence and activity, it is a sign that life that has gone, it is a welcome to new life and it is a key factor in Malawian cosmology of the creation of life as we know it today.

My argument here is not that communities should be granted free use of fire solely on the argument that it is symbolically prevalent in the cultural history of Malawi, but merely to demonstrate that many cultures, it could be argued *all* cultures, have a deep and intricate relationship with fire that cannot be ignored. In sum, we can conclude that symbolically "fire means life" ("*moto ndi mphamvu*"). It is a driving force in many activities that take place in daily life and the centre point around which much ritual behaviour takes place.

As I have said in the beginning, the relevance of many traditions of daily life are diminishing in the eyes of the younger generation, however, I still feel it is importance to look at their past relevance in contexts such as these. If nothing else, it may enhance our understanding of the fire-culture in Malawi. This culture in which spiritual beliefs relating to burning were once prevalent and now, although people may have lost the spiritual significance of fire, burning continues because that is what has always been done. It may add an extra dimension to why the burning of the bush is generally seen in

positive terms and why it may accord a “quasi-religious” significance which is, at least, not solely pragmatic.

Having a better understanding of how fire may be attributed a distinctly cultural significance in Malawi, let us now turn to the present situation by looking at what causes are currently attributed to wildfires.

## **4.2. Causes of Wildfires**

It is important to bear in mind that the data for this part of the report is derived from interviews, and what people *thought* or *said* are the causes of wildfires. Their response is likely to be influenced by numerous factors in addition to personal belief, including the political status of the activities discussed. However, observational data is problematical, if not impossible, to obtain, and community members are likely to have knowledge far more representative of the true causes of wildfires. The present lack of law enforcement and the fact that ‘people who burn’ were, unless otherwise volunteered, always referred to in the third person, gave us no reason to suspect that informants were twisting the truth beyond recognition. However, the discussion and analysis presented here is intended to describe people’s perceptions of, and attitudes towards, the reported circumstances under which fires are started, rather than to maintain that our data represents an entirely accurate reflection of the causes of wildfires. In this section, each of the *primary* causes presented to us during our community interviews will be discussed individually in decreasing order of frequency reported (see Figure 3.1).

### **4.2.1. Hunting**

Following suggestions by Lowore *et al* (2000a) and Activity 5.4.1 of the Five Year Management Plan to initiate discussions with local hunters on co-management (EDG 2000), we took the opportunity to talk with fourteen self-confessed hunters in total. Two of these, who were ‘full-time’ hunters, became frequent informants. The remaining twelve were ‘discovered’ while conducting our regular community consultation and with whom we diverted the interview to ask more in-depth questions about hunting. Questions revolved around methods of hunting, animals most frequently caught, changes in population sizes, preferred hunting areas and times, use of fire and the idea of co-management

The majority of our hunting-informants were in their early-twenties to mid-thirties and all were male. Ten were from the Chole/Phunduma area while the others were from Songwe. Most indicated they had come to hunt by accompanying male relatives from a young age. For some hunting was a full time profession, for others it was a means of supplementing income. Money was always a strong incentive, as the proceeds from a successful hunt can be substantial.

Six of the hunters we spoke to hunted with dogs only, three used a combination of dogs and traps (*khonje*) and three used traps only. In addition to dogs, the hunters are armed with spears, bows and arrows, pangas (machete-like blades) and sticks (knobkerries) to make the kill if the dogs have not done so already. As some hunters listed to us, on more than one occasion;

Hunters will never leave for the forest without spears, bows and arrows knives and a box of matches (Anon. *Pers. Comm.*).

Whether these matches were intended for hunting or camping purposes was unspecified. None of the hunters we spoke with possessed guns, although according to Lowore *et al* (2000c) the majority of hunters owning guns can be found in the Nagoli to Muloza area, on the southern side of the forest reserve. I will focus our descriptions on hunting with dogs, as this is more relevant to fire.

Table 4.1 in Appendix 4 indicates the animal species hunted, presented in decreasing order of frequency mentioned, and their predicted breeding seasons according to the hunters. The table suggests that *Nguluwe* (bush pig), *Zumba* (rock hyrax) and *Kalulu* (hare) are the most popular and/or most often acquired form of bush meat. All hunters agreed that animal populations have decreased. They described, as with many other forest products, how game used to be found on the lower slopes near the villages but nowadays they have to go all the way to the top of the mountain to find it. This is in accordance with other consultancies (For example, Konstant 2000, Lowore *et al* 2000 a&c). Furthermore, it was commonly agreed that uncontrolled hunting and too many hunters have reduced the animal population, but loss of forest habitat was an equally important factor. One hunter also



suggested that habitat damage by the Phalombe flash-floods disaster of 1991 had a significant impact on the game population.

The consensus was that the dry season is the best time of year to hunt, during which they would go hunting two to five times a week, depending on how dedicated they are and the health of their dogs. However, various, sometimes conflicting reasons were given for the best time of the dry season to hunt, some of which suggest a reference to burning:

*Early dry season is the best time to hunt because...*

- There is plenty of grass for the animals to eat.
- The animals have just finished breeding.
- The grass is shorter so it is easier to run and the dogs can see better.

*Late dry season is the best time to hunt because...*

- Because lack of food makes animals feed all day and move around more so easier for dogs to track their scent.
- Grass is dry and does not get tangled when running as green grass.
- Once grass is burned it is easier to run and see, and for the dogs to track animals scent.

*Early dry season is not a good time to hunt because...*

- There are many obstacles in the way that make hunting more difficult.
- There are many snakes at this time of year.
- Many of the animals are too young.
- It can get very cold at night.
- Because many people are still busy harvesting their crops.

All hunters that specified said they preferred overnight trips, except for one, who preferred day trips because they fitted in more conveniently with his schooling schedule. Overnight hunting trips could last from one night up to one week, when they would stay in caves and self-built shelters on the plateau. The idea was that they would reach the camp the first day with all their supplies, sleep the night there and rise in the early hours of the morning when the animals were feeding and the dew had not yet evaporated and so lost the scents. The most popular days for hunting in the Phunduma/Chole area were Saturdays and Tuesday, the days before market at Tchuchilla trading centre.

#### **4.2.1.1. Hunting and fire:**

Five hunters admitted to using fire to clear the land in order to maintain hunting grounds. Three said they used fire directly during hunting to drive animals in a particular direction, but this only seemed to be if they knew, or if there was a very high possibility that an animal was in the target area. Fire was often used to smoke animals out of hiding places between rocks if the dogs were not able to enter. Six said that they did not use fire. However, four of these stated, at their own accord, that areas that had been cleared by burning made good hunting grounds. The time scale after burning in which an area becomes, for some, 'good' hunting ground was unspecified. For the remaining three fire was considered an enemy, and they looked down on those who did use it.

On discussing possibilities of mitigating fires, the issue frequently transposed into that of reduced fire-control measures by the Forestry Department causing present day fires to be more destructive. It would be very difficult to convince hunters not to use fire as it is a valuable tool and there is no alternative as far as they are concerned. Many seem to consider it their right to use it. For the convenience of MMFR management authorities in Malawi, further discussions with regards to co-management, but not fire-use specifically, are also reviewed in Appendix 4.1. Contrary to other consultancies, most of our hunting informants, although understanding well the concept of co-management and liking the idea, did not think it would realistically be viable.

Hunting was the most frequently suggested primary cause of wildfires during our community interviews, although it bears little influence in the Forestry Department records (Figures 3.1 & 3.2). In agreement with Lowore *et al* (2000), we have found that hunters are often blamed for starting fires. However, this explanation was just one of many, and that attitudes towards fire vary considerably amongst hunters.

#### 4.2.1.2. Attitudes towards hunting

Other research, as well as our own, has found that attitudes of both local communities and plantation workers towards mitigating hunting tend to lack enthusiasm (Lowore *et al* 2000a, Konstant 2000). I would not describe it as indifference, because many people were aware of the implications of fire, but most felt they had no right to reprimand their activities and understood that they were just trying to make a living like everybody else. One forestry worker explained that he was lucky to still have his job and, therefore, would not punish those who no longer had theirs. Fears of provoking jealousy and envy are also strong in Malawian superstition, as they are believed to encourage witchcraft being used by others against you (Van Breugel 2001).

Hunting particularly remains more secretive than many other activities. We certainly experienced far more superstition in relation to hunting than any other practices (see Box 4.2: “Hunting and magic”). For this reason some forestry workers indicated that people were scared to reprimand hunters, because of the magic (*matsenga*) believed to be involved.

#### Box 4.2: Hunting and Magic

Far more reference was made to magic in Songwe than our other two study villages, whether or not this is a factor of isolation is unclear. Medicines are used by hunters for protection against wild animals and are given to dogs both for protection and in training:

Some dogs are born hunters, others have to be trained. We have a medicine (vulalu, mixture of roots and the dung from a wild animal which is mixed with water and put into the dogs nose) which makes the dogs go crazy and disappear somewhere for the whole day. When it comes back it is a proper hunting dog! (Hunter)

They make sure not to tell many people where they are going, sometimes not even their wives. This is not just a legal precaution, but to prevent them from being attacked by wild animals and so that people who wish them harm cannot use witchcraft against them. They were also aware that in the past hunters were expected to enter the forest in a ‘cold’ state (meaning that they are sexually inactive) and should sleep outside the previous night. The forest is considered ‘cold’ and those entering should be in the same state so that animals should not detect you and the spirits residing there should not be disturbed (Morris 1998). However, this is no longer adhered to. There are also ‘avoidance terms’ that, in the past, should have been used in the forest for fear of the spirits hearing your intended words and denying you what you were seeking. A person’s name should not be used because if the spirits hear he is there they may take him. There are stories of people disappearing for years at a time and returning with no memory or too fearful to talk of it. Further examples are given below.

Term intended		Term used in forest	
English	Chichewa	Chichewa	English meaning
Firewood	Nkhuni	Nsiki	A building material
Fire	Moto	Nasale	
Honey	Uchi	Alendo	Visitors
Water	Madzi	Mowa	Beer

#### 4.2.2. Carelessness with Camping Fires

Masipiqueña *et al* (2000) excluded domestic fires from his analysis as they were not relevant to the causes of the forest-fires in the Philippines. Looking at Figure 3.1 we can see that in our case ‘domestic fires’ are extremely relevant, because so many fires are attributed to carelessness with camping fires. We certainly observed, time after time, pit sawyers at work with a small fire maintained smouldering amidst the wood chippings and sawdust from their work, from which they would intermittently light their cigarettes. It should be remembered at this point that even the setting of camping fires anywhere within the forest reserve is itself prohibited. However, for the sake of the discussion, “illegal activities” will refer to poaching or illegal logging only.

An important consideration is that many informants specifically stated that it was the camping fires of those conducting an illegal activity within the forest reserve that were responsible for wildfires. At present, most community activities within the forest reserve are illegal, except firewood and grass collecting. Therefore, the majority of local people who are spending a significant amount of time in the MMFR to warrant the lighting of a campfire are likely to be there conducting illegal activities. To this end, it is extremely 'easy' to blame this group of people. However some further reasoning was put forward as to why this group may be particularly likely to let fires get out of control:

- 1) **They are in a rush;** because they are concerned about getting caught by forestry guards and the smoke from the camping fire is a testimony to their whereabouts. They are therefore less likely to take extra time ensuring their campfire is fully extinguished.
- 2) **Underground fires;** Cooking fires of illegal loggers are often built close to cedar trees they are felling or dried stumps. Cedar wood is extremely flammable, and therefore any root running directly under the fire can easily ignite and the fire can then run underground and rise up elsewhere. Although such fires are known to happen, especially in areas where forest litter is built up to a peaty consistency, the stories seem to have taken on properties of an interesting amalgamation of truth and exaggerated folktale.
- 3) **Campfires are never extinguished;** Frequently such discussions were accompanied with an explanation, or admission, that campfires are never extinguished as a matter of course:

Sometimes when hunters are disturbed they run away because they know they are conducting an illegal activity. If they were in the process of cooking the fire is just left burning and can start a wild fire. Although, that doesn't really matter since fires are never put out anyway (Ex-forest guard).

Explanations for such statements were hard to obtain from the informants themselves, other than that they were left burning in case they returned to the camp later, but they seem to suggest two additional possibilities:

- 1) Because burned areas are such an advantage to hunting activities, hunters may leave fires in the hope that they will spread, therefore removing the responsibility of intentionally igniting a wildfire.
- 2) As there is still antagonism between local communities and the Forestry Department, campfires may be left burning for similar reasons as above (see 1) therefore being an element of malice.

However, from our own observations we can suggest one further factor. There may be an underlying cultural approach to domestic fires that is acquired in the home, and then transported and applied to camping fires in the wild.

A number of observations support this hypothesis. The first observation is that, time after time, we witnessed households almost continuously keeping the fire smouldering, ready for any moment when it might be required. In fact, the very first interview we conducted was with a single woman of about twenty-five in the village of Phunduma. On explaining that we were interested in how people used fire she took great pride in showing us her fireplace and how the coals were still smouldering, ready to be revived at any moment with a handful of dry grass. Neither she, nor I, at the time, realised the significance of what she was telling us. The practice of not extinguishing fires in the home could be acquired through various channels and, in this case, explanations are not complex. Fire is essential for regular and daily activities; cooking; bathing; warmth; lighting; smoking; the list is endless. Neither is the economic limitation of people being financially reluctant to purchase matches (one box  $\approx$  2 MK  $\approx$  2.2 pence) entirely unreasonable. These factors combined encourage the behaviour of maintaining cooking fires within the domestic sphere.

A second observation suggests a further factor; Many of the elderly family members we spoke to still recalled making fire in the traditional manner of creating friction-heat between two sticks, one hard

the other soft. In conjunction with this, they recalled the amount of time and effort it would take to ignite the fire. Their presence within the family may therefore continue to promote and enforce the 'social norm' that the fire must not be allowed to burn out. During our fieldwork we also collected samples of oral literature about, or including, fire. One particular story, presented in Box 4.3, I think incorporates a concept of fire that further supports our thesis that fire is an element that should be kept present and continuous.

**Box 4.3: Example of Fire in Oral Literature**  
**Moral; "There are no secrets in the world"**

*Once upon a time there was a man who was a hunter with a young son. Unfortunately he was a very greedy man. One day he went to the forest to hunt for animals, but when he returned with some meat he was saddened to discover that there was no fire burning. Because he was greedy he was concerned about sending his boy to ask for some fire from his neighbours, because he knew that they would ask what the fire was for and would then want some of the meat. So, he sent his son to ask for some fire but told him that he must say that they wanted to cook sweet potatoes, even though he knew it was for cooking their meat. The boy did exactly as he was told and went and asked for some fire from their neighbours. When they asked him what the fire was for the boy said, "We want to cook sweet potatoes, although I know that really we want to cook the meat my father just brought back from the forest". The people were surprised and confronted the hunter "What is your son talking about? He says that you want to cook sweet potatoes, and yet, that he knows you want to cook meat!". To which the hunter replied, "Yes....."*

At this point the story-teller, in the voice of the hunter, asks someone to go and check how their potatoes are cooking.

(Middle aged woman in Chole)

Admittedly, in order for the story to support and demonstrate its moral lesson (i.e. 'not to lie') it is necessary for the boy to ask their neighbours for fire. A further function of the story seems to be raising the audiences' curiosity as to whether the food cooking might be meat, and thereby convince them to tend your cooking-pots for you. However, as well being a humorous example of oral literature, the story seems to support a consensus that fire is an element that should be kept burning continuously, and that within the village fire is a symbol of presence and life. This thesis was further supported by material presented in the Section 4.1.5 (Significance of Fire in the Home).

### 4.2.3. Clearing

Six clearly defined reasons for clearing the bush were explained:

- 1) **Traditional Norms.** Burning the bush has always been done.
- 2) **Stimulating new grass growth and maintaining pastures.** This benefits hunters who rely on pastures for supporting game and increases the supply of broom and thatching grass.
- 3) **Destroying the refuge of undesirable animals.** Dangerous animals such as snakes and hyena, and crop raiding animals, such as bush pigs and baboons, were particularly mentioned.
- 4) **Improving visibility.** This applies to viewing dangerous animals around the gardens and while in the forest reserve, crop raiding animals around the gardens and to approaching forestry guards while in the forest reserve.
- 5) **Destroying ground cover.** Allows one to walk freely while in the forest reserve and to carry heavy bundles of thatching grass or firewood (which is usually done by women on their head) and planks (which is done by forestry workers and illegal loggers –men– on their heads) without having to worry about long grass.

## 6) Grass sellers wishing to increase demand for their product.

Theoretically, clearing is not an independent category in itself, as *all* burning of the bush constitutes 'clearing'. For example, flushing game for hunting and revenge are equally valid reasons for burning the bush. However, as they were separately identified as primary causes of wildfires, they have not been reproduced here. It is interesting to note that reducing the fuel load and risk of hotter, more destructive, late-season fires is not listed as a *reason* to clear the bush, even though early prescribed burning policies were implemented in MMFR by the Forestry Department for a number of years. It was, however, given as an *advantage* of other types of fire.

I am aware that in drawing on the case-study presented in the introduction (Box 1.1) I must be cautious and aware of my own cultural values with regards to fire (see Section 1.1). However, it seemed as though in observing this event we experienced something typically expressive of an attitude common to much of rural Malawi. That is one of indifference towards fire outside of the domestic domain and a general consensus that burning of the land is a positive practice. Furthermore, it seemed that burning in this case provided entertainment to eliminate boredom at a time when many people were gathered together for a significant amount of time.

However, this topic becomes more pertinent when it is broadened to include burning within the domestic domain as well as within the forest reserve. This introduces topics such as **clearing for cultivation** and encompasses **conflicts** that exist within the community. This will be further discussed in Section 4.3 - 'Inter community conflicts over burning' – where a more detailed breakdown is given of the rationality involved in fire setting that we witnessed in different circumstances, and by different people. But first let us continue to discuss other possible causes of wildfires we were presented with.

### 4.2.4. Forestry Department

Since Mulanje massif was declared a forest reserve the forestry department have, until recently, created and maintained an extensive network of firebreaks in order to protect the cedar forests and some areas of secondary thicket vegetation from grassland fires. Prescribed burning was carried out early in the dry season in order to reduce the fuel load for later fires that might occur. There were a number of lookout points on the mountain, gangs of fire fighters stationed on the plateau and even a telephone link to the Likabula and Fort Lister forestry offices. People told us stories of how sirens used to sound and many people from the surrounding communities would rush to help extinguish the fire, encouraged by handouts of maize as incentives to those who contributed their efforts. The fire regime seemed effective.

In 1982, Edwards notes that the protection of some of the grasslands from fires has resulted in a reversion to secondary scrub in which *Widdrintonia* seedlings have been able to develop. He also comments that many of Mulanje's endemic plant species "owe their survival to the effective fire control policy instituted by the forestry department" (Edwards 1982:90). However it was not to last.

Evidence of faults in the Forestry Department's operations are first evident in Sakai's (1989) report that many of the firebreaks which lie along the lip of the plateaux had only a single burning line, the other side being open towards the foot of the mountain. Thus the outer slopes are repeatedly burned by the Forestry Department. He exclaims;

Misguided early burning is a complete mistake on the part of the Forestry Department...It is ridiculous that the Forestry Department itself should burn forest resources (Sakai 1989: 4)

Further to that, written evidence for such concerns are available for as recently as 1996. A letter dated 25<sup>th</sup> April from the Senior Forester of Mulanje prioritises firebreak clearance operations in the face of inadequate labour force. In a second letter, dated 4<sup>th</sup> June 1996, Tchuchilla's Head-Forester expressed concern to the District Forestry Officer of the ability to achieve fire protection if temporary employees are not recruited. Further reports of misguided burning have been reported including that the Forestry Department's early burning policy was, year by year, prescribed later and later until it could no longer

be described as ‘early’ burning and was in fact doing “*more harm than good*” (Anon *pers. comm.*). As it stands, drastically insufficient fire control mechanisms are co-ordinated by the forestry department (Regional Forestry Officers and MMCT members; *pers. comm.*). Yet the annual fire plan is still loyally produced and distributed despite there being no means with which to carry it out satisfactorily.

So, why then is the forestry department such a frequently cited cause of wildfires? Four possibilities can be suggested:

- Such beliefs may demonstrate a lack of understanding of the concept of early prescribed burning amongst local communities. An educational or community based fire-management programme may therefore be appropriate. (This is supported by the fact that the reduction of fuel-load and the risk of hotter, more destructive, fires later in the season were not given as a reason for burning, but only an advantage of it.)
- The Forestry Department has become a justification for peoples own burning practices, and also a disguise for it. For example, Lowore *et al* (2000c) was informed that some hunters waited until the Forestry Department started their early burning before starting their own so that it would not be obvious what they were doing.
- Once posted, forest guards seem to have very little input from the Forestry Department, and seem to be relatively left to their own initiative. The annual fire management plan continues to be produced and distributed despite lack of capacity to implement it. However, in our own fieldwork we observed that the firebreak between Chole and the forest reserve was well maintained, whereas in villages that were not situated directly next to the forest reserve (Phunduma and Likulezi) firebreak clearance was left to the Forestry Department. Continued early burning may, therefore, be an example of locally initiated fire-control schemes, either by influential forest guards or the communities themselves.
- A further suggestion made to us is that in many areas people may well have become accustomed to seeing the lower slopes burned each year on account of the forestry department and have taken to feeling that it *should* burn (Lowore *pers. comm.*).

#### 4.2.5. Malice

There is a complex history of government policy and indigenous forest exploitation on Mulanje. Sawing operations began in 1895, and progressed through a number of different stages and manifestations of power relations, including six years of intensive mechanical timber extraction (1950-1956). In 1982, concerns of rapid deforestation stimulated the Forestry Department to reaffirm complete control of cedar exploitation with a view to sustainably harvesting resources. Only dead trees could be logged, a valid permit from the Forestry Department was required and forestry staff would now select those trees to be taken. These measures were apparently imposed with little warning, causing a great deal of resentment which was expressed by a spate of fires the following year to kill as many cedars as possible (Chapman 1994). A similar scenario, following a series of redundancies, took place in the 1996 harvesting season.

Both Vayda (1999) in Indonesia and Masipiqueña *et al* (2000) in the Philippines, discuss the use of fire as a weapon. However, both refer to situations where competing land-use patterns between ethnic groups, with non-simultaneous use of fire as a management tool, give rise to land tenure conflicts between each other. CIFOR, ICFRAF and UNESCO (1998) also identify land tenure issues as key to understanding land use practices, changes and causes of fires. In Indonesia, government-drawn boundaries often conflict with local communities’ sophisticated traditional systems of customary land tenure, and more fires are observed in areas where these two claims conflict than in areas with clear tenure policies.

The traditional kinship system amongst the Chewa and the Lomwe is matrilineal (Morris 1998), although how much it still links to land-tenure systems around Mulanje is unclear. Currently active ethnic and land-use conflicts within the communities surrounding the base of the Mountain are also, to my knowledge, undocumented. However, should they exist, they are unlikely to be a major factor

influencing fires in MMFR<sup>10</sup>. Of more relevant concern is the direct relationship between the people and the forestry department and the restrictions that the Forest reserve imposes on the local populations' activities. Such land-use conflicts are likely to be more prevalent with increases in population, and population increase is undoubtedly a massive problem for Malawi. Malawi has four times the density of all of Sub-Saharan Africa put together. On average, each farmer has only one hectare and the estate sector holds only a small portion of the land, thus, the big farmers are not responsible for most of the deforestation. The population grows 3.2% per year and in many regions farmers have no way to expand their operations except to encroach on the forest reserves and it is estimated that Malawi's 8.5 million people clear about 50 000 hectares of forest each year (Minde 1999). This is reflected in the fact that since the forest reserve was gazetted in 1927 there have been at least five re-demarcations of the original forest boundary, each reducing the size of the reserve due to population pressure (Sambo 2001). Furthermore, there is a long history of immigration, especially from Mozambique, culminating in the floods in December 2000 from which over 200 000 refugees are estimated to have fled to the highlands Malawi. As Vayda notes (1999), there are categorical differences between so-called indigenous peoples and new settlements of migrants, or non-indigenous peoples. This may well jeopardise any co-management plans reliant on a strong sense of community.

[Migrants] can hardly be expected to constitute the kind of community which is likely to either already have, or be able to readily develop, institutions or mechanisms for community fire management (Vayda 1999: 18).

A surprisingly few number of informants identified malice as the primary cause of wild fires in MMFR. Amongst Chambe pine-plantation workers, Forest Department officials and MMCT members, arson was considered a more prominent motive for starting wild-fires. Malice is perhaps the most daunting of causes to these groups because not only is it harder to justify than income generating activities but also because, as a protest against the government, it poses a direct opposition to any good intentions they may have. However, it must be considered that malice does not necessarily have to exist as a motive in itself, but can exist simultaneously with other motives, such as hunting and carelessness with camping fires.

Three distinctive explanations for malicious fires were presented to us by our informants within our community villages and the plantation-worker village in Chambe basin (see Figure 1.2):

- 1) Following the retrenchments, some of the people who were laid-off set fires in vengeance with the hope that the Forestry Department might re-employ them.
- 2) On the plantation, pit sawyers are hired on a contract basis of one to three months. Once this contract is finished some set fires in a new area so that they will then be employed to clear that area, and so it continues.
- 3) Hunters set fires because they do not like visitors coming to the mountains and want to declare it as their own.

The first two versions were specific to the renowned fires that took place in Chambe pine plantation in 1996/97 and, although both may be equally true, demonstrate the complexity of oral testimony. To those forestry-workers posted at Chambe pine plantation the first scenario was certainly the most relevant. The fires of 1996/1997 have become a pivotal mark in time and everything is remembered as happening either before or after the "big fire". These fires were repeated in forest plantations throughout Malawi and the retrenchments are said to have led to rivalry, and a jealousy fuelled split, between those that lost their jobs and those that remained employed. This may further explain why vengeance remains a more frequent explanation for wildfires amongst Forest Department employees. Generally, however, employees' attitudes towards arsonists seems to be of sympathy and understanding. Their reluctance to provoke further jealousy only contributes to their lack of enthusiasm over reprimanding hunters, arsonists or anyone who might deliberately set fires.

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<sup>10</sup> Should ethnic conflicts exist around the base of Mulanje, MMCT and the Forestry Department must exercise extreme caution in selecting communities to be put forward for the pilot co-management programme.

**Box 4.4: MCM Circular No: 307, February 1999**  
**Madmen Out of Control: Mulanje as a Target for Ecovandalism**  
Lichenya 13/14/15/16<sup>th</sup> October.

Perception is intensely individual and in most people strongly subject to modification in the light of the opinions of others, but there was no need of that amongst our small band descending the 'Milk Run' (*path between Likhubula and Lichenya*) on Friday 16<sup>th</sup> October. We were in total unison. This was absolute madness. Sheer evil. The mountain forests were being systematically torched.

One month ago we had been on the Lichenya plateaus to wince at the extensively carbonised grassland. A planned burning programme is part of the overall scheme of reducing the chances of larger unplanned, out of control fires. What we saw then was not the work of forestry but out of control poachers, driving out dassies, porcupines etc. However we did not despair knowing the recovery powers of the grassland and indeed a few weeks later, verdant pastures once more crowned the plateau. But then to witness the multiple attempts at fires starting as we descended the plateau and see the numerous plumes of smoke, some wispy, others billowing, on different sides of the Likabulah valley made it clear something was afoot.

The first bit of forest below the CCAP/Lichenya hut path fork has been subject to cedar poaching for a few months now. We quenched our thirst at the stream crossing and followed the cobbled track along the cliff edge into the major forest decent. Great flames were shooting up the mountainside fanned by a stiff breeze directly above the track route. It was dense smoke and burning branches either side, but the porters had gone through and so we followed. It was nasty but OK, then. Fifteen minutes earlier and we would have been braised. Forest fires racing up steep hillside veering one way and then the other with the chasing wind are distinctly dangerous and to be avoided. As we came off the steep decent and crossed the slabs, we could hear huge cracking and whoosh. The porters were edging carefully around the corner. Fortunately for us, the prevailing winds were towards the Chambe plateau. Huge plumes were leaping up the Chambe side of the Likabulah Valley and the echo of the inferno was bouncing across to us. It was clear to us that this was no accident. Fires were being set to maximise damage.

Without further hazard we plodded through the earlier charred landscape down to the Likhubula River for a welcome cold dip and onto the forestry office. There we learned the cause of the problem. The Government had suspended sawing on the Chambe plateau where there is a major pine plantation. A good number of people make a living there sawing and carrying, but as anybody who had visited Chambe Hut in the last couple of years will tell you, the place resembles a disaster zone. Two years ago when forestry workers were laid off as part of a 'Structural Adjustment Programme' the affected people took it out on the management in the easiest way, with fire. You fire us, we fire you! Madness and absolute evil, against a unique and helpless forest on a World Heritage Site. Just one perception, but surely one that must prevail.

Martin Horrocks  
Chairman of Mountain Club of Malawi  
Member of Mulanje Mountain Conservation Trust

It is interesting to note the significant increase in fire attributed to "arson" in the 1995 Forestry Department records data (see Figure 3.2). This supports the reported spate of malicious fires following a series of redundancies within the Forestry department during that era. However, it is also interesting to note the high percentage of fires whose causes were "unknown" in the 1985-89 and 1992-1994 data periods and the total absence of this category in the 1995 data period. This suggests that assumptions may have been made during this latter period, that fires were a consequence of the current politically relevant explanation.

From this explanation you may expect my argument to be that malicious arson, five years after the notorious 1996/97 retrenchments, is no longer of serious concern. However, vengeance is a powerful tactic that can rematerialise at any given time, as demonstrated by Martin Horrock's report in the MCM newsletter of February 1999 (Circular No. 307, see Box 4.4.). The conflicts between the Forestry Department and the local communities must therefore be a priority. While malice is still a valid reaction in many people's minds, a community based fire-management, or educational, scheme intended to reduce numbers of fires through awareness, may in fact be extremely difficult to implement without causing the opposite effect of actually stimulating arsonist activity.

Although I am by no means wishing to suggest that arsonists of MMFR are 'pathological' Johan Goudsblom (1992) quotes Nolan Harris' and Helen Yarnell's (in their book *Pathological Firesetting*)



captivating description of the therapeutic and emotionally satisfying solution incendiarism, or arson, offers.

Being an excellent means of destruction, it [fire] is admirably suited to the carrying out of aggressive tendencies, for the venting of hatred and a perfect medium for the discharge of a considerable volume of other suppressed emotions...By the use of a match the firesetter achieves tremendous spectacular effects which transcend the usual proportion between effort and result. He feels that he has accomplished what the forces of nature released by him are producing for him. (Goudsblom 1992:201)<sup>11</sup>

#### 4.2.6. Conclusion

According to our results the primary causes of wildfires in descending order of frequency are:

- Hunting
- Carelessness with camping fires
- Clearing
- Practices of the Forestry Department staff, and
- Malice

It is probably not surprising that this is not in agreement with the few documented fire records, and strongly reflects the divide between the Forestry Department and the local communities. However, as mentioned previously, the documented records are for pine and *Eucalyptus* Plantations only, are grossly incomplete and should be treated with caution.

Looking as a whole the causes discussed so far, an underlying theme is apparent, that fire is somehow a means of ‘domesticating’ the wild. By taking the domestic fire into the bush, one then provides for oneself, necessities of life to be taken back to the domestic.

It is interesting to note that ‘malice’ and ‘Forestry Department staff’ were only given as primary causes of wild fires by informants in Chole and Songwe, and not Phunduma. Especially because Chole and Songwe are situated directly adjacent to the forest reserve border, while Phunduma is distanced from it by a stretch of private land and a road (see Figure 1.3). Deep interpretation of this observation may be over-stressing its relevance, however distance from the reserve border may well influence both communities’ awareness of the Forestry Department’s activities and the conflict felt between community and Forest Department. It is also worth noting that the bad relationship between the Forestry Department and the Songwe community is particularly prominent, due to the reclamation of previously cultivated land within the forest reserve boundary and establishment of a *Eucalyptus* plantation to prevent further encroachment. This may account for both the higher occurrence of malicious arson suggested to us in Songwe and the higher number of informants declining to answer.

Through discussion of the causes and motives behind anthropogenic fire, it has not been my intention to focus on the consequences of fire specifically. However, because we are investigating the reasons why people burn, our discussion inevitably relates to the immediate effects of fire, whether it drives game from their refuge, clears obstructive ground cover, or provides a dramatic form of protest. Following this, I now wish to take this analysis to a deeper level by exploring conflicts over the consequences of burning that exist within the community. By expanding this discussion to encompass the village gardens as well as the forest reserve, concerns of the longer-term effects of fire are evoked, such as nutrient degradation and erosion. This highlights the fundamental contrast between peoples’ attitudes and feelings of responsibility towards customary land and the forest reserve.

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<sup>11</sup> Please note the author’s apologies for being unable to locate the original text.

### **4.3. Inter-Community Conflicts Over the Consequences of Burning**

Fire is essentially the starting point for a chain of consequences. Fire has immediate environmental impacts and knock-on ecological, economic and social effects, both positive and negative. Tables 3.2(a)&(b) in the results section represent the anticipated consequences of burning according to the informants, negative and positive respectfully. Table 3.3 organises these into responses according to different, and sometimes conflicting, income generating activities.

The symbolic and complimentary opposition between the wild/woodland and domestic/village domains is pervasive in Malawian rural culture, and this is reflected in a strong dichotomy between male and female, and a clear division of labour. While women are generally symbolically associated with the village, domestic household, subsistence agriculture and the wet season, men are associated with the wild, woodland environments, hunting and the dry season. (Morris 1995 & 1998). From the horticulturist domain 'the wild' is seen in opposition to human concerns and well-being. In contrast to the domestic, the wild domain is also seen as a source of materials and of life-generating powers.

An interesting aspect of burning is the conflicts that exist within the communities. These conflicts can be separated into functioning within the same two domains:

- 1) The domestic domain of the village, namely that between agriculturalists and rodent hunters, and
- 2) The 'wild' domain, that between those that burn (whether accidentally or intentionally) and those that gather products from the forest reserve (such as fire-wood, grass for thatching and brooms, wild vegetables and medicines).

Hunting larger game can generally be excluded from the domestic domain because animal populations have been restricted to the forest reserve by human pressures. However, some communities close to the border, which are subject to crop-raiding, do attempt to either deter animals with contained fire along the perimeter of the garden or trap them with various kinds of snares and covered pits.

The following analysis is based entirely on our own interviews and observations:

#### **4.3.1. The Domestic Domain: *Burning Versus Agricultural Activities***

Rodent hunting was, by far, the most notorious cause of destructive fires within the village gardens. Rodents (*mbewa*) constitute an important form of food for many people in Malawi and, certainly in the area where we were working, rodents were highly sought after. Some hunters use traps, but most dig the rodents out of their burrows. During the breeding, and dependent on species, one burrow can yield whole families of up to twenty rodents which are boiled and dried and presented on a skewer arranged in tapering order of size. Once a burrow entrance is located the area surrounding the burrow is usually burned<sup>12</sup>. This serves three purposes; 1) It clears the vegetation so that secondary escape holes can be easily located and are then blocked; 2) It drives the rodents into their burrow from which, once escape routes are blocked, they can then be dug out, and 3) The heat and smoke serves to weaken the animals and make it easier for them to catch. Mangani Katundu (2001), who worked with us on our project, carried out intensive research into the economic, environmental and social aspects of rodent hunting, including the effect of burning, digging, and the recently emerged trend of using pesticides to kill rodents for consumption (which has been responsible for several recent deaths in Malawi).

The majority of digging for rodents is carried out in gardens, although trapping is popular on the mountain. This is because many rodents are found in association with the high availability of grains in

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<sup>12</sup> In our experience, rodent hunting was more common in gardens around Phunduma, than it was in Chole and Songwe. The resultant number of fires may also contribute to explaining why the majority of Phunduma informants suggested that the number of fire in MMFR had increased.

cultivated gardens, and partly because the soil on the plateaux is uncultivated and rocky and therefore difficult to dig. During the dry season, once crops have been harvested, people are barely concerned with their gardens and land tenure until the coming of the new rains. The land virtually becomes open-access and others are usually free to trap and dig on all land. The majority of rodent hunting is carried out by young boys, although men also do so if it is more of a serious income generating activity. Occasionally, young girls may be seen rodent hunting, but this is unusual.

At the beginning of our fieldwork in May, all rodent-hunters we came across were clearing the area manually as opposed to burning. However, when asked why they were clearing the area that way, the reason given was because the vegetation was not yet dry enough to burn rather than any concern about neighbouring crops not yet being harvested. Although the primary reason given for wildfires in the gardens was rodent hunters, most informants admitted that usually by the time the rodent hunting season is at its peak all gardens should have been fully harvested. Many informants were nevertheless very concerned over the effect of burning of soil fertility and the risk to valuables if the fire were to get out of control and expressed the belief that rodent hunters had no concern for other peoples' crop still to be harvested. Many cleared paths around their land, which were said to act as fire breaks and define their border as well as provide access. Furthermore, there was recognition of beneficial nutrient-related consequences of burning, for example, the ash piles from burned agricultural waste (*chikusa*) were said to be good for growing pumpkins, however, these assertions are yet to be substantiated. To this end, agriculturalists had a balanced and reasonably well-developed perception of the effect of fires. Still, it was a notable observation that such concerns about fertility and erosion were rarely expressed with regards to the forest reserve as they were towards peoples' own gardens (see Table 3.2(a)).

Women are generally associated with agriculture, while men are generally associated with hunting, whether large game or rodents (*mbewa*). Such a conflict can therefore generally be attributed to differences in gender roles. However, both sexes share the ultimate goal of acquiring food during unconflicting seasons and are therefore tolerated by each other during the transition period between wet and dry season.

#### **4.3.2. The 'Wild'/Forest Reserve Domain: *Burning versus gathering activities.***

In this discussion, "those that burn" refers to people initiating any of the various causes of wildfires within the forest reserve. "Gathering activities" refers to collection of firewood, grasses for brooms and thatching, and other plant materials for food and medicines. Table 3.3, again, gives an idea of the complex trade-offs that exist between the 'positive' and 'negative' effects of burning of the bush, and the conflicts that exist between each IGA.

Uncultivated patches of land are an important source of grass thatch, which is usually collected once crop harvesting is completed. For many, only those that were considered "lazy" would not be able to collect their required amount of thatching. However, others saw that the population increase, and the associated lack of uncultivated land and increased frequency of burning by rodent hunters, had led them to start collection earlier in the dry season while grass is still slightly green, and to venture further up the slopes of the forest reserve in order to collect sufficient quantities. This, they say, is dangerous when having to carry a heavy or awkward load while negotiating steep pathways. This conflict is also said to be particularly prominent when there has been a late harvest, as the extra time required in the fields leaves less time for grass-collection and therefore increases the risk of it being burned before sufficient is obtained. Notably, there is no system of reaching a community consensus of when it is convenient for all to burn, other than when it is dry enough to do so.

As a rule, it is the women's role to collect both firewood and thatching. Men sometimes do collect but, again, this is usually only if it is as an income generating activity, i.e. for the purpose of selling. Other domestic responsibilities seem to limit gathering activities by women to day-time trips as we did not encounter any evidence that women ever used campfires while in the Forest Reserve. Additionally, men are primarily associated with the causes of wildfires within MMFR identified in Figure 3.1. Hunting and logging (whether by legal or illegal contract) is considered a male

occupation, therefore it is more likely to be men staying in the forest reserve for sufficient time to warrant the need for a camping fire. Only men are employed by the Forestry Department for labour and security roles<sup>13</sup>, and were therefore most affected by the retrenchments to feel sufficiently revengeful to contemplate arson. This conflict of burning within the forest reserve can therefore also be aligned to differences in gender roles.

There are a couple of interesting points to be made about our informants' responses presented in Tables 3.2(a). The first being that the same proportion of informants from all three villages gave responses indicating that their concerns were that fire destroyed the resources that they rely on from the Forest Reserve. However, twice as many informants in Songwe than in Chole or Phunduma mentioned that fire destroys natural resources in general. This reflects concerns among the majority relying primarily on immediate needs. Why Songwe residents should be more broadly concerned is unclear, but they may be influenced by their enclosure between the forest reserve and tea estates through which residents are reliant on MMFR's resources<sup>14</sup>. A second factor may be that traditional beliefs and values are far more prominent and adhered to in Songwe than was experienced in Chole or Phunduma, again possible as a result of Songwe's relative isolation.

The second observation was that only residents of Phunduma suggested that wildfires are not a problem for the forest; rather they only view wildfires in their gardens as a problem. Once again, we see a clear differentiation between the villages situated adjacent to the forest reserve boarder and the village distanced from it (although not separated by inhabited customary land).

### 4.3.3 Conclusion

From an anthropological perspective, we can conclude that a use of fire exemplifies gender roles and the associated 'dialectical' schema between domestic and 'wild' spheres. It can be said relatively safely that women are unlikely to ever be in the position of setting wildfires within the forest reserve. In the home, women are in charge of igniting and maintaining the fire, and responsible for the domestic duties associated with it (cooking, heating bathing water, distilling cane-spirit etc.). In the 'wild' sphere of the forest reserve men have control over fire, where it is used for masculine activities such as hunting, and camping. Attitudes towards fire setting however, are less simplistic, as fire both advantages and disadvantages the activities of both genders.

From a local community's perspective, fire had a destructive influence on the immediate availability of firewood and grasses, and costs extra time, energy and money to obtain sufficient substitute quantities. However, in the longer-term, fire kills trees and dries out large logs of wood, creating 'future' firewood. It clears away old grasses and promotes new fresh growth for next years thatch or brooms. It may also promote growth of certain food or medicinal products, for example, in Chole fire was frequently said to be 'good for mushrooms'. However, again, evidence behind these beliefs is yet undiscovered by the author and community consultations from Liwonde national park in Malawi reportedly found people believed fire was *bad* for mushrooms (Lowore *pers.comm.*).

Several researchers participating in a recent "Community Based Fire Management" workshop held in Bangkok also reported the belief that fire promoted mushroom growth (RECOFTC 2000).

Villagers who are collecting mushrooms and wild vegetables think that the forest fire stimulates growth of these non-timber forest products [NTFP]. They believe that without forest fire there would not be any NTFPs or if there were, they would grow very slowly. The underlying socio-economic reason behind these fires is the subsistence or livelihood dependence on forests, particularly NTFPs.....To manage a forest there must be management plans to provide benefits that the community requires. Similarly to manage fire we must ensure a plan of management that provides the benefits the community requires. If we want mushrooms or young grass for cattle,

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<sup>13</sup> Although we did meet one forestry extension advisor who was a women

<sup>14</sup> These factors may also account for the percentage of fires being attributed to carelessness with camping fires

fire might be managed every year so that mushrooms and young grass can grow (Makarabhirom *et al.* 2000: 25-29).

Johan Ramon (2000), reporting on Indonesia and Malaysia, even suggests growing mushrooms as an alternative income generating activity on the bases that it utilises both agricultural waste and potential wildfire fuels.

Furthermore, as well as destroying the immediate availability of some forest products, fire “clears the place” which makes collection much easier. People can move freely without being hindered by long grass and without fear of dangerous wild animals, such as hyena or snakes. They can also see the forestry guards coming from further away and make their get away if necessary.

In general, local people seemed to have a balanced and well-developed perception of the effects of fires. However, the opposition between the wild and domestic domains are strongly reflected in peoples’ attitude towards fires. Within the forestry reserve the possibility, or desire, to apply this knowledge into a framework of rational decision making is, as it presently stands, simply not feasible. The high population density and poverty creates a “first come, first serve” approach, with fire-setters being concerned only with the immediate benefits of the fire at the expense of the long-term consequences. People tend not to be concerned about following regulations because most of the damage affects forestry department land from which they are politically excluded. The symbolic relevance of fire may also be playing a significant role in peoples’ perceptions of fires and their attitudes towards it.

Through this section we have come to recognize the conflicts within local communities perceptions of burning and its consequences. However, it is important not only to recognise contradictions within the community but also the difficulties in overcoming discrepancies between the beliefs of local communities and those of forest reserve officials. Such differentiation is especially apparent between our own data and that drawn from Forestry Department records. This has been approached previously during our analysis of the possible causes of fires, but will now be discussed further by looking at differences in the perceptions of fire frequency. This will then lead us to final conclusions and recommendations.

#### **4.4. Changes in Number of Fires**

It is interesting to note that two of three villages in which we conducted interviews said that the number of fires had *decreased* in recent years. It is impossible to determine whether these responses are given in an attempt to disguise the community's involvement in fire setting. However, such a large majority in agreement in two of the villages, and the openness of informants with other questioning, suggests not. This result is in strong opposition to the general consensus between Forest Department officials and MMCT members acquired through interviews; that numbers of fires has *increased*. It is also, unfortunately, impossible to determine which belief is correct, as there is insufficient record keeping on the number of, causes of, and damage by fires in the forest reserve (see Appendix 5). As we see from figure 3.3 the records we do have indicate an increase in number of fires and area burned per plantation year prior to 1995. However, there were no records found to determine any changes after this date.

Figure 3.3 supports the thesis that both number of fires and area burned have increased over the past two decades and Figure 3.2 suggests that these increases are the result of malicious arson. Both of these correspond well with the reported spate of fires following redundancies by the Forestry Department. However, although the area burned (represented by the pink line) increases significantly (from 0 to 757 Hectares), the number of fires (represented by the blue line) does not increase so dramatically (fluctuating between 0 and 17 per year). These results may therefore suggest a reduction in the effectiveness of fire protection methods, as much as they do an influence of arsonist activity.

Presuming that the Forestry Department records do reflect an increase in arsonist activity, the question still remains whether or not arsonist activity *specifically* has declined since 1995. Our informant interviews suggest that it had at the time of our questioning.

In our discussion of malicious arson in section 4.2.5 we described how, amongst plantation workers, arsonist activity has remained strong in the rhetoric surrounding fires, and this may also be true for increases in number of fires reported by Forestry Department officials and MMCT members. However, I reiterate, that arson poses a constant threat and may always exist simultaneously with other motives, such as hunting and carelessness with camping fires.

Increases in area burned by fire each year due to unfulfilled fire-protection measures by the Forestry Department must not be confused with increases in number of fires. Documentation of fire frequency, damage estimations and, where possible, causes should therefore be a priority.

It is also interesting to note that, again, we see a difference between Phunduma, which is distanced from the forest reserve boundary, and Chole and Songwe, which are situated directly next to the border (see Figure 1.3). In this case, in both Chole and Songwe the vast majority of informants believed fire frequency in MMFR had decreased, while in Phunduma informants believed fire frequency had increased. Such beliefs are likely to be founded on personal experiences. Perhaps, an informant's position in relation to MMFR has sufficient influence on personal experience to account for fundamentally opposite beliefs<sup>15</sup>.

It is unfortunate that our questioning did not distinguish between changes in the numbers of fires started by the forestry department, carelessness with camping fires, hunters etc, individually. This is an inadequacy in our interview structure, which in hindsight should have been included.

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<sup>15</sup> It should be noted that some of the reasons given for the decrease in number of fires in Songwe however are inapplicable to Chole and Phunduma (see *Table 3.2*). For example, Songwe is surrounded by tea plantations and therefore experiences higher employment opportunities. Unlike Chole and Phunduma, *Eucalyptus* had been planted between Songwe and MMFR to mitigate encroachment, which alters the fire regime substantially.

## **5. Conclusions and Recommendations**

The data on which this dissertation is based was collected over a period of three months fieldwork in and around the Mulanje District of southern Malawi. The sources of information included interviews with local communities and key informants from special-interest groups, published literature and unpublished documents from the Forest Department of Malawi and Mulanje Mountain Conservation Trust resource centre.

It is important to bear in mind that much data for this part of the report is derived from interviews. We should also remain aware of the problems faced in accessing relevant and available data from documentary sources and relating these to the material from community interviews and participatory observation. It is clear that further study to obtain observational data is needed to substantiate what people say about the causes, effects and numbers of fires. Such studies would be important in gaining an insight into a fire regime specific to the ecology of Mulanje Mountain and the need of the local communities reliant on its resources.

Our first discussion described daily activities and ceremonies in which fire plays a prominent role, the intention of which was to gain insight into the current importance of fire in Malawian culture, in relation to the past. Particularly relevant was the cultural meaning and use of fire in the domestic domain contrasted with that in the wild domain of the bush. We found that some aspects of past significance were still prevalent today, but that many traditions were clearly losing importance in the eyes of the younger generations, and this may have an impact on the future fires that take place in MMFR.

According to our results, the reported primary causes of wildfires in descending order of frequency are:

- Hunting
- Carelessness with camping fires
- Clearing
- Practices of the Forestry Department staff, and
- Malice

In agreement with Lowore *et al* (2000a), we have found that hunters are frequently blamed for starting fires. However, this explanation was just one of many, and attitudes towards fire vary considerably amongst hunters. However, for those that use fire, finding an alternative to it is difficult. Hunters should therefore be a key target group in discussing alternative income generating activities. As formalisation of hunting activities, control and legislation through co-management is already on the agenda (EDG 2000: 5.4), the possibility that hunting and fire management implementation (especially early burning practices) be linked in some way should be considered.

A further possibility contributing towards a large number of fires in the Forest Reserve is that there is a custom of not extinguishing camping fires. We interpreted this in two ways. Firstly, as a tactic by which people hope to start wild fires but avoid the responsibility of doing so; and, secondly, that people may be taking behaviours acquired in one sphere (the home) and applying it in another (the wild). Whether this practice has always been present or is a recent phenomenon is unclear, but the question remains, is this application now relevant? The current 'fire-scenario' for MMFR is likely to be mutually dependent on changes in peoples' application of fire, subject to a breakdown in traditional values and once-suitable applications becoming unsuitable due to population increase, environmental degradation and shifts in economic and political climate. At the same time, the 'burning of the bush' to maintain traditional norms, maintain grasslands, destroy refuge areas for undesirable animals and to improve access and visibility continues to be considered a generally positive process.

Continued reference to the Forestry Department's early-burning practices, despite the collapse of the policy in recent years, suggests several explanations. One being that the Forest Department has become a justification, and a disguise, for peoples own burning practices, and another that there may be a lack of understanding of the concept of prescribed burning amongst local communities.

Our research found that local communities have a balanced and well-developed perception of the effects of fire, especially those directly relevant to their income generating activities (IGA) or roles within the village social structure. However, large population density and complex interactivity conflicts over the consequences of burning makes rational decision-making ambiguous in the actions people take. These 'IGA-roles' are strongly characterised by gender and reflect the dialectical schema between the domestic and wild domain. Men and women use fire for different and sometimes conflicting reasons, so gender as well as influencing uses of fire, also seems to have an impact on attitudes towards it. Notably, there is no present system within communities for reaching a consensus of when it is convenient to burn, other than when it is dry enough to do so. Perhaps, the process of co-management will encourage development of institutions, or mechanisms, for community-induced local fire management.

Whether the number of fires has increased or decreased since 1995 is impossible to know, and discussions can be no more than speculative. Even so, increases in area burned each year due to unfulfilled fire-protection measures should not be confused with increases in the number of fires. If the number of fires has, as suggested by our results, actually decreased then the question for conservation management might be; why worry? The problem is that despite decreases in the number of fires, it only takes a single fire out of control to cause widespread damage. The trend in fire frequency could also be dramatically shifted by the causal factor malice. Although malicious arson did not seem to be a major concern at the particular point in time in which our fieldwork was conducted, it is a powerful and destructive tactic that can re-emerge at any given moment. Resolving the conflicts between the Forestry Department and the local communities must therefore be a priority.

Our conclusions lead us to the following recommendations:

- **Research:** Record-keeping of fire frequency, damage estimations and, where possible, causes should be a priority. The possibility of recruiting regular visitors to the mountain who have detailed knowledge of its terrain, such as MCM members and long-term researchers, to document their sightings of fires should be explored. The method of documentation should be standardised and an element of training should be involved. Unless *direct* observations are made, the suspected causes of the fires should be treated with caution, as frequently hunting is the obvious scapegoat. Equally, quantification of damages is likely to be subject to cultural and economic and aesthetic values. It is certainly clear that more scientific research has to be conducted to establish the effects of fire on the specific ecology of Mulanje Mountain<sup>16</sup>.
- **Education:** with increases in population density and other factors contributing to deforestation, opportunities for people to make first hand observations of the detailed interaction of fire with their environment may be being masked. Opportunities for discussion should therefore be implemented providing space for communities to share and develop their knowledge in an environment where information is made available to them. At the same time, education on the ecological role of fire should be provided for both community members and Forestry Department staff implementing fire control regulations. Ideally, participants should be representative of a

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<sup>16</sup> As asserted by the MMFR Five Year Management Plan (EDG 2000), the relevant literature is full of assertions that periodic fires are essential for the ecology and regeneration of the Mulanje Cedar, and that fire acts as its natural rejuvenating agent. Where as, in fact, there is no experimental evidence to support these conjectures, and all circumstantial evidence seems to indicate that mature Cedar is very sensitive and susceptible to fire. Doubts are growing as to whether *Widdringtonia whytei* is actually a fire-adapted species. The Five Year Management Plan also recommends that the maintenance of fire tolerant grasslands under a regime of controlled early burning is considered acceptable for a number of reasons. Lemon (1961) concluded that early fires were not detrimental to the grassland communities of Nyika Plateau, further north of Mulanje. This is likely to be the same for Mulanje, given that many of the dominant species are either common to both plateaux or members of the same family. However, given the high number of endemics on Mulanje such an assumption may be dangerous. It is recommended that, at least, the frequency of fires reaching areas in which rare endemics are found should be monitored in some way (John Wilson *pers. Comm.*).



range of income generating activities involving or directly affected by fire. Both men and women and a comprehensive age range should be included, as we have seen here that gender and generation influences the use of and attitudes towards fire. However, in making this suggestion we are well aware of the difficulties of achieving participation from all strata. These workshops should equally serve as an opportunity for MMFR management officials to gain insight into the locally specific economic and cultural dependence on fire use and develop their policies accordingly. It is hoped that such programmes will stimulate local communities to implement local fire-control measures, as well as promote the process of conflict resolutions between Forestry Department and MMFR dependents.

- **Conflict resolution:** Arson is the means through which local communities feel they are able to vent their frustrations with great effect. Therefore, while malice remains a valid reaction in many people's minds and while there is still sufficient conflict to provoke it, the implementation of an educational or community based fire-management programme by the Forestry Department, aiming to reduce fire frequency through awareness, may be problematical without causing the reverse intention of actually stimulating arsonist activity. It may be advisable that the supervision of such a scheme be coordinated by a neutral third party, such as MMCT. However, it still remains a high recommendation that any education or exchange of ideas be directed equally towards forest reserve workers and other community members. In this way, it is further hoped that such workshops may not only bring people together to exchange knowledge, but also build coalitions for co-operative management of MMFR.

## **Appendices**

## **Appendix 1: Story of Chole Village**

The 'Story of Chole Village' presents an interesting merge of folk-tale and history. The story was given to us by Mrs. Bodzo (70+ years old), the grandmother of the Chief of Chole, and was also supported by several other informants.

*At first there was no Kambenje, there was a family called 'Chole'. The family was staying in the land of a European, Bruce Lijet<sup>17</sup>. A man Jonas became the first chief for this group of people. Jonas had a sister called Akhalepo (meaning 'she ought to be here') and brother called Thomas. After Jonas died his sister succeeded him by choice of the people, but she failed to satisfy their needs, so the chiefdom was given to her brother, Thomas. Thomas, however, was poorly educated and could not read or write. So whenever there was a ceremony he would send in his place the man who came to marry the daughter of Akhalepo, Kambenje Mandevu. Because this man was clever, when he attended the many ceremonies he changed the chiefdom name from 'Chole' to 'Kambenje'. At this time there were now two names for the chiefdom, but because it was always Kambenje Mandevu who attended the ceremonies, the peoples said they would change the name to 'Kambenje'. This should be around 1962-1963. During this time there was a conflict between the late president Dr Kamuzu Banda and the federal government (is it said led by Weleske). Kambenje Mandevu participated in the conflict, on the side of Banda, trying to stop the thangata<sup>18</sup> system, so the federal government put him in jail. This meant there was no longer any ruler. After nine months Banda won independence (1964) and therefore allowed Kambenje Mandevu out of jail, wanting to give him a gift. Kambenje asked for land for his people. But because the land was in the hands of Bruce Lijet it was not possible until the land was officially divided. There was much fighting between Bruce Lijet and the government as at the time all the land was covered in tea and coffee estates, with little land for growing food crops.*

*At the time the office of the government was in Thylo at an area called 'Matipwiri'. They divided the land at Tchuchilla River the northern side for Bruce Lijet and the southern side for Chole. Kambenje then asked Chole for some land, as he had helped him for so much time. At first Thomas Chole said 'no' because Kambenje Mandevu was only "Kamwini" ("for others"), meaning he had married into the village under the matrilineal system. Eventually he did give Kambenje the land and soon after Thomas Chole died. Chepete, the son of Thomas's sister, Akhalepo, and the 'brother-in-law' of Kambenje, was too young to take over the chiefdom at the time, so, Kambenje Mandevu was left in charge of the two villages. After Kambenje Mandevu died there was no one to stand to be chief. The uncle of Kambenje Mandevu, Namainja, wanted to be chief. But again people said no because Kambenje had come in to marry and his relatives were not entitled to take over the chiefdom. Eventually a son born between Kambenje Mandevu and Akhalepo's daughter, called Alatan, took over. But Alatan he was overthrown for being a drunkard, so his brother Sawasawa was took over, but again he was overthrown for drinking. The third brother then took over, Lamusi. This took place sometime between 1979 and 1983.*

*Once Chepete, Akhalepo's son, had grown he took over the chiefdom for Chole, leaving Lamusi the chiefdom for Kambenje. Conflict meant that people started to divide. Because there were more people on the Kambenje side it grew faster and acquired more land. However, Chepete was also a difficult man, fighting with people and drinking, and he soon died young in about 1985/6. Kimu, who was of the same grandmother as Chepete took over. After Kimu dies there was a man called Gambatula who was on the same side of the family as Cepete took over. However he was too old and soon died. At this time no one was willing to take over because there had been such a long succession of chiefs dying. People felt that the Kambenje side were performing magic to kill the chiefs of Chole so that the village would fall. The present Chief's Mother, Mrs Kusaluh, was in the line to take over but the people refused to let her for four to five years because they were scared she would die. In the mean*

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<sup>17</sup> The oral literature remembered the character as 'Bruce Lijet'. However this was later deduced to most likely be a combination of two landowners. David Ritchie and a 'Mr Bruce'. Possibly Mr Alexander Low Bruce of the Magomero estate, which in 1964 retained mining rights for bauxite at Mulanje and minerals deposits at Likulezi (White 1987).

<sup>18</sup> Thangata: A colonial system of resident tenancy whereby residence on land appropriated for the estates were required to work for their land-lord for a period of time each year in payment of rent and taxes.

*time Lamusi, the chief of Kambenje village, had been over thrown and another brother, Nampoto, had succeeded him. Nampoto now held the chieftom books<sup>19</sup> for both Kambenje and Chole. Mrs Kusalu however, still acted as advisor and recieving the problems of people as if she were chief. The people's fears came true and she too died in 1995. On Chole side there had now been no chief for a number of years. So, following the death of his mother the first born of Mrs Kusalu came from Lilongwe became chief of Chole, Chief Kusaluh, and he is still the present chief today.*

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<sup>19</sup> The book of Chieftom in kept by the chosen chief in which he keeps record of all the births, deaths and families living within in their village. The holding of that book is symbolic of the status of the chief.

## Appendix 2: Interview Protocol (Chichewa translations by Mangani Katundu)

### General information

Informants present:

**Gender** (amai kapena abambo)

**Age estimation** (muli ndi zaka zingati)

**Occupation/Main source of income** (mumagwira ntchito yanji / ndalama mumazipeza mu njira zANJI?)

**Past occupations** – (mbuyomu munagwirapo ntchito yanji?)

*This question became particularly usefull in establishing whether informants ever worked for forestry department or tea plantations.*

**Where is your garden? How much land do you cultivate?**

(Munda wanu uli kuti? Nanga mumalima mbali yaikulu bwanji?)

*These two questions were inextricably linked. They were designed both establish in what land tenure the gardens were situated (i.e. whether the garden was within the village's customary land or, in the case of Chole and Phunduma, rented from Mr Tsamwa's private Tinyarde estate or, in the case of Songwe, on encroached government land. This proved to be especially relevant to peoples attitudes to fires) and to give a measure of family status.*

### “Fire” questions

**What are the uses of fire?**

*If relevant:*

**Who uses it?**

**Why is it used?**

**How is it used?**

**When is it used?**

(Kodi ntchito ya moto ndi Chiyani?)

(Amaugwiritsa nthito ndani?)

(Ndi chifukwa chiyani amaugwiritsa ntchito?)

(Umagwiritsidwa nthito motani?)

(Ndi nthawi ziti zomwe moto umagwiritsidwa ntchito, pa zotani?)

**Do you use fires in your garden?**

*If so:*

*If not:*

**How?/When?/Why?**

**Why not?**

(Mumagwiritsa ntchito moto kumunda kwanu?)

(Motani?/ nthawi ziti?/chifukwa chiyani?)

(Chifukwa chiyani simumaugwiritsa ntchito?)

**Do wild fires ever cause problems in your garden?**

(Kodi munayamba mwaonapo zovuta m'munda mwanu chifukwa cha moto olusa?)

**What are the main causes of wild fires in your garden?**

(Kodi kweni kweni chimayambitsa moto m'munda mwanu ndi chiyani?)

**Do you make firebreak around your garden?**

(Kodi mumalambulira m'mbali mwa munda wanu kuti muutetze ku moto?)

**Does the firebreak between the forest reserve and private/customary land stop fires satisfactorily?**

(Kodi nseu womwe unalimidwa ngati malire pakati pa nkhalango ya boma ndi malo kapena nkhalango za anthu umathandiza kulpheretsa moto kudumphika kuchoka mbali imodzi kupita kwinako?)

**What are the main causes of wild fires on the mountain? Are they the same or different? (Kodi moto umayamba bwanji mphiriri? Kodi zifukwazi ndi zomwezo kapena zimasintha?)**

*Informants were asked to free-list causes, through which an order of importance was often expressed without prompting. If such order was not immediately apparent, informants were asked either asked to rank these causes in order of importance/effect, or if that proved to be inappropriate, simply asked which one they thought was the most important/influential.*

**What are the effects of wildfires on the mountain/ in the forest reserve?**

(Kodi moto umenewu umakhudza bwanji khalango yotetezedwa ndi bomayi?)

*If no positive effects previously mentioned:*

**Are there any positive effects of fires on the mountain/ in the forest reserve?**  
(Kodi moto womwe umayaka mphirimu uli ndi ubwino uliwonse?)

### **“Forest Reserve” questions**

**How long has the family/key members been living in their village?**  
(Kodi malo ano mwakhalapo nthawi yaitali bwanji?)

*This question is designed to acquire some quantifiable information on the amount of time during which changes may have been observed.*

**Have there been any changes in vegetation cover/size of the forest during your lifetime or during the time you have been living here?**  
(Kodi mwaonapo kusintha kulikonse kokhudzana ndi kukula kwa nkhalangoyi mu nthawi yomwe mwakhala muli kuno?)

- **What have these changes been?**
- (Yasintha motani)

**Have there been any changes in vegetation composition of the forest during your lifetime or during the time you have been living here?**  
(Nanga mwaonapo kusintha kulikonse kokhudzana ndi mitundu ya mitengo yopezeka mnkhalangoyi?)

- **What have these changes been?**
- (Kusinthaku ndi kotani?)

*Informants were asked to free-list particular tree species that were decreasing/increasing at noticeably faster rates than most others.*

**What are the causes of the above-mentioned changes, and how would you rank these causes in order of influence?**  
(Kodi mukuona ngati chapangitsa kusintha kumeneku ndi chiyani? Muike zifukwazi mu ndondomeko ya kufunika kwake.)

*Informants were asked to free-list causes, through which an order of importance was often expressed without prompting. If such order was not immediately apparent, informants were asked either asked to rank these causes in order of importance/effect, or if that proved to be inappropriate, simply asked which one they thought was the most important/influential.*

**What benefits do you receive from the mountain being a governmentally managed forest reserve?**  
(Kodi mumapindula bwanji/ mumaonapo ubwino wanji kuti nkhalangoyi ikuyang'aniridwa ndi boma?)

**What costs do you endure from the mountain being a governmentally managed forest reserve?**  
(Nanga kuipa koti nkhalangoyi imayang'anira ndi boma ndi kuti?)

**What do you see as the future of the forest reserve? Why do you say this?**  
(Kodi tsogolo la khalangoyi ndi lotani? Chifukwa chiyani mwanena choncho?)

**What suggestions would you make as to how the forest management could be improved? (Kodi inu muli ndi malangizo otani omwe angathandize kuti nkhalangoyi iziyendetsedwa bwino?)**

### **“Interactive” questions**

**Which member of your household goes to the forest most often? Why do they go?**  
(Kodi amene amapita ku nkhalango kawiri kawiri pa banja lanu lino ndani? Amakachitako chiyani?)

**What (other) resources does your family collect/rely on from the forest?**  
(Kodi kunkhalango mumakatolako zinthu zanjiji?)

**Have there been any changes in forest management rules and regulations that have affected your activities during your lifetime or during the time you have been living here?**

(Kodi pali kusintha kulikonse pa malamulo a kayendetsedwe ka nkhalangoyi komwe kakukhudzani, m'moyo mwanu kapena pa nthawi yomwe mwakhala kuno?)

*Designed to capture informant's awareness of changes in government policy*

**Do people know the differences between land tenure, the presence of borders and the relative rules and regulations within those borders?**

(Kodi anthu amdziwa za malire omwe alipo pakati pa khalango ya boma, ya anthu monga ya estate ndi minda? Nanga amasiyanitsa malamulo omwe alipo m'malo osiyanasiyanawa?)

*The above question was not asked directly, for obvious reasons, but was put in the local context in the form of discussion about who 'owns' the local area.*

**How do the differences in rules and regulations, and their degree of enforcement, effect your decisions of where you prefer to go to collect the things you need?**

(Kodi kusi yana kwa malamulo ndi kakhwimitsidwe ka chitetezo zimakhudza bwanji maganizo anu pa komwe mumakonda kukatolelako nkhu.)

### **"Specific collection" questions: Firewood and thatching**

*These two subjects were chosen firstly because they were relevant to the vast majority of informants, and secondly because of the interesting interaction between fires and their affect on the availability of both resources during the current and proceeding years. Both of these points became apparent during our preliminary base-line study.*

**Who collects grass/fire-wood?**

(Kodi amakatora nkhu kapena kukamweta udzu pa khomo pano ndani?)

**How many people collect how much how often/ how long does one bundle last?**

(Kodi mumapita anthu angati kukatolera nkhu? Nanga mumapita kangati pa sabata? Naga mtolo umodzi umakutengerani nthawi yaitali bwanji mukugwiritsa ntchito?)

*The intention of the above question was to gain a quantifiable figure of the amount of firewood collected from the reserve in order to make an inter- household comparison*

**Do you ever sell or buy grass/firewood?**

(Kodi mumagulitsa nkhu kapena udzu?)

**Has the ease collecting enough firewood changed during the time you have collecting?**

(Kodi mapezedwe a nkhu asintha motani kusiyanitsa kale ndi masiku ano?)

**Do the household buildings have thatched/corrugated iron roofs? Are walls built from bricks or mud?**

(Kodi nyumbayi ndi yofolera ndi udzu, kapena malata? Nanga makoma ake ndi a njerwa kapena yosinja kapena yophoma?)

*It was never necessary to ask this question directly, direct observations were made. The building material and condition of the housing was also used as an indicator of family wealth and status.*

**Where do you collect grass from?**

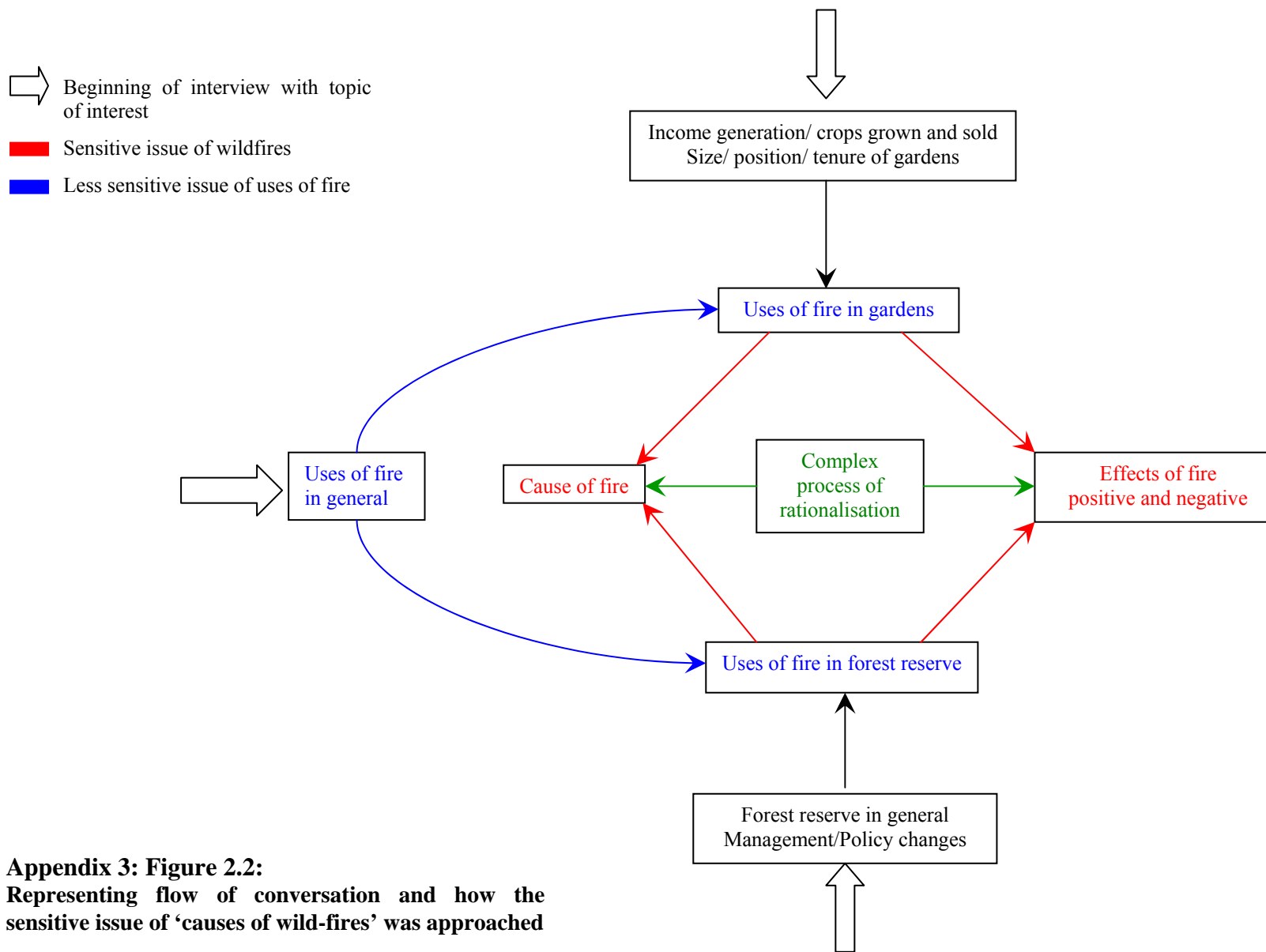
(Kodi udzu mumweta kuti?)

**What kind of grass do you use?**

(Kodi mumagwitsa ntchito udzu wa mtundu wanji?)

**Have you ever not been able to collect sufficient grass or firewood because of fires?**

(Kodi munayamba mwalepherapo kumweta udzu okwanira chifukwa cha moto?)



**Appendix 3: Figure 2.2:**  
**Representing flow of conversation and how the sensitive issue of 'causes of wild-fires' was approached**





**Appendix 4: Table 4.1: Species Hunted, in decreasing order of frequency reported hunted, and their predicted breeding seasons according to interviewed hunters.**

<b>Chichewa</b>	<b>English (<i>Latin</i>)</b>	<b>Number of mentions (comments)</b>	<b>Comparable results reproduced from Konstant (2000)</b>	<b>Breeding seasons</b>
Nguluwe	Bush pig ( <i>Potamochoerus porcus</i> )	7 (< MK 2000)	9	December-March (wet season)
Zumba	Rock hyrax ( <i>Procapra capensis</i> )	7 (MK 140) (has toes)	7 ( <i>most common</i> ) (MK30)	July-October (hot dry season)
Chikhoma/ Nangwale	Klipspringer ( <i>Oreotragus oreotragus</i> )	6 (MK 700)	3 (MK 100)	July-October (hot dry season)
Kalulu	Scub hare ( <i>Lepus saxatilis</i> )	5	11 (MK60)	July-October (hot dry season)
Mbawala	Bush buck ( <i>Tragelaphus scriptus</i> )	5	7 ( <i>rare</i> ) (MK200)	July-October (hot dry season)
Nyani	Baboon ( <i>Papio cynocephalus</i> )	4 (MK 1000)	7 ( <i>common in miombo</i> )	All year
Nchesi	Cane rat ( <i>Thryonomys swinderianus</i> )	4	5 (MK 45-90)	May-July (cold dry season)
Mbewa / mwaphini	Mice general/ giant rat	3	8	May-July (cold dry season)
Pusi	Vervet monkey ( <i>Cercopithecus pygerythrus</i> )	3	7	All year
Kafolombwe	Red Rock hare ( <i>Prindolagus rupestris</i> )	3 (only found on plateau)	1	July-October (hot dry season)
Mbalame	Birds general	3	1	April/May (end of rains)
Mbira	Yellow spotted rock hyrax ( <i>Heterohyrax brucei</i> )	2 (no toes)	10 (MK30)	September/October (hot dry season)
Nungu	Porcupine ( <i>Hystrix africae australis</i> )	2	1	
Agologdu	Squirrel-like tree mammal ( <i>Praxerus cepapi/palliates</i> )	1	0	June- September (mid-dry season)
Gwape	Common grey duiker ( <i>Sylvicapra grimmia</i> )	0	8	No season
Nkonde	Blue monkey ( <i>Cercopithecus albogularis</i> )	0	4 ( <i>rare</i> ) (MK 1/piece)	
Mkhquale/ Nkhwali	Red necked francolin (Partridge-like) ( <i>Francolinus afer</i> )	0	3 (MK20)	
Pate	Squirrel-like tree mammal (may be two-spotted palm civit <i>Nndinia binotta</i> )	0	1	
Likongwe	Squirrel-like tree mammal	0 (tail like a rat)	0	
Kadumba <sup>20</sup>	Blue duiker ( <i>Cephalophus monticola</i> )	0	2	July-October (hot dry season)
Ngoma	Kudu ( <i>Tragelaphus strepsiceros</i> )	0 (Not in MMFR)	1	
Njoka	Snakes general	0 (Not hunted)	1	
Nkhowonde/ nkhandwe	Side-striped jackel ( <i>Canis adustus</i> )	0 (Not hunted)	0	No specific season
Nyalugwe	Leopard ( <i>Panthera pardus</i> )	0 (Not hunted)	1	Rainy season
Mfisi	Hyena ( <i>Crocuta crocuta</i> )	0 (Not hunted)	2	(Cannot say, rarely see young because dogs are afraid.)
Napolo	African rock python	0 (Not hunted)	1	

<sup>20</sup> The *Kadumba* is said to elude hunters and their dogs by jumping, so that its horns get stuck in a tree and it stays there hiding until the danger has passed (Hunter *pers.comm.*).

Phonetic transcriptions of the Chichewa and Latin equivalents were translated using Morris (1999) and Konstant (2000) - who herself used the Public Lands Utilisation Study (1998). Konstant's corresponding results are reproduced in the third column of the table in order that a comparison may be made. Additions to the table were also made from conversations about the animals present in the forest reserve, but not necessarily in the context of hunting. The table suggests that *Nguluwe* (bush pig), *Zumba* (rock hyrax) and *Kalulu* (hare) are the most popular and/or most often acquired form of bush meat. Differences in valuation (in MK) of meat between Konstant's work from 1997 to 1999 and our own, clearly reflect inflation of consumer prices effecting the rural population<sup>21</sup>. Discrepancies between the two sets of data may reflect differences in study-area, whether it be animal population sizes or variations of terms used for animals, as well as inter-informant variation.<sup>1</sup>

Following Konstant's suggestion that information on catches, changes in population sizes and breeding seasons should be obtained from hunters themselves, we initiated in depth questions about breeding seasons and population sizes with four of our hunters, three of which were full time hunters. As also suggested by Konstant, it would be interesting to compare such information on the breeding and distribution biology of important species with the literature and knowledge of regional zoological experts, however at this stage it has not yet been possible. There are four widely recognised seasons (*nyengo*) in Malawi which are categorised as follows: the rainy season (*dzinja*) extends from December to March. Towards the ends of the rains, around March and April, is the harvest season (*masika*). Between May and July '*nyengo ya chisanu*' (*chisanu* meaning 'coldness'). The dry season (*chilimwe, malimwe*) begins around August when the leaves begin to fall and extends until the break of the rains (Morris 1998).

#### **Co-management:**

Co-management discussions were introduced following Janet Lowore *et al* (2000c) and *Activity 5.4.1* of the Five Year Management Plan (EDG 2000). The idea of co-management was discussed in detail with four hunters, all from the Phunduma/Chole area, with whom we became familiar. Generally the idea was well understood. Although our informants liked the idea, none of them thought it was realistically feasible. The primary reason given for this was that, for many men, hunting is their full-time profession which they rely on to bring food and money to their families. With the lack of alternative sources of income few hunters would be willing to co-operate. It was suggested that all hunters be employed as forestry guards. A further problem arose in that it is impossible to prevent the dogs from chasing certain species of endangered animals, young animals or animals of a certain sex, as would be required if controlled hunting were to be considered (Konstant 2000 p56, EDG 2000 p59). Neither are trappers able to specify their prey sufficiently according to both our own informants and Lowore *et al* (2000c p8). The only method, therefore appropriate is by gun which raises further issues: Firstly, the majority of village members, those for whom the community co-management plan is designed to help, cannot afford to maintain and licence a weapon; Secondly, it seems that the majority of those hunters that already possess are gun are from the southern side of the forest reserve (Lowore *et al* 2000c p8) of which the five year management plan specifically states that "*attempted enforcement of the hunting ban should continue*".

Controlled hunting by closed and open seasons therefore seemed to most feasible option. In fact at least two of our hunting informants had previously suggested a similar programme themselves to allow the game populations to recover, but while other community members would continue to hunt, so would they. It was frequently implied that there are different types of hunters who have different ideas of what hunting is;

Those who take it seriously understand, and would abide by the rules without enforcement, but many would not abide by the rules"; "Hunters know that if you do not hunt now there will be more animals later, but this is not enough. There needs to be some enforcement (Anon *pers. comm.*)

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<sup>21</sup> Inflation can be seen in many aspects of the rural economy. It was interesting to observe how prices are dealt with at the village level; for example, a certain grass-thatch seller was struggling to convince his fellow sellers to raise the prices of a *Natita* (small bundle of grass about a wrist's width in size) from 1.5 MK to 3MK in order to meet current price levels. He recalled selling them a few years ago for 50 Tambalas.

Two informants genuinely suggested, independently of each other, that the only way to make licensing work would be to put up an electric fence all around the reserve so that people could not get in, except through guarded gates where they would have to produce their permits. Another explained that he already has many people wanting to accompany him because he has a reputation for being a good hunter, if he were to be one of a few to have a licence then there would be even more. Therefore he would not want a licence.

## Appendix 5: Reproductions of all forest Department Fire Records we could find

Extracts from: Forestry Department Records-  
Likhubula Forest Station- Planting  
Malawi Forestry Department  
(Available at MMCT resource centre)

### Planting returns records: Chambe Basin/ Likhubula

Plantation season	83/84	84/85	85/86	86/87	87/88	88/89	89/90
Area of plantation from previous year	476.95	477.61	489.74	455.74	495.74	520.71	520.71
Area destroyed by fire (Hectares)	-	-	-	-	-	-	-
Burned area re-planted (Hectares)	-	-	-	-	-	-	-
Area of plantation on completion of planting season	476.95	477.61	489.74	455.74	495.74	520.71	151.19

Plantation season	91/92	92/93	93/94	94/95	95/96
Area of plantation from previous year	520.71	520.71	520.71	520.71	492.15
Area destroyed by fire (Hectares)	-	69.31	-	60.61	5.86
Burned area re-planted (Hectares)	-	-	-	29.68	-
Area of plantation on completion of planting season	519.53	514.57	567.42	567.42	567.42
					Likhubula

### Planting returns records: Eastern Outer Slopes, Muloza

Plantation season	84/85	85/86	86/87	87/88	89/90	90/91	91/92	92/93	93/94
Area of plantation from previous year	378.8	734.8	879.3	1230.95	1271.91	1741.75	1252.85	1298.85	1298.85
Area destroyed by fire (Hectares)	-	4	5	10.3	12.4	-	-	2.27	-
Burned area re-planted (Hectares)	-	4	4	10.3	-	-	-	2.27	-
Area of plantation on completion of planting season	734.8	879.3	1075.1	1230.95	1271.91	1252.85	1298.85	1298.85	1298.85

**Planting returns records: Fort Lister Match Industry Plantations, Namalini & Bwaibwai**

Plantation season	86/87	87/88	86/87	90/91	92/93	92/93	90/91	92/93
Area of plantation from previous year	384.44	432.41	141.55	223.05	24.31	198.9	426.01	426.01
Area destroyed by fire (Hectares)	3.0	72.13	0.04	-	-	-	-	32.0
Burned area re-planted (Hectares)	10.83	20.00	0.04	-	-	-	-	32.0
Area of plantation on completion of planting season	432.41	432.41	141.55	223.05	24.31	198.9	426.01	426.01
	Match Industry Plantations		Rehabilitaion areas (Namalini/Bwaibwai)		Bwaibwai	Experimental area, Namalini	Fort Lister	

**Planting returns records: Phalombe/ Nandiwo / Sombani**

Plantation season	84/85	86/87	90/91	92/93	92/93	92/93
Area of plantation from previous year	37.45	37.47	38.47	20.51	12.89	5.65
Area destroyed by fire (Hectares)	-	-	-	-	-	-
Burned area re-planted (Hectares)	-	-	-	-	-	-
Area of plantation on completion of planting season	37.45	37.47	38.47	20.51	12.89	5.65
	Chawinga			Phalombe R.F.P.P.	Nandiwo R.F.P.P.	Sombani R.F.P.P.

**Fire History Records: Chambe Basin/ Likhubula**

DATE AND YEAR OF FIRE	LIKHUBULA	CHAMBE	LICHENYA
<b>1980</b>			
14/05/80	1	-	-
23/09/80	-	1	-
12/11/80	1	-	1
09/11/80	-	1	-
TOTAL	<b>2</b>	<b>2</b>	<b>1</b>
<b>1981</b>			
23/08/81	-	Chambe Cottage	-
11/08/81	-	-	1
11/09/81	1	-	-
27/10/81	1	-	-
18/11/81	1	-	-
TOTAL	<b>3</b>	Chambe Cottage	<b>1</b>

<b>1982</b>			
09/11/82	<b>1</b>	<b>0</b>	<b>0</b>
<b>1983</b>			
27/07/83	1	-	-
07/08/83	1	-	-
24/08/83	1	-	-
01/09/83	1	-	1
02/09/83	2	-	-
17/09/83	-	-	-
18/09/83	1	-	1
Other days (NA)	5	-	-
TOTAL	<b>12</b>	<b>0</b>	<b>2</b>
<b>1984</b>			
08/10/84	1	-	-
13/10/84	1	-	-
TOTAL	<b>2</b>	<b>0</b>	<b>0</b>
<b>1985</b>	-	-	-
<b>1986</b>	-	-	-
<b>1987</b>			
29/10/87	<b>1</b>	<b>0</b>	<b>0</b>
<b>1988</b>			
27/09/88	<b>0</b>	<b>1</b>	<b>0</b>
<b>1989</b>	-	-	-
<b>TOTAL FIRE 1980/89</b>	<b>21</b>	<b>3 + Cottage</b>	<b>4</b>

**Fire History Records: Eastern Outer Slopes (Oct. 85-Nov.89)**

<b>Date</b>	<b>Plantation type &amp; plot no.</b>	<b>Area Burned</b>	<b><u>Cause</u></b>
14/10/85	Eucaliptus saligna, plot 84	6 ha	Fire from garden preparation of a local farmer jumped the firebreak due to heavy wind.
29/07/85	P. Kesiya	2.4 ha	Forestry workers during early burning, due to heavy wind during the day.
18/09/85	P. Kesiya, plot 83	1.5 ha	Honey collectors.
14/10/85	Plot 84	38 trees	
27/06/86	Pinus Kesiya, plot 84	1.5 ha	People who were cutting grass for thatching left their fire unattended after roasting sweet potatoes.
10/08/86	Pinus Kesiya, plot 85	3 ha	Garden preparation.
15/09/87	Pinus Kesiya, plot 87	4.5 ha	Fire from garden preparation jumped into plantation due to wind.
16/09/88	Pinus Kesiya, plot 83	0.5	
27/09/88	Pinus Patula, plot 83	0.75 ha	
01/10/88	Compartment 22	0.11 ha	Fire from the forest reserve crossed through dry fallen leaves.
03/10/88	Pinus Kesiya, Compartment 26B, plot 87	9.09 ha	Fire from forest reserve crossed through fallen leaves in the fire break.

07/10/89	NDARA AKEA 5 yr Pinus Kesiya	0.5 ha	
06/11/89	Pinus Kesiya, plot 84	2.8 ha	
12/11/89 a	Pinus Pseudostrubus, plot 83	0.9 ha	
12/11/89 b	Pinus Pseudostrubus, plot 83, comp.8	2.7 ha	

**Excerpts from the Fire Reports File: 1992-1994**

Plantation	Date	Serial No.	Area Burned (hectares)	Species	Planting year	Cause of Fire	Remarks
Chambe	01/09/92	1/92	0.5	Pinus patula	92	Accidental	Total Damage
	21/09/92 & 22/09/92	2/92	69.31	Pinus patula	55, 56 & 59	Unknown	- do -
	27/09/94 & 2/09/94	1/94	60.61	Pinus patula	56	Accidental (pit sawyers)	- do -
	Total = 130.42						
Likhubula	03/09/92	1/92	1.5	Eucalyptus gra. Coppics		Honey extractors	Total Damage
	03/09/94	1/94	1.05	Pinus oocarpa		Deliberate	80% survival
	11/11/94	2/94	0.46	P. oocarpus	88	Deliberate	- do -
	12/11/94	3/94	2.65	P. oocarpus	86	Deliberate	Slight scorches
	20/11/94	4/94	0.5	P. elliot	86	Deliberate	- do -
	21/11/94	5/94	0.5	Elliottii		Arson	Slight butt scorches
Total = 8.41							
Eastern Outer Slopes	05/06/92	1/92	0.5	Pinus kesiya	83	Accidental	Butt scorches
	31/07/92	2/92	2.7	Pinus kesiya	85	Deliberate	Total
	02/09/92	3/92	3.58	Pinus kesiya	87	Unknown	Damage 50%
	02/09/92	4/92	1.2	Pinus kesiya	87	Carelessness by staff	Survival Total
	22/09/92	5/92	8.32	Pinus kesiya	92	Hunters	Damage
	23/09/92	6/92	20.0	Pinus kesiya	83	Hunters	Damage
Total = 30.3							
Fort Lister Match Industry Plantation (MIP)	14/07/92	1/92	0.8	Pinus pse.		Deliberate	
	12/08/92	2/92	4.0	Pinus pseud.		Hunters	
	12/09/93	1/93	8.6	Pinus kesiya	80	Unknown	
	16/09/93	2/93	6.29	Eucalyptus and Pinus		Unknown	



	22/09/93	3/93	1.0	kesiya Pinus pseud	82	Deliberate	
	15/09/94	1/94	45.5	Pinus pseud & Pinus patula		Deliberate	
	15/11/94	2/94	16.53	Pinus pseud	90	Deliberate	
			Total = 82.72				
Nanchidwa (MCGP)	09/10/92	1/92	1.6	Eucalyptus gr. & pinus Ooca.	88	Deliberate	50% Damage
	20/10/93	1/93	1.01	Pinus Ooca	91	Unknown	Survival Total
	27/06/94	1/94	5.0	Eucalyptus gr & Pinus Kesiya	91	Unknown	Damage
	08/08/94	2/94	11.01	Eucalyptus & Oorcapa	92	Unknown	Damage
	29/10/94 & 30/10/94	3/94	48.05	Eucaltpyus & Oocarpa	90	Arson	Damage
	13/11/94	4/94	6.28		88	Arson	Damage
			Total = 72.95				
Mini Mini	24/9/92	1/92	0.2	Forest Reserve	N/A	Hunters	Total Damage
	25/9/92	1/94	4	Pinus Patula	90	Hunters	- do -
			Total = 4.2				
Thuchila shelf	25/9/92	1/92	2.0	Forest Reserve	N/A	Hunters	Total Damage
	26/9/92	2/92	25.5	Forest Reserve	N/A	- do -	Total Damage
			Total = 27.5				
Lichenya	30/9/92	1/92	20.0	Cedar Area	N/A	Hunters	Total Damage
			Total = 20.0 Ha				

### **Excerpts from the Fire Reports File: 1995**

Station	Date of fire	Serial no.	Comp't no.	Area burned (Ha)	Species	Planting year	Cause of fire	Damage
Fort Lister	27/08/95	1/95	11A & B	18	Pips	93	Accidental	Serious
	10/09/95	2/95		5	Pps	90	Outside fires	Serious
	17/09/95	3/95	14B	3	Pps	85	Outside fires	Serious
	18/09/95	4/95	14B / 16A	48	Pps		Arson	Serious
Eastern Outer	20/10/95	-	-	40	-	-	Arson	Serious
Slopes	22/10/95	-	-	20	-	-	Arson	Serious
Likhubula	10/10/95	4A	4A	1	POC	89	Arson	Total
	18/10/95	1C	1C	15	POC	86	Arson	Serious

	28/10/95	4	4	11	POC	96	Arson	
Rehab. Area	25/10/95	-	-	80	Peu.G	84/90	Arson	
MCGP								
Chisambo		9G/9F	9G / 9F	0.5	POC/E.G.	88	Arson	Total
Phwazi	06/10/95	7B, JC	7B, J.C.	80	POC/E.G.	82	Arson	Serious
Phwera	09/10/95	11	11	200	Grandis	88	Arson	
Mwanalir anji	28/10/95	20	20	235.23	Grandis	91	Arson	

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<sup>23</sup> Dahlem Workshop Reports; Environmental Science Research Report 13

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