



Land Fragmentation and Agroforestry Shifting Practices and Perceptions of Trees on Small Farms

Line Vinther Hansen, Laxmi Lama, Milan Milenovic, Iris Rios Vargas, Edith Welker

University of Copenhagen, Department of Science, Denmark



UNIVERSITY OF
COPENHAGEN

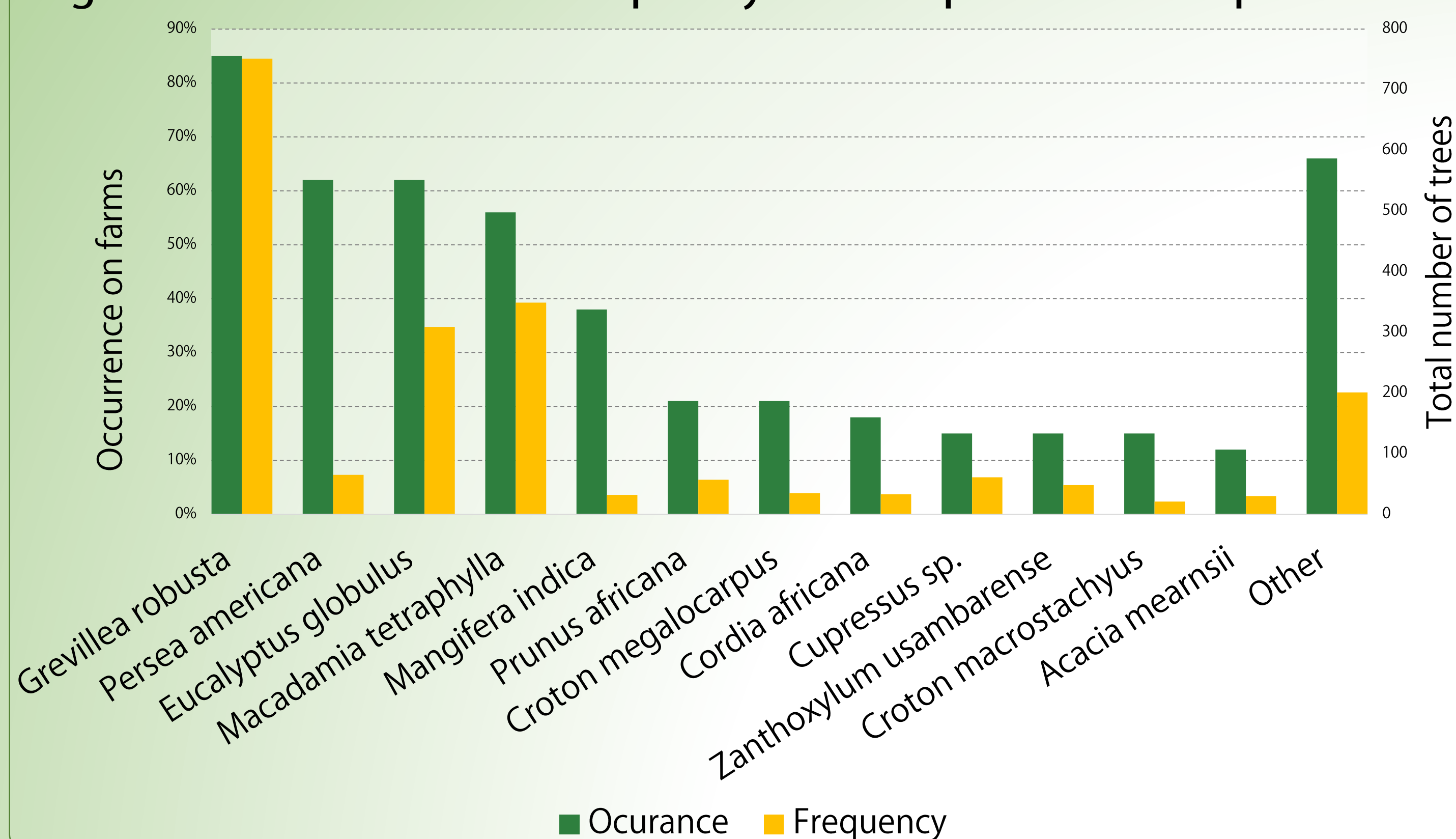
Introduction

Agroforestry is the predominant agricultural system practiced by smallholder farmers in Othaya area, Nyeri South District in the central highlands of Kenya. Trees are grown in combination with food and cash crops in order to meet household needs for food, fuelwood, and timber, and earn income. Farms are small (mean 0.76 ha), and decreasing in size as they are subdivided via inheritance. The objective of this study was to investigate whether and how decreasing land size shapes agroforestry practices, as well as the effects of having trees on farms.



89% of the sampled farms have trees

Figure 1: Occurrence and frequency of tree species on sampled farms



Economic factors shape agroforestry

Farmers prefer exotic trees which are fast growing, providing income or self-sufficiency in timber and fuelwood. These economically-driven preferences for trees have resulted in the most common trees on farm being exotic wood and fruit trees. These exotic species are replacing indigenous species, which today are much less common in occurrence and number (Figure 1). Remarkably, the effect of the utilitarian attitude about trees has resulted in self-sufficiency in fuelwood and timber on most farms surveyed, despite the very small size of many of these farms. Relatively few species are used, usually with only one or two uses.

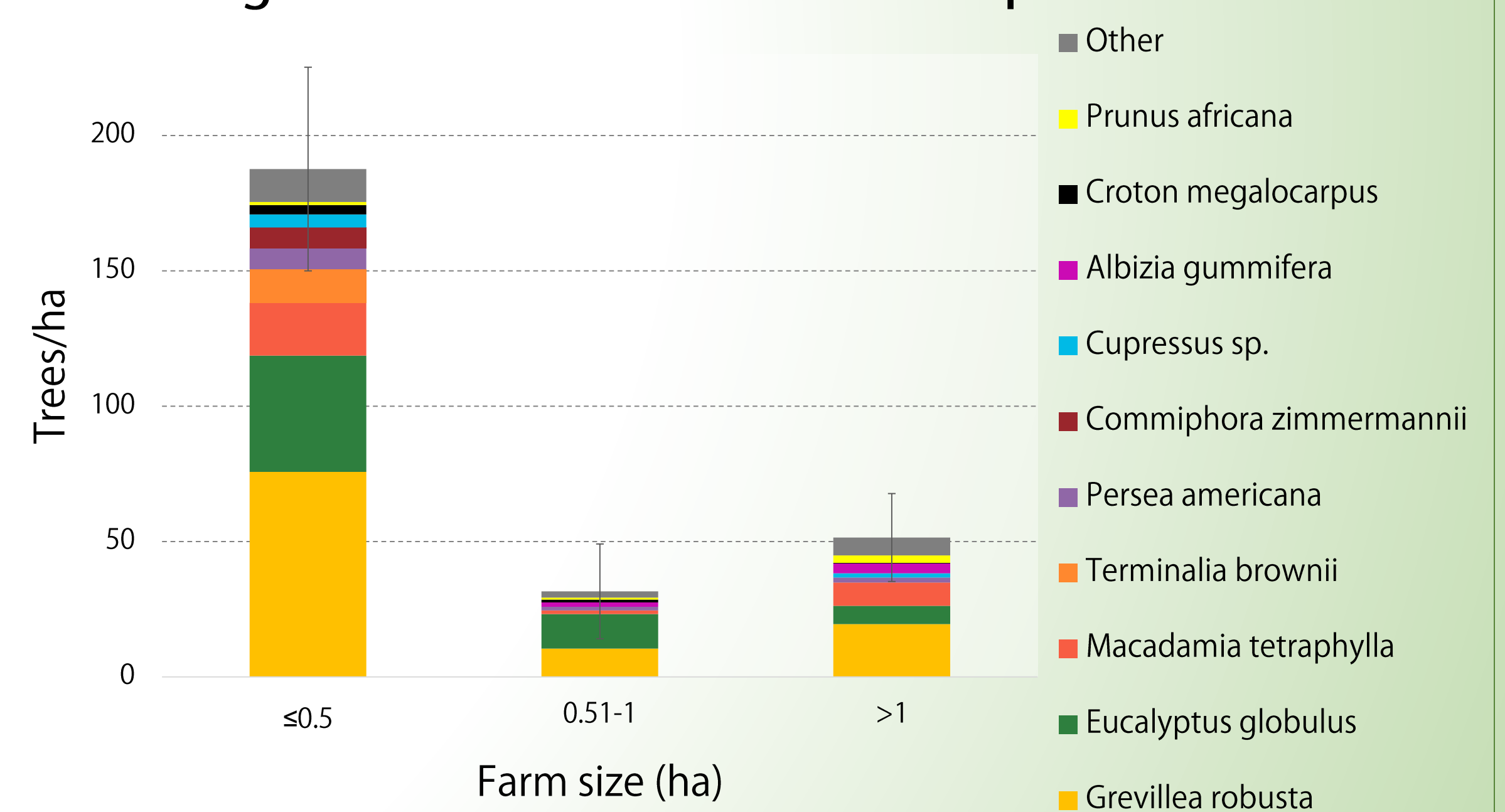
Agroforestry and intensification

We found that small farms (<0.5ha) have significantly higher density of trees compared to larger farms which is consistent with previous studies in similar areas in Kenya (Figure 2). This illustrates the importance of having trees despite very limited land size. Having more trees is a tradeoff between having more crops, so farmers must find a balance between the need for fuelwood and timber, and the need for crops. Surprisingly, almost none of the farmers use tree species that could contribute to self-sufficiency and diversification of fodder.



Picture of one of the studied farms depicting the agroforestry system

Figure 2: Mean number of trees per hectare



Culture and agroforestry

The culture of planting trees on Othaya farms is a common practice, and it is increasing as deduced from satellite images and interviews. The expansion of exotics is showing a decrease in cultural importance. Traditionally, medicinal and religious uses of trees were more prevalent, but changing preferences have led to some loss of the cultural legacy and significance of certain trees. Despite that, indigenous species remain present nonetheless, which may be due to their enduring cultural value, or perhaps they are simply relics of the past.

Conclusion

The knowledge gap, as well as a poor extension work, were identified as key barriers to agroforestry in the Othaya area. Multipurpose trees, such as leguminous fodder species, are underutilised, which may represent a missed opportunity for increased livelihood and farm system diversification. Better understanding of trees' effects on crops, livestock, climate, soil, and water, could make the systems more productive and resilient, helping to mitigate the effect of land fragmentation.

References

Appiah, Mark, and Ari Pappinen. 2010. Small-Scale Forestry 9 (3): 297–316.
Deweese, Peter A. 1995. Africa: Journal of the Int.African Institute 65 (2): 217–35. doi:10.2307/1161191.
Pinard, F., E. Joetzer, R. Kindt, and K. Kehlenbeck. 2014. Biodiversity and Conservation 23 (2): 467–95. doi: 10.1007/s10531-013-0615-0.

Acknowledgements

This study was done as a part of the SLUSE course, a collaboration between Wangari Maathai Institute for Peace and Environmental Studies at University of Nairobi, Roskilde University and University of Copenhagen. The inputs and efforts of Prof. S. G. Kiama, Dr. Thenya Thuita, Dr. Jane, Dr. Kiemo, and Prof. Mungai from Wangari Maathai Institute, Martin Skrydstrup and Daniel Ortiz Gonzalo from University of Copenhagen and Ebbe Prag from Roskilde University are highly appreciated. The contribution of Othaya community is acknowledged and much appreciated. A special thanks to elder Philip Kibanga and our guides James Nderitu Theuri and Joyce for helping us get to know the area and facilitating communication with local villagers.