

Research Application Summary

**Wild fire impact assessment on availability of the main forest resources in the Niassa National Reserve**

Aniceto Chaúque<sup>1</sup>, Natasha Ribeiro<sup>1</sup>, Bandeira, R.<sup>1</sup> & Ribeiro, A.<sup>2</sup>

<sup>1</sup>Faculty of Agronomy and Forestry Engineering

Campus Universitário, Building # 1, P. O. Box 257, Maputo, Mozambique

<sup>2</sup>Eco-Bio/ Tropical Research Institute – Quinta do Marquês (INRB) – 2784-505 Oeiras, Portugal

**Corresponding author:** anicetochauque@yahoo.com.br

**Abstract**

This study was conducted in Niassa National Reserve (NNR), located in the north of Mozambique. The main objective was to examine the availability of selected forest resources to local communities along a fire gradient. To achieve this objective areas located in the north-central and east NNR were selected. In these areas we conducted focus group discussions and established transects to assess vegetation structure and composition with focus on selected tree resources. The study will contribute to the fire management programme of NNR adjusted to the needs of local communities. Preliminary results indicate that the main causes of fires in the reserve are: honey production, pedestrian routes to Tanzania and, to a less extent, agriculture; and tends to reduce from the centre to east and west. Selected tree species assessed in the study were: *Julbernardia globiflora* and *Brachystegia boehmii* (used for beehives and poultry activities) and *Pterocarpus angolensis* (used for making canoes).

Key words: Fire, Forest Resources, Niassa National Reserve, Miombo woodlands

**Résumé**

Cette étude a été réalisée dans la Réserve Nationale de Niassa (NNR), située dans le Nord du Mozambique. L'objectif principal était d'examiner la disponibilité des ressources forestières sélectionnées pour les communautés locales le long d'un gradient d'incendie. Pour atteindre cet objectif, les zones situées dans le centre-nord et à l'est de la réserve ont été sélectionnées. Dans ces zones, nous avons mené des groupes de discussion et établi des sectionnements pour évaluer la structure et la composition de la végétation en mettant l'accent sur les ressources d'arbres sélectionnées. L'étude contribuera au programme de gestion des incendies de la réserve adapté aux besoins des communautés locales. Les résultats préliminaires indiquent que les principales causes des incendies dans la réserve sont: la production du miel, les voies piétonnes vers la Tanzanie

et, dans une moindre mesure, l'agriculture qui tend à réduire du centre à l'est et à l'ouest. Les espèces d'arbres sélectionnées évaluées dans l'étude étaient les suivantes: *Julbernardioglobiflora* et *Brachystegiaboehmii* (espèces utilisées pour les ruches et les activités de la volaille) et *Pterocarpus angolensis* (espèce utilisée pour la fabrication des pirogues).

Mots clés: Incendie, ressources forestières, Réserve Nationale de Niassa, boisements de Miombo

## Background

There is strong evidence that fires have a negative effect on forest ecosystems, especially when there is a change in the fire regimes that ecosystems have experienced for many years. Zolho (2005) studied the effects of fire frequency on the miombo species regeneration in Nhambita, Sofala Province, and showed that fire frequency affects the regeneration of the main species. Another study carried out by Mello *et al.* (2009), in Gália in Brazil, also showed that fires have a strong effect on forest communities. Finally Caudwell (2002), conducted a study in the Central Province of Zambia with the aim of assessing the tolerance to fire of some Miombo tree species and concluded that there was a positive correlation between the fire regime and the reduction of plant biodiversity, canopy cover, amount of biomass and levels of regeneration.

## Study Description

Niassa National Reserve (NNR) is located in the North of Mozambique and covers 42 000 km<sup>2</sup>. Of this, 70% is covered by miombo and the remaining 30% is covered by open savannas and dambos. The climate is tropical humid with annual medium precipitation between 600 to 1400mm. This study is examining the availability of selected forest resources and to characterize the ecosystem along a fire gradient. The study is being conducted in three stages. The first is a desktop study to understand the fire behaviour and its effect on forest resources. This step is also contributing to defining methodological field approaches. The second involves field data collection. The field data were collected in two management units of NNR varying in fire frequency. In each area, three communities were selected and in each one, interviews and discussion groups were held in order to understand the uses and management of forest resources and fires. In each community, 2-3 transects were allocated, following a fire frequency gradient. Each transect has a distance of 5.5 km and, in each transect 20\*50 m plots were established every 500 m. In each plot, the following information was

collected: species identification, the number of individuals per species, height and DBH. Data analysis included correlation between fire frequencies and spatial statistics to address the availability of resources from the villages.

### Research Application

Preliminary results indicate that the main cause of fires in the reserve are: honey production, pedestrian routes to Tanzania and, to a less extent, agriculture. The main forest resources for local communities are: *Brachystegia*, *Julbernardia* and *Pterocarpus angolensis*. These species will be further assessed in the field to describe their variation along the fire gradient, which currently indicates a tendency of fire frequency reduction from center to west and east.

Our hypothesis is that if we are able to show local people that resources used by people are affected by fires, then they will perceive the importance of engaging in fire management. This would make possible the definition of more efficient fire management strategies for community-based.

### Acknowledgement

The study is funded by the Regional Universities Forum for Capacity Building in Agriculture (RUFORUM).

### References

- Abdallah, J.M., Mbilinyi, B., Ngaga, Y, N and Ok'ting'ati. 2007. Impact of Fuel- Cured Virginia on Miombo: A Case of Small-Scale- Cured Virginia Production in Iringa Region, Tanzania. Tanzânia.
- Akinnifesi, F.K., Kwesiga, F. R., Mhango, J., Mkonda, A., Chilanga, T and Swai, 2004 Domesticating Priority for Miombo Indigenous Fruit Trees as a Promising Livelihood Option for Small-holder Farmers in Southern Africa. Malawi.
- André Luiz Silva Monteiro. 2004 Impactos da Exploração Madeireira e do fogo em florestas de Transição da Amazônia Legal, Brasil.
- Anders.Malmer, S/ ano. General ecological features of Miombo woodlands and considerations for utilization and management. Sweden.
- Lugo, A. E. 1995. A management of tropical Biodiversity. Rio Piedras, Puerto Rico
- Ribeiro, N. S., Shugart, H. H., Swap R. J. and Okin G. S. 2007. Interaction between fire and elephants in relation to vegetation structure and composition of miombo woodlands in northern Mozambique. PhD thesis, University of Virginia, Charlottesville.

- Roberto Zolho, 2005. Effect of fire frequency on the regeneration of Miombo Woodland in Nhambita, Mozambique. Escócia, Edinburgh.
- SGRN, 2006. Plano de Maneio da Reserva de Niassa, Niassa.
- The World Bank, 2008. Managing the Miombo Woodlands of Southern Africa. Policies, incentives and options for the rural poor. The World Bank.
- Zolho, R. 2005. Effect of Fire Frequency on the Regeneration of Miombo Woodland in Nhambita, Mozambique. Escócia, Edinburgh, 2005.