

Aimy Suzanne Cáceres Pinedo

**Viability study of the implementation of ecotourism as a
conservation tool to save the last remains of
Afromontane forest of Mount Moco, Angola**



Faculty of Sciences

Department of Geosciences, Environment and Territorial Planning

Porto, 2011

Aimy Suzanne Cáceres Pinedo

**Viability study of the implementation of ecotourism as a
conservation tool to save the last remains of
Afromontane forest of Mount Moco, Angola**

Thesis Submitted to the Faculty of Sciences of the University of Porto in Partial Fulfillment
of the Requirements for the Degree of Master of Science in Environmental Science and
Technology

Advisor: PhD. Paulo José Talhadas dos Santos
Co-advisor: PhD. Martim Ferreira Pinto Pinheiro de Melo

Faculty of Sciences
Department of Geosciences, Environment and Territorial Planning
Porto, 2011

ACKNOWLEDGEMENTS

There are many persons and organizations that I want to thank for their help and support in completing this thesis.

First, I would like to thank my advisor, PhD. Paulo Santos, and co-advisor, PhD. Martim Melo, for their guidance and assistance in making this thesis possible.

I also want to thanks Michael Mills for all the information about Mount Moco and for always transmitting great ideas and that unconditional motivation for conservation.

Thanks to Nigel Collar, Phil Hall and Tasso Leventis for all their support and for making things possible.

Special thanks to Dr. Fernanda Lages from the ISCED Lubango.

I am also grateful to Alexandre Vaz, Feliciano Tchalo, Francisco Gonçalves and José Dala, for their help with the surveys and observations during the field work.

I would also like to thanks to my friends in Luanda: Ana Nunes, Bernardo Melo, Cristovão Vieira, Herculano Antas, Michael Rogerson and Zulmira Miranda for receiving me in their homes and helping me with the logistics in and outside Luanda.

I express my sincere thanks to PhD. Nuno Formigo for his help and advice with the statistical part of the thesis and to PhD. Cristina Chaves for her great recommendations and ideas in the development of this thesis.

For the financial support to perform this thesis I am grateful to the A. P. Leventis Foundation, DST/NRF Centre of Excellence at the Percy FitzPatrick Institute, The Clancey Trust (Percy FitzPatrick Institute) and the Rufford Small Grants Foundation.

Last but not least, I would like to thank my husband, Henrique, who most admires my virtues and understands my defects, for his constant encouragement and unconditional support and for believing in me even more than myself.

ABSTRACT

Mount Moco is the highest point of Angola and also holds some of the best example of Afromontane forest in the country. Unfortunately the unsustainable use of the natural resources by the local population is threatening the conservation of this unique place.

This study assessed the viability of an ecotourism project as a conservation tool for the Afromontane forest in Mount Moco. To achieve this, different information was collected and evaluated: (i) tourist attractions in the area, (ii) social and economic characteristics of the local population, (iii) principal threats to the biodiversity and (iv) available tourist services and infrastructures. With this information it was possible to propose an ecotourism project that will assist with the conservation of Mount Moco.

Mount Moco presents a high diversity and endemism of bird species, being an important area for conservation and an interesting place to visit by birdwatchers. Also, Mount Moco constitutes a major tourist attraction of Angola by virtue of being its highest point, even though no tourist services and infrastructures are available in the area. Nevertheless, the principal cities of Angola provide these services, but with high prices and low quality, a situation that is expected to change with the development of the country and the increasing growth of the tourist sector.

The local population of Mount Moco (Kanjonde village) is poorly educated and lives from a subsistence economy based in agriculture. No basic amenities are present in the village and the people depend on the natural resources of the area for their survival. Hunting activities, deforestation through burns (for agriculture) and collection of wood for fuel and construction are the major threats for Mount Moco.

Because of the characteristics of the local population and the major objective of achieving the conservation of Mount Moco, an ecotourism project directed by a NGO seems to be the best option. This project will allow the active involvement of the local population, ensuring their socio-economic development. Nevertheless an ecotourism project by itself will never achieve the conservation of Mount Moco; it has to be implemented together with conservation projects. This way, the ecotourism project will give an economic value to the area while the conservation projects will give sustainable alternatives for the use of natural resources, stopping and reversing the degradation of the Afromontane forest.

RESUMO

O Morro do Moco é o ponto mais alto de Angola e contém alguns dos melhores exemplos de floresta de montanha no país. Infelizmente, o uso insustentável dos recursos naturais pela população local ameaça a conservação deste local único.

O presente estudo avalia a viabilidade de um projecto de ecoturismo como instrumento para a conservação das florestas Afromontanas no Morro do Moco. Para tal, foi recolhida e avaliada informação nos seguintes domínios: (i) recursos turísticos na área, (ii) características sociais e económicas da população local, (iii) principais ameaças à biodiversidade, e (iv) serviços e infra-estruturas turísticas existentes. Com esta informação foi possível propor um projecto de ecoturismo que permita a conservação do Morro do Moco.

O Morro do Moco apresenta uma elevada diversidade e endemismos de aves, pelo que constitui um local de elevada importância para a conservação e possui um interesse elevado para "birdwatchers" (observadores de aves). Sendo o ponto mais alto de Angola, constitui também um local de atracção turística, apesar de não existirem ainda serviços e infra-estruturas básicas no local. Apesar de estes serviços existirem nas principais cidades de Angola, apresentam-se, geralmente, com preços elevados e uma baixa qualidade, situação que se poderá alterar com o desenvolvimento do país e o incremento do interesse no sector turístico.

A população local do Morro do Moco (Kanjonde) possui uma educação rudimentar e vive de uma economia de subsistência baseada na agricultura, totalmente dependente da exploração dos recursos naturais locais, não possuindo qualquer tipo de serviços ou infra-estruturas básicas. A caça, a desflorestação pelas queimadas (para agricultura) e a colecta de madeira para combustível e construção são as maiores ameaças para o Morro do Moco.

Perante esta realidade, um projecto de ecoturismo gerido por uma ONG apresenta-se como a melhor opção. Este projecto permitira a participação activa da população local, contribuindo para o seu desenvolvimento socioeconómico. Ainda assim, o projecto deve ser implementado em paralelo com projectos de conservação. Desta forma, o projecto de ecoturismo dará um valor económico à área enquanto os projectos de conservação darão alternativas sustentáveis para o uso de recursos naturais, cessando e revertendo a degradação das florestas.

TABLE OF CONTENTS

1. INTRODUCTION	1
1.1. General Framework	1
1.2. Ecotourism Definition and Objectives	1
1.3. Ecotourism, Conservation and Development	4
1.4. Study Site: Angola	8
1.4.1. Geography	8
1.4.2. Environment	9
1.5. Afromontane Region	11
1.6. The Afromontane Forests in Angola: Mount Moco	12
2. OBJECTIVES	16
3. METHODOLOGY	17
3.1. Inventory of Tourist Resources	17
3.2. Social and economic description of the local population	19
3.2.1. Population General Information	20
3.2.2. Village infrastructures and services	21
3.2.3. Economic activities and population needs	22
3.3. Evaluation of the principals threats to biodiversity	22
3.3.1. Wood collection and forest use	23
3.3.2. Hunting activities	23
3.3.3. Fire regime (Burns)	23
3.3.4. Statistical analyses of socio-economic variables	25
3.4. Inventory of existent tourist infrastructures	28
3.5. Proposal of an ecotourism project for the conservation of Mount Moco	28
3.5.1. Potential Clients	28
3.5.2. Competition	28
3.5.3. SWOT Analysis	28
3.5.4. The Ecotourism Project	30
4. RESULTS	31
4.1. Inventory of Tourist Resources	31
4.1.1. Avian Diversity and other animals	31
4.1.2. Forest Patches	32
4.1.3. Hiking routes	33
4.1.4. Mount Moco Summit	35
4.1.5. Classification and Evaluation of Tourist Resources	35
4.2. Social and economic description of the local population	36
4.2.1. General Information	36
4.2.2. Village infrastructures and services	38
4.2.3. Economic activities and population needs	41

4.3. Evaluation of the principals threats to biodiversity	44
4.3.1. Wood collection and forest use	44
4.3.2. Hunting.....	47
4.3.3. Fire regime (Burns)	50
4.3.4. Statistical analyses of socio-economic variables	52
4.4. Inventory of existent tourist infrastructures	59
4.4.1. Luanda	60
4.4.2. Benguela.....	62
4.4.3. Huambo	62
4.5. Proposal of an ecotourism project for the conservation of Mount Moco	63
4.5.1. Potential clients.....	63
4.5.1.1. National Clients, residents in Angola: Angolans	63
4.5.1.2. International Clients, residents in Angola: Expatriates	64
4.5.1.3. International Clients, residents abroad	65
4.5.2. Competition.....	65
4.5.3. SWOT Analysis.....	66
4.5.4. The Ecotourism Project.....	68
5. DISCUSSION	76
6. CONCLUSIONS.....	85
7. REFERENCES.....	87
8. APPENDIX.....	93
Appendix 1. Tourist Resources Data Sheet.....	93
Appendix 2. Tourist Resources Classification according to the OAS.....	94
Appendix 3. 2009 Survey for Kanjonde population.....	95
Appendix 4. Socio-economic Data Sheet.....	97
Appendix 5. Village Information Data Sheet	98
Appendix 6. Questionnaire for biodiversity threats in Mount Moco	99
Appendix 7. Identification Plate for Vegetation Types in Mount Moco.....	100
Appendix 8. Identification Plate for Animals present in Mount Moco.....	101
Appendix 9. Mount Moco Bird Species List.....	102
Appendix 10. Products' prices and quantities in Usoque and Balombo markets.....	109
Appendix 11. Frequency of fire-wood collection in Kanjonde Population 2009.....	110
Appendix 12. Frequency of fire-wood collection in Kanjonde Population 2010.....	111
Appendix 13. Weight of Fire-wood packs in Kanjonde village.....	112
Appendix 14. SPSS Output for the Optimal Scaling Analysis with 33 dimensions.....	113
Appendix 15. SPSS Output for the Optimal Scaling Analysis with 3 dimensions.....	114
Appendix 16. International destinations from Luanda's airport.....	116

LIST OF FIGURES

Figure 1. Ecotourism objectives.	5
Figure 2. (a) Angola's location in Africa. (b) Borders and Provinces.....	9
Figure 3. Afromontane forest in Mount Moco.....	14
Figure 4. (a) and (b) Kanjonde's villagers planting seeds and seedlings for the nursery.....	33
Figure 5. Potentials hiking routes for Mount Moco area.....	34
Figure 6. Elevation profiles for the trails (one way) in Mount Moco.	35
Figure 7. Percentage of people speaking "Only Portuguese", "Only Umbundu" or "Portuguese and Umbundu" in Kanjonde	37
Figure 8. Degree of education in Kanjonde population.....	38
Figure 9. Kanjonde village and Mount Moco area.....	39
Figure 10. Location of Balombo and Usoque regarding Kanjonde village	39
Figure 11. (a) Adobe blocks for construction in Kanjonde. (b) House with thatched roof and satellite TV disk.....	40
Figure 12. (a) Construction site for Kanjonde school (b) Children attending class in the Catholic church of Kanjonde.....	40
Figure 13. (a) Catholic church. (b) Interior of Adventist church.....	40
Figure 14. Different economic activities in Kanjonde.	42
Figure 15. Different crops grow by Kanjonde population.	42
Figure 16. Animals bred by Kanjonde population.	42
Figure 17. Products sold by Kanjonde population in 2009 and 2010.....	43
Figure 18. Products bought by Kanjonde population in 2009 and 2010	43
Figure 19. Habitats where local population goes to pick up fire-wood.....	45
Figure 20. Fire-wood collection methods use by Kanjonde population.....	46
Figure 21. Habitats where local population look for construction wood	46
Figure 22. Construction wood collection methods use by Kanjonde population	46
Figure 23. Hunting frequency of Kanjonde population	48
Figure 24. Species hunt in Mount Moco Area.	48
Figure 25. Places where hunting activities take place in Mount Moco.....	49
Figure 26. Hunting methods in Kanjonde population.	49
Figure 27. (a) <i>Thryonomys swinderianus</i> captured with trap. (b) Trap in detail.	49
Figure 28. Satellite imagery from Web Fire Mapper with the numbers and location of fires in Angola during 2009	51
Figure 29. Dendrogram for the 2009 surveys variables (Simple Matching index)	52
Figure 30. Dendrogram for the 2009 survey variables (Jaccard index)	52
Figure 31. Dendrogram for the 2010 surveys variables (Simple matching index)	54
Figure 32. Dendrogram for the 2010 surveys variables (Jaccard index).	55
Figure 33. Graphic of Inertias.....	56

Figure 34. Plots of case numbers (Optimal Scaling).....	57
Figure 35. Discrimination measures of the variables (Optimal Scaling).....	58
Figure 36. Combined plot for age, hunting place, method and frequency (Optimal Scaling).....	59
Figure 37. Angola map with location of Luanda, Benguela, Huambo and Mount Moco	59
Figure 38. Characteristics of Mount Moco regarding biodiversity, tourist resources, and services and infrastructures	68
Figure 39. Characteristics of Kanjonde population regarding education and economic resources.	69
Figure 40. System proposed for an ecotourism and other projects in Mount Moco	72

LIST OF TABLES

Table 1. Characteristics evaluated in the tourist resources.	19
Table 2. Age groups recommended by United Nations and those used in this study.	21
Table 3. Questions and set of answers used to gather information regarding wood use for fuel and construction in Mount Moco.	24
Table 4. Questions and set of answers for the hunting activities in 2010 surveys.	25
Table 5. Variables from the 2010 survey for the Optimal Scaling analysis.	27
Table 6. Values for the magnitude of the SWOT Analysis..	29
Table 7. Common and scientific names of endemic species and subspecies in Mount Moco.....	31
Table 8. Classification and evaluation of tourist resources in Mount Moco.	36
Table 9. Age groups and gender composition in Kanjonde village	37
Table 10. Tourist Services and Infrastructures in Luanda, Benguela and Huambo.	63
Table 11. SWOT Analysis..	67
Table 12. Advantages and disadvantages of an ecotourism project directed by a private company.....	71
Table 13. Advantages and disadvantages of an ecotourism project directed by a NGO.....	71

1. INTRODUCTION

1.1. General Framework

Mount Moco, located in the province of Huambo, is the highest point of Angola. Here, within valleys of difficult access, we can find the best examples of the most endangered habitat of Angola: the Afromontane forest (Huntley, 1974). These forests have a high biodiversity and endemism and are extremely interesting because they share different species groups with other Afromontane forests situated thousands of kilometers away, and not with the surrounding area (Huntley, 1974; Dean, 2001). This has been particularly documented for birds, the best studied group in the region. Half of the known Afromontane forests of Angola are in Mount Moco (Mills, *et al.*, *in press*). Nevertheless this represents only 85 ha of forest, divided in many small fragments and therefore more susceptible to human impact. The unique Afromontane forest bird community together with the threat to this habitat in Angola led to the classification of Mount Moco as an IBA (Important Bird Area) by Birdlife International (Dean, 2001). Several endemic bird species and subspecies occur in this area, including the only viable population of the very threatened Swierstra's Francolin (*Pternistis swierstrai*), an endemic species to Angola entirely dependent on this habitat (Mills, *et al.*, *in press*).

Unfortunately, deforestation – for agriculture, through uncontrolled burns reaching the forests, and to obtain wood for construction and fuel – puts in danger the future of the forests at Mount Moco. It is very important to mention that the local population engages in these activities for their own subsistence rather than commercial purposes.

Ecotourism is believed to be a successful conservation strategy (Ngece, 2002; Terborgh, 2002; Okello, 2003; Tyynelä & Rantala, 2004; Gordillo, *et al.*, 2008; Stronza, 2008). By linking the socio-economic development of the local community to the health of their surrounding environment, ecotourism initiatives may be the most efficient way to conserve the highly threatened forests at Mount Moco.

1.2. Ecotourism Definition and Objectives

Ecotourism is a widely used concept that nevertheless, for lacking a single definition, can mean different things. One of the most used or accepted definition is the one established by the IUCN's Ecotourism Programme, which defines ecotourism as "*environmentally responsible travel and visitation to relatively undisturbed natural areas, in order to enjoy and appreciate nature (and any accompanying cultural features- both past and present)*"

that promotes conservation, has low visitor impact, and provides for beneficially active socio-economic involvement of local populations" (Ceballos-Lascurain, 1996).

In a similar line, the International Ecotourism Society defines ecotourism as *"the responsible travel to natural areas that conserves the environment and improves the well-being of local people"* (TIES, 1990).

Even though different definitions have been proposed for the term, four fundamental elements must be present in order to define "ecotourism": i) travel, ii) nature-based, iii) conservation-led and iv) educative role (Wearing & Neil, 1999).

For ecotourism to take place a trip has to be performed. Usually ecotourism includes travels to relative undisturbed areas or in many cases protected natural areas (Wearing & Neil, 1999). For this reason ecotourism is always nature-based because it is related to natural areas that present a biological or cultural value. Nevertheless, it is important to understand that ecotourism is not the same that nature-based tourism. While nature-based tourism depends on nature resources it differs from ecotourism because it does not necessarily contribute to the conservation of these resources (Ceballos-Lascurain, 1996). For example, hunting and fishing are nature-based tourism activities, but they do not conserve nature. Ecotourism is conservation-led because it aims to directly contribute to the conservation of the natural area where its activities take place. It can become a very important tool for conservation (Wearing & Neil, 1999).

Ecotourism has an educative role because it looks to educate the tourist in order for them to have more enjoyment of their experience with nature. Ecotourism not only looks for the contact with nature but also for the awakening of awareness in their visitors. Much importance is given to appreciation, education and interpretation of the natural environment, as well as its conservation issues (Wearing & Neil, 1999). Additionally, ecotourism works on the education of the local population, in order for them to value and appreciate their natural areas.

These elements are not only important for a working definition of ecotourism but as well to define its principal objectives (Ross & Wall, 1999a, 1999b):

- ***Generation of socio-economic benefits for the local population*** such as employment opportunities, improvement of infrastructures and local services, and incomes from ecotourism fees. Economic income must be produced in order for the

ecotourism project to be viable. These revenues can go directly to the local population or by way of products or services that benefit the community.

- **Participation of the local population** in the conservation of their resources and through local empowerment. Local communities can assume the decisions for the conservation of the areas where they inhabit and establish a sustainable use of their natural resources.
- **Conservation of the natural area.** One of the main objectives of ecotourism is the conservation of natural areas and its biodiversity. Giving an economical value to the area allows the implementation of conservation plans and at the same time motivates the local population to stop performing unsustainable extractive activities.
- **Provision of environmental education services** for visitors and the local population through the appreciation of the natural area and the understanding of the importance of its conservation for human well-being.
- **Provision of a high-quality experience to visitors.** Ecotourism must provide a unique and special experience for its participants.
- **Increase of foreign exchange** through the economic contributions done by international tourists to the local economy.

Most of the objectives previously mentioned are closely related to each other, and for this reason the failure to achieve one of them will automatically make impossible the achievement of others (Ross & Wall, 1999a). For example, achieving the conservation of an area where natural resources are heavily used by the local population is very difficult, or even impossible, if an economical benefit derived from conserving the area cannot be generated. Local communities will not stop the activities that produce an economical income for them unless an alternative is proposed.

The term “ecotourism” is used often as a marketing strategy for companies aiming at a new and growing sector of the tourism market (Wall, 1997). Nowadays people are becoming more aware of their environment and the importance of its conservation. For this reason a series of “green” or “environment friendly” products and services have appeared in the markets. Many companies perform so called “ecotourism” activities that have negative impacts in nature, have no conservation purposes and bring no benefits for the local populations; activities that do not fulfill the definition of ecotourism or its objectives (Brandon & Margolius, 1996). To address this issue, the International Ecotourism Society established the following principles for persons or companies that want to participate or offer an ecotourism experience (TIES, 1990):

- Minimize impact.
- Build environmental and cultural awareness and respect.
- Provide positive experiences for both visitors and hosts.
- Provide direct financial benefits for conservation.
- Provide financial benefits and empowerment for local people.
- Raise sensitivity to host countries' political, environmental, and social reality.

1.3. Ecotourism, Conservation and Development

Ecotourism can be a very important tool to protect natural areas (Ceballos-Lascurain, 1996; Wall, 1997; Gosling, 1999; Wearing & Neil, 1999; Ross & Wall, 1999a, 1999b). This can be accomplished through the generation of revenues, environmental education and local population participation, that will help achieve conservation and development of the natural area (Ross & Wall, 1999a). For this to happen, appropriate strategies have to be used in order to create a relationship between biodiversity, tourism and local communities, and it is imperative to have an effective planning, management and control of the project (Gosling, 1999; Ross & Wall, 1999b).

The generation of revenues gives an economical value to a natural area. The value of conservation has to be superior to the value of other uses the same area may have (Gosling, 1999). It is important that the local population receives part of these revenues. This way they will understand directly the importance that the natural area has and how its conservation can benefit them economically. They can even stop performing detrimental activities for the area in order to increase its ecotourism value. Unfortunately the distribution of benefits among the local population is not always equal. A great portion of the revenues often goes to foreigners or just some individuals of the local population, who monopolize the opportunities ecotourism might present (Gosling, 1999).

Environmental education allows the local population and visitors to have a better understanding of the importance of the natural area they inhabit/visit (Gosling, 1999). In the case of the visitors, it also has a “chain effect” as tourists can act as educators themselves by sharing the experience and knowledge they acquire during the visit with their own communities all over the world. In this way people that did not visit the natural area can get informed about its importance and get interested in its conservation.

Local population participation is vital for the success of ecotourism as a conservation tool (Wearing & Neil, 1999; de Vasconcellos Pêgas & Stronza, 2008). Many ecotourism

projects have failed because they did not manage to get the involvement of the local population (Wall 1997; Kruger 2005). It is extremely important that local people is able to benefit from ecotourism and able to manage their own resources (Munn, 1992). The local population must not be displaced by ecotourism initiatives or otherwise they will perceive conservation as a threat and will undertake activities that go against it, like poaching or logging (Wall 1997; Kruger 2005).

Another way ecotourism promotes conservation is by supporting scientific research (Brightsmith, 2008). An ecotourism company can provide logistical support to a research team in the form of lodging, food and transportation. In return, researchers can interact with tourists explaining about the importance of the area, maximizing the visitors' experience. The company also benefits from detailed information regarding the fauna and flora of the area increasing the possibility of sightings by the tourists. Finally, researchers provide publicity to the company through presentations and publications (Brightsmith, *et al.*, 2008).

By linking development to conservation ecotourism can be sustainable (**Figure 1**) (Ross & Wall, 1999a). This way ecotourism can effectively contribute to conservation, helping in solving conflicts between resource exploitation and resource conservation in order to conserve natural resources for the next generations (Ross & Wall, 1999a).

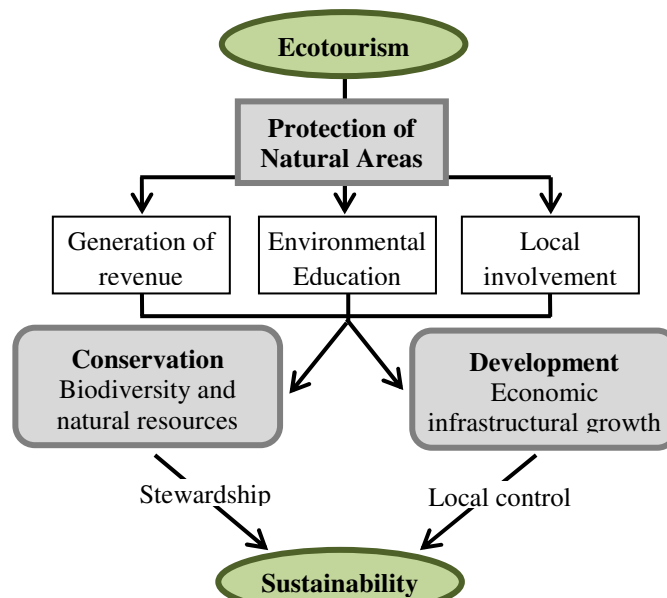


Figure 1. Ecotourism objectives. Through the fulfillment of its objectives, ecotourism allows the conservation and development of an area achieving sustainability (Ross & Wall 1999a).

It is important to mention that ecotourism and sustainable tourism are not synonyms. Even though sustainable tourism has not an ultimate definition two different approaches are

used for this term. One approach focuses only in the everlasting capacity of the activity and defines sustainable tourism as the tourism that is developed and managed in such a way that all tourism activities can continue indefinitely (Ceballos-Lascurain, 1996). A more interesting approach focuses in the relationship of tourism with other activities in order to achieve a greater good. This way sustainable tourism acknowledges that tourism is not the only activity using resources and seeks a balance between the different activities in order to achieve sustainable development (Wall, 1997).

Ecotourism is not always sustainable. In order for this to happen, ecotourism has to be economically viable, ecologically sensitive and culturally appropriate (Wall, 1994). Unfortunately, in many cases ecotourism projects fail to achieve this (Wall, 1997; Kruger, 2005).

Regarding economical viability, ecotourism usually takes places in remote natural areas, where the costs of the logistics can be high and tourists groups have to be small in order to have minimal environmental impact and enjoy a quality experience. For these reasons prices have to be quite expensive (Wall, 1997). Many companies prefer to have lower prices in order to be competitive in the market and, therefore, turn to mass tourism in order to assure profits, neglecting the principles for sustainable ecotourism (Issacs, 2000).

By being ecologically sensitive, it is believed that ecotourism has minimal impacts in the environment, but this is not always true. Many negative impacts can be detected in ecotourism activities such as damage to wildlife, habitat deterioration and impact in the local communities (Issacs, 2000). The negative impacts are not only felt at the local level but often also express themselves at a global level. For example, many ecotourists travel long distances consuming energy and contributing to global climate change (Wall, 1997). Responsible measures and commitments have to be taken by ecotourism companies and tourists in order to minimize the impacts they can cause to a natural area.

It is expected that ecotourism will benefit the local population by being culturally appropriate, but this does not always happen. Often, the lack of appropriate skills or capital in the local population hinders their active participation in the ecotourism process and therefore the possibility of benefiting from it. Without income from ecotourism, the local communities will have to continue their traditional activities that usually make them compete with ecotourism for natural resources (Wall, 1997). Furthermore, in many cases ecotourism overlooks the fact that local populations may need to perform certain activities for their survival, and will prohibit and banish these activities. By doing so it creates a

serious conflict that ultimately may lead to the failure of the ecotourism project. It is important that ecotourism acknowledges the needs of the local population and provides alternatives wherever necessary. For example, many African communities use wood from forests for cooking. The wood collection performed by some of these communities can seriously affect a forest. Prohibiting wood collection will not work unless an alternative is given to the population, such as the opportunity to use fuel effective stoves or to collect wood in specific areas.

The failure in the achievement of the previously mentioned characteristics unable an ecotourism project to become sustainable (Wearing & Neil, 1999). Also insufficient environmental education efforts, both next to the local population and the visitors, can also hinder the implementation of a successful ecotourism project (Kruger, 2005).

Nevertheless, there are many instances where ecotourism successfully achieved sustainability. The main reasons for success are (Kruger, 2005):

- Participation of local communities, as an important part of the planning and development of the project.
- Adequate planning and management strategies for the project.
- Sufficient amount of income produced by ecotourism. If ecotourism produces more money than any other land use, people will prefer to engage in ecotourism projects.
- Presence of charismatic flagship species. Many successful ecotourism projects are developed around flagship species. Flagship species are capable of inspiring people and producing a considerable tourism flow to a specific area.
- Differential entrances fees. Developed countries have a higher entrance fee so more income is generated through ecotourism for a natural area

When achieved, sustainable ecotourism can produce many benefits. These benefits are directly related to the conservation and socio-economic development of the local population in a specific natural area.

One of these benefits is the achievement of a protection status for a natural area when the government acknowledges the economic benefits of ecotourism (Kruger, 2005). Another benefit is the increase of the economic income of the local population. This can be extremely positive especially when the local population decides to change their use of land from a consumptive to a non-consumptive form.

Furthermore, sustainable ecotourism will allow the creation of revenue in a regional and national level. In order for tourists to arrive to an area they usually have to pass through

different cities and villages, leaving an economical trail in the form of lodging, transportation and food expenses. Sometimes these economic incomes may not be large but they can definitely make some difference in small economies (Wall, 1997).

The most important and maybe everlasting benefit is the change of attitude from the local population towards the natural area. The local population may start perceiving the natural area as a source of economical income and development. In this way they will decrease activities such as poaching and logging, change their land use to benefit the environment, while also engaging in conservation programs (Kruger, 2005).

In summary, real ecotourism can indeed, with adequate principles and management, achieve the conservation of a natural area at the same time that it improves the socio and economic development of local population.

1.4. Study Site: Angola

1.4.1. Geography

The Republic of Angola is a country located in the southwest part of Africa, between the Equator and the Tropic of Capricorn. The country is surrounded by Namibia in the south, the Democratic Republic of Congo in the north, Zambia in the east and the Atlantic Ocean in the west. It also has an enclave, Cabinda, surrounded by the Democratic Republic of Congo and the Republic of Congo (Brazaville). The capital is the city of Luanda located in the coastal area of the country (**Figure 2**).

The country has a land surface area of 1 246 700 km² and is divided in 18 provinces: Bengo, Benguela, Bié, Cabinda, Cuando-Cubango, Cuanza Norte, Cuanza Sul, Cunene, Huambo, Huila, Luanda, Lunda Norte, Lunda Sul, Malanje, Moxico, Namibe, Uíge and Zaire. The country has three main ethnics groups: Ovimbundu (37%), Kimbundu (25%) and Bakongo (13%). Others ethnics groups include Ambo, Chokwe, Ganguela, Herero, Lunda, Nhaneca-Humbe and Xindunga. There is also a small amount of mixed (2%), and white population (1%) (CIA, 2010).



Figure 2. (a) Angola's location in Africa (source: CIA, 2010). (b) Borders and Provinces (source: World Geographic)

Angola was a Portuguese colony until November 11th of 1975, when the country declared its independence after 14 years of war. Unfortunately the country was internally divided and a civil war between the main two political parties started after the independence. The civil war lasted for 27 years ending in 2002 after Jonas Savimbi's death (leader of UNITA) in Moxico. It is calculated that around 1.5 million lives were lost during the war and 4 million people displaced (US Department of State, 2010).

No exact figure is available for the population size because no census has been done since 1970, but the population was estimated to be c. 18 500 000 people in 2009 (US Department of State, 2010). Population density is estimated to be 14.8 persons *per* km², however much of the population is clustered in major urban centers. For example, the population of Luanda passed from approximately 400 000 people in 1970 to an estimated population of c. 5 millions in recent years. This was a direct result of the war in which many people fled from the rural areas to the urban centers, especially the capital.

1.4.2. Environment

Angola has six major geomorphological regions: the Coast Belt, the Transition Zone or "Scarp", the Marginal Mountain Chain, the Old (Highland) Plateau, the Congo Basin and the Zambesi-Cubango Basin (Huntley, 1974). The Coast Belt, an arid and semi-arid area, extends from 12 km to 200 km from the coast and presents a maximum elevation of 300 m. Following the Coast Belt there is the Transition Zone before getting into the Marginal Mountain Chain that has the higher points in the country. The Old Plateau includes the central highlands of Huíla, Huambo and Bié Provinces. The Congo Basin, north of the country, has plains that range from 1000m to 1500m (Huntley, 1974; Dean, 2001).

Angola is located in an area of intertropical trade winds characterized by hot wet summers and dry warm winters. The southwest and west of the country is influenced by the cold Benguela current (Huntley, 1974).

The Highland Plateau and a small part of the Coast Belt present the lowest mean annual air temperatures, below 19°C. The highest temperatures, above 25°C, occur in the inner margin of the Coast Belt and in the Congo Basin (Huntley, 1974).

Rainfall in Angola increases with the distance from the sea, increasing altitude and decreasing latitude (Huntley, 1974). Hence, the highest values for mean annual precipitation can be found in the north of the country, with values of 1600 mm in Cabinda as well as in the Marginal Mountain Chain and Highland Plateau. On the other hand, the driest areas are found in the Coast Belt, where some of them experience extreme desert conditions with a mean annual precipitation as low as 50 mm (Dean, 2001).

Rainfall is seasonal throughout the country (Huntley, 1974). The rainy season usually lasts from November to April, followed by a dry season from May to October (US Department of State, 2010). Nevertheless in the north east part of the country the rainy season is usually longer, lasting from August to May, while in the south west it usually lasts only a couple of months, from December to March (Huntley, 1974; Dean, 2001).

Five main biomes can be recognized in Angola: Guinea-Congo Forest, Afrotropical Highlands, Zambezian, Kalahari-Highveld and Namib- Karoo (Huntley, 1974). However other ecosystems exist in the country, such as mangroves forests and aquatic vegetation, which even though they do not form part of the previously mentioned biomes present characteristics of their own that make them important.

The Guinea-Congo Forest is present in the provinces of Cabinda, Zaire, Uige, Cuanza Norte and Cuanza Sul and is formed by evergreen semi-deciduous forest with a canopy height of 50m. The Afrotropical Highland is composed by isolated forest patches in the protected slope of mountains in Huambo, Cuanza Sul, Benguela and Huíla; located in an altitude between 2000m to 2500m and with a canopy height of 10m to 15m. The Zambezian biome is located in the interior plateau of the country and the predominant vegetation is miombo woodland with a canopy height of 4m to 12m. The Kalahari-Highveld is located in the eastern edge of the Namib dessert and is composed by sub littoral shrublands and open woodlands. Finally, the Namib-Karoo Biome extends to the north of Benguela with perennial grassland, shrublands and thickets (Dean, 2001).

1.5. Afromontane Region

From a botanical perspective, the Afromontane Region was described by White (1978, 1981) as the vegetation of the lower slopes of the highest African mountains and the upper slopes of lesser mountains that differed greatly from the vegetation in the lowland areas around them. It is considered a different phytogeographical region from the Afroalpine (higher altitudes) because of the higher abundance and diversity of flora species that the Afromontane Region presents (White, 1978). It is not a discrete or continuous vegetation region but is instead formed by a series of isolated mountains, that can be viewed as “islands” among an ocean of lower elevations, which results in an archipelago-like regional centre of endemism (White, 1978; Scott, 1998; Cowling, *et al.*, 2004). These isolated mountains were created probably during the tectonic activity of the Miocene (Grimshaw, 2001). Some of the “islands” present populations of species that can only be found in other mountain islands, sometimes thousands of kilometers away (White, 1978). The region extends along the African continent, from Loma Mountains and Tingi Hills in Sierra Leone to the Ahl Mescat Mountains in Somalia, and from the Red Sea Hills in Sudan to the Cape Peninsula (White, 1978, 1981). Nevertheless, outliers can be found on the high mountains of West Africa and Angola (Cowling, *et al.*, 2004).

Each mountain presents different vegetation types and floristic compositions. Nevertheless, regardless of the long distances that separate some of these mountains, their flora shows consistency and continuity: a flora common to all African mountains (Grimshaw, 2001). The differences between extreme vegetation types in a particular mountain is greater than the difference between the composition of the vegetation of this mountain with other near or distant mountain (White, 1978, 1981).

The region presents a flora probably exceeding 4000 species, from which more than 75% are endemics or near-endemics to the region (White, 1978, 1981). Nevertheless the region presents a poor familiar and generic endemism with only three endemic families and 20% of the tree genera being endemic (White, 1978).

Even though the vegetation of the islands in the archipelago is mainly endemic or near-endemic, in some areas, such as Angola, lowland species are present among the afromontane vegetation (White, 1981). These species were recruited from the lower woodlands and made their way into the lower limit of the Afromontane region in these areas (White, 1978). Initially, because of their peculiar floristic characteristics, these areas were not considered as part of the Afromontane region even though their geographic characteristics are certainly Afromontane (Grimshaw, 2001).

The height of the vegetation in this region usually decreases with altitude. Forest (usually *Podocarpus*-dominated) slowly becomes shrubland dominated by *Senecio* and *Lobelia* in the upper limits and eventually grassland, especially in areas where natural vegetation has been destroyed by fire (White, 1978).

Grassland is the most common vegetation type in the Afromontane region. Grasslands benefit from fires, once natural and now increasingly with a human origin. Even though grassland vegetation includes fire tolerant species and even fire climax communities their presence is not determined by the existence of fires (White, 1978). More recently, human-made fires are becoming a major threat to the Afromontane forests due to their extent and high frequency (annual). The presence of scattered and single trees in the grasslands is evidence of the past extent of the forests, which likely receded due to the intensive anthropogenic fire regime.

The Afromontane region usually makes a transition to miombo through mosaics of vegetation that are determined by the soil characteristics. The miombo usually present a canopy height of six meters, with *Brachystegia spiciformis*, *B. taxifolia*, *B. glaucescens* and *Uapaca kirkiana* as the principal species (White, 1978).

It is now difficult to determine where exactly the Afromontane region begins, as the transitional zones that should be present in the lower limits of the region have been destroyed for agriculture and settlements (White, 1978; Grimshaw, 2001).

The Afromontane vegetation has shown to be more susceptible to change than any other floristic region in Africa possibly because of the complex origin and evolution of its flora (White, 1981). Conservation efforts should not only target the endemic species (that hold a unique ecological and evolutionary value), but also the non-endemics as these give valuable information about the history and evolution of the Afromontane region.

Representative communities of the whole Afromontane region have to be conserved, giving special importance to the satellites populations, which are extremely small and being destroyed at an accelerated pace (White, 1981). This is particularly true in Angola, where the most isolated Afromontane forests are found.

1.6. The Afromontane Forests in Angola: Mount Moco

The Afromontane region in Angola does not present a well-developed afromontane vegetation (White, 1978). As mentioned before, the flora in these areas is composed by

Afromontane species mixed with other species, especially from the lowlands. Nevertheless some of these Afromontane species are separated from other species occurring in more distant areas, sometimes thousands of kilometers away. In this sense, the Afromontane forests present in Angola are considered satellite populations (White, 1978, 1981). The Afromontane forest is probably the most seriously threatened of all the ecosystems in Angola, but unfortunately no protected area exists in the country for its conservation.

The Afromontane region in Angola is composed by a small group of isolated forest patches in the deep ravines and slopes of mountains in the west-central highlands of Angola, especially in Huambo and Cuanza Sul provinces (Huntley & Matos, 1994). The area of all these patches together is probably less than 200 ha and patches seldom exceed 20 ha (Huntley, 1974). Nevertheless they are still capable of maintaining populations of flora and fauna that sometimes are isolated from other populations more than 2000 km away (Huntley, 1974).

The best known examples of these forest patches are found in Mount Moco, in the province of Huambo, where 15 or more patches of one to 20 ha, are still present in the area (Huntley & Matos, 1994). Recent information states that 30 forest patches with areas larger than 0.5 ha still exist in Mount Moco and they have a combined total area of 85 ha. Nevertheless, few of these patches have areas larger than 5 ha (Mills, *et al.*, *in press*).

Mount Moco is part of the Marginal Mountain Chain of Angola and is the highest point in Angola with a summit of 2620 m. No climate information regarding the area is available, but the rainfall is within the 1400 mm isohyets (Dean, 2001). Most of the Mount Moco area is covered in woodland and grassland, while forests represents a scarcely 1.2% of the total central area (Mills, *et al.*, *in press*).

The forest patches in Mount Moco are found in deep ravines in altitudes from 1800 to 2400 m. The canopies are irregular as they depend on the slope gradients, but forests usually have a height of eight meters (**Figure 3**). The forests include trees of *Podocarpus milanjanus*, *Polyscias fulva*, *Apodytes dimidiata*, *Pittosporum viridiflorum*, *Syzygium guineense afromontanum*, *Halleria lucida*, *Ficus spp.*, and *Ilex mitis*. The presence of epiphytes in these forests is not abundant, when compared to montane forests in other areas (Huntley & Matos, 1994).



Figure 3. Afromontane forest in Mount Moco. (a) Forest patches in deep ravines. (b) Inside view of one of the forest patches.

The forest patches are surrounded by grasslands with scattered trees and shrubs (Dean, 2001). The principal shrub species are *Philippia benguelensis*, *Erica spp.*, *Protea trichophylla*, *Stoebe vulgaris* and *Cliffortia spp.*, while grass species such as *Themeda triandra*, *Tristachya inamoena*, *T. bequertii*, *Hyparrhenia andongensis*, *H. quarrei*, *Festuca spp.* and *Monocymbium cerasiiforme* are also present in the area (Huntley & Matos, 1994).

A considerable part of the north, east and south part of the mountain is covered in *Brachystegia*-dominated miombo woodland (Mills, *et al.*, *in press*).

The forests used to have different mammals species such as yellow baboon (*Papio cynocephalus*), red-footed squirrel (*Funiscuirus pyrrhopus*), blue duiker (*Cephalophus monticola*) and bush-pig (*Potamochoerus porcus*) (Huntley, 1974), but these species have disappeared probably because of hunting and habitat destruction.

The avifauna is of great importance in Mount Moco, not only because of the presence of endemic, rare, and threatened species, but also for the presence of isolated populations from species present in other distant Afromontane forests (Huntley & Matos, 1994). Species and subspecies have been recorded only on Mount Moco and in other afromontane forest patches in other provinces of Angola (Dean, 2001). Together with the forests of the scarp, the Afromontane forests of Angola make up Angola's only EBA (Endemic Bird Area), and have been classified as an IBA (Important Bird Area) (BirdLife, 2010b, 2010a).

The most important bird species in the area is the Swierstra's francolin (*Pternistis swierstra*), which is an endangered endemic species that depends exclusively on the

afromontane forests. Mount Moco forests are crucial for its conservation, as they hold the only known viable population of the francolin. The Angola slaty flycatcher (*Dioptrornis brunneus*) and Ludwig's double-collared sunbird (*Cinnyris ludovicensis*) are also endemic species but, although associated with montane areas, they are not restricted to the afromontane forests (Mills, *et al.*, *in press*).

The major threats for the forests at Mount Moco are logging, clearing and burning (Huntley, 1974). The unsustainable use of wood for fuel and construction material by the local population, together with fires, of natural and human causes, are leading to the fast disappearance of the forested areas in Mount Moco (Mills, *et al.*, *in press*).

The conservation of the forests of Mount Moco is therefore extremely important and urgent, as these may represent up to half of the Afromontane forest habitat present in Angola (Mills, *et al.*, *in press*). This area can provide unique insights regarding the past climatic conditions that once allowed a wide distribution of these forests (Huntley, 1974).

Up to now, the implementation of a protected area has been repeatedly proposed as the best way to conserve Mount Moco forests, with a 60 km² area first proposed back in the early 70's (Huntley, 1974; Huntley & Matos, 1994; Mills, *et al.*, *in press*), together with education and the development of sustainable use of the forests by the local population (Mills, *et al.*, *in press*). Nevertheless, although recently the government has shown again interest in this proposal (B. Huntley, *pers. comm.*), its implementation still seems to remain on the theoretical realm. The critical plight of Mount Moco forests requires, nevertheless, that immediate action be taken. This study aims to assess the efficiency of ecotourism as an alternative conservation strategy. The rationale is that if an ecotourism model can be designed that creates a clear link between the benefits to the local community and the preservation of the forests then the conservation of these forests would ensue automatically. Ecotourism has therefore the potential to quickly reverse the forest degradation trend.

2. OBJECTIVES

This work aimed to determine the potential and viability of ecotourism as a conservation tool for the Afromontane forests of Mount Moco. In order to achieve this, a multi-disciplinary approach was used, combining a full socio-economic assessment of the local community, biodiversity surveys, inventories of cultural values, and testing of alternative models of ecotourism for their viability and conservation impact. This study was therefore developed along five objectives:

1. *Execute an inventory of the tourist resources in Mount Moco area.*

Information regarding resources was collected (through field surveys and a literature review) and their tourism potential assessed. Information about the important bird community and other animal groups was included, as well as all the potential tourism resources and activities that could be performed in the area.

2. *Assess the social and economic characteristics of the local population.*

The composition, activities and use of the natural resources by the local population was determined. This information allowed the proposal of viable solutions, adapted to the local reality, for the development of an ecotourism project that will allow the conservation of the area and the improvement of local livelihoods.

3. *Evaluate the principal threats to Mount Moco biodiversity*

The patterns and intensity of natural resource use by the local population were surveyed. Also the impact of their activities (e.g., fire, hunting) in the natural environment was assessed in order to identify the threats the Afromontane forests are facing.

4. *Describe the existent tourist services and infrastructures*

Information about tourist infrastructures (e.g., airports, hotels, roads, etc.) in the principal cities that could facilitate tourist access to the Mount Moco area was collected.

5. *Propose an ecotourism project model for the conservation of Mount Moco*

The information previously collected was used to build a proposal for an ecotourism project that directly promote the conservation of the forest of Mount Moco. The proposed project considered both the local population reality and the natural needs of the area. The efficiency of the project for maximizing forest conservation, benefiting the local community and is economic viability was evaluated.

3. METHODOLOGY

3.1. Inventory of Tourist Resources

The characteristics of the tourist resources define the potentiality of a tourist destination (Cunha, 2008). For this reason the inventory, description, classification and evaluation of these resources are quite important for determining the tourist potential of a specific area.

Information regarding the location (GPS coordinates and altitude), accessibility and general characteristics of different tourist resources was collected through direct observations and field notes. All this information was registered in a data sheet (**Appendix 1**).

Resources were classified according to the method proposed by the Organization of American States (OAS) (OMT, 1998; Blanco, 2008; Cunha, 2008). This method not only allows the classification but also the organization of tourist resources into hierarchies, making possible comparisons between resources. Even though this method is considered an objective assessment, a degree of subjectivity remains attached to the observer and the reality of the place (Blanco, 2008).

The method divides tourist resources into two major classes (natural and artificial) and into five categories, each one with different types and subtypes (Blanco, 2008) (**Appendix 2**, for the complete list).

Being Mount Moco a natural area, in this work we focused especially in the natural resources. This category includes places with a scenery value as well as the resources associated with them, such as wildlife and flora (Cunha, 2008). Some of the most important attributes of Mount Moco are described in detail such as the vertebrate fauna, forest patches and potential hiking routes. For mammals and avian diversity, information collected by Mills *et al.* (*in press*), Dean (2001) and Huntley (1974) was used. Direct observations of some species were performed during the field work. The mapping and measurement in satellite imagery (*Google maps*) of potential hiking routes to visit different points of interest in the area were performed.

Tourist resources evaluation was made using two methods: i) the OAS hierarchical classification and ii) the guidelines of Gomez (2008). According to OAS (Cunha, 2008) tourist resources can be organized into five hierarchies:

- **Hierarchy 5:** Extraordinary resources that produce by themselves a considerable tourist flow to an area. They are resources of international interest and extremely important to the tourism market. Examples of resources with this hierarchy would be the places declared by UNESCO as World Heritages Sites.
- **Hierarchy 4:** Resources capable to produce, by themselves or together with others resources, a tourist flow of national and international visitors to an area. They are resources with national interest.
- **Hierarchy 3:** Resources that can generate interest in visitors who are in the area for other resources or reasons.
- **Hierarchy 2:** Resources that can only produce the visit of regional or local people.
- **Hierarchy 1:** Resources that are not capable by themselves to interest visitors in a specific area. Nevertheless they act as complementary resources to tourists visiting the area.

The guidelines of Gomez (2008) assess different characteristics, such as accessibility, actual use and conservation. For each characteristic a score was given (**Table 1**). A total qualification was obtained for every tourist resource by adding the different scores of the eight characteristics. According to this final qualification, resources can be classified as Exceptional (21 – 24 points), Very good (14 – 20 points), Good (7 – 13 points) and Normal (0 – 6 points) (Gomez, 2008).

This evaluation allows comparison of the different tourist resources in the area and therefore the establishment of priorities. Nevertheless it is important to mention that this evaluation follows subjective criteria and could have quite different results when applied in other areas or situations.

Table 1. Characteristics evaluated in the tourist resources. Eight characteristics were assessed and scores from 3 to 0 points were given. Descriptions regarding each characteristic are presented.

Characteristics	Scores				Description
	3	2	1	0	
Singularity	Unique	Rare	Common	Very common	Describes how unique the resource is. A “unique” resource cannot be found in other place.
Attractiveness	Exceptional	Very good	Good	Normal	Describes how good or great the resource is.
Conservation State	Exceptional	Good	Normal	Bad	Refers to the resource condition. An “exceptional” resource is in excellent conservation, whereas the “bad” need rehabilitation.
Actual use	Many times	Sometimes	Very rare	None	Refers to the actual visitors/users, according to their frequency.
Accessibility	Good	Normal	Difficult	Very difficult	Describes the access. “Good” means that it is extremely easy to get to the resource, while “very difficult” usually indicates long walking through rough terrain.
Setting conservation	Exceptional	Good	Normal	Bad	Refers to the conservation condition of the area around the resource.
Seasons	3 seasons	2 seasons	1 season	Very limited	Describes the seasons when the resources are present. “3seasons” refers to almost all year while “very limited” is for resources that are available in very shorts periods of time only.
Demand	Everyone	Many	Some	Very few	Refers to the amount of people that would be willing to visit the resource.

3.2. Social and economic description of the local population

Surveys were performed during 2009 and 2010 to collect information about the socio-economic characteristics of Kanjonde, the only village in the surroundings of Mount Moco.

In 2009, surveys covering most of the households (n=59) collected general information regarding the local population such as languages spoken, number of children in each household, principal economic activities, principal animals bred and crops grown (**Appendix 3**). The 2009 survey provided valuable information about local population economical activities and needs (e.g., medicine, construction material, etc.). During 2010, surveys gave special emphasis to household composition and products bought and sold by the villagers.

Information for the surveys was collected through the personal interview method and field notes. The personal interview method consists in collecting information through questionnaires. This method is very useful in surveys in developing countries where illiteracy rate is usually high (UN, 2005). Nevertheless, questionnaires have to be carefully designed and performed in order to collect reliable information. In 2009, when little was known about the local community, open-ended questions were used, where the interviewee can give all the information possible in his answer. The detailed information collected this way allowed to design “closed-ended questions” for the 2010 survey. This kind of questions restricts the answers of the interviewee to a list previously established. The information obtained with this method is more uniform and easier to analyze, but might overlook some possible answers as respondents are restricted to a set of answers (UN, 2005). Questions for the 2010 surveys were based on the detailed information collected in the 2009 “open-ended” surveys and on knowledge about the natural characteristics of the study area obtained from collaborators (e.g., Mills *et al. in press*).

Most of the villagers of Kanjonde speak Umbundu, one of the languages of Angola. Only some of the persons living in Kanjonde are fluent in Portuguese. This situation presents difficulties, as some Portuguese terms are difficult to translate to Umbundu or may mean different set of ideas. In order to overcome these difficulties, a Portuguese-Umbundu fluent translator was always present during the interviews.

3.2.1. General Information

Information regarding age and gender composition was collected for each household in order to determine demographic characteristics of the Kanjonde population.

Here, household is defined as *“the basic residential unit in which economic production, consumption, inheritance, child rearing, and shelter are organized and carried out. In the vast majority of human societies most household are made up of families but there are many others arrangements...so it is that family and households are not always synonymous”* (Haviland, *et al.*, 2009).

For this study, household was considered a group of persons living in the same house and depending on the same income. Family relationships in Angola are much extended, so no relationship status was asked to the interviewees in order to avoid confusions (e.g., people calling mother to their aunts).

The Standard International Age Classifications for population age and distribution recommended by the United Nations was used (UN, 1982). This classification divides population in age groups equivalent to Infancy, Youth, Young Adulthood, Middle Adulthood, Older Adulthood and Retirement. Nevertheless slight modifications were done to this classification in order to be able to compare the results with information about the population composition for the country (**Table 2**).

Table 2. Age groups recommended by United Nations for Demographic, Social and Economic Data, and those used in this study.

Age Group	Age - UN	Age – This study
Infancy	Under 1 year	0 – 4 years
Youth	1 – 14 years	5 – 14 years
Young Adulthood	15 – 24 years	15 – 24 years
Middle Adulthood	25 – 44 years	25 – 44 years
Older Adulthood	45 – 64 years	45 – 64 years
Average retirement age	Over 65 years	Over 65 years

Interviewees were asked their names and ages, as well if they have a wife/husband or partner. Also questions regarding the age and gender of people that form part of their household were asked. The information was recorded in the socio-economic data sheet (**Appendix 4**).

Information regarding languages spoken and education was collected during the 2009 surveys.

3.2.2. Village infrastructures and services

An important part of this study aims to determine how an ecotourism project could help the local population achieve economical and social development. For this reason it is very important to assess the services and infrastructures present in the village, and to determine the needs that the community has regarding basic services.

Information regarding services and infrastructures through direct observations was collected through a data sheet (**Appendix 5**), field notes and a community meeting held in 2009. The presence of services such as electricity, water, drainage system, communications (e.g., radio, cell phone and phone), education and health was recorded. Also, other miscellaneous information was collected such as different religious groups present in the village, social organization and any other relevant observations.

GPS coordinates and altitude was recorded for the village, as well as relevant information concerning the village location (e.g., name of main road, nearby city, etc.). Distance and time to get to the village from the main road was recorded. The time was included because depending on the condition of the road, several hours can be taken to do only a few kilometers in some parts of Angola

3.2.3. Economic activities and population needs

Information regarding the principal economic activities, crops grown, and animal bred was collected in the 2009 and 2010 surveys. The products sold and bought by the population as well as the prices of these products in local markets were also recorded.

3.3. Evaluation of the principals threats to biodiversity

The 2009 and 2010 surveys also determined the use of natural resources by the population of Kanjonde. While surveys performed in 2009 had a more exploratory nature in order to know the principal activities of the population, the 2010 surveys were performed giving a special emphasis to the activities believed to impact more negatively and directly in the Afromontane forests biodiversity: wood collection and hunting (**Appendix 6**).

As mentioned previously, most of the local population speaks Umbundu. Usually some confusion is generated regarding common names of plants and animals because some Umbundu words cannot or are very difficult to translate to Portuguese or vice versa. In order to be sure that the interviewer and the interviewee were referring to the same place/species, identification plates were used (e.g., vegetation types and animals) as the list of answers for a particular question.

The identification plate for vegetation types was done using recent photos (less of two years old) of Mount Moco area (**Appendix 7**). The three dominant vegetation types were illustrated:

- **Forest:** The Afromontane forest patches present in Mount Moco.
- **Woodland:** *Brachystygia*-dominated woodland (miombo) present in the mountains slopes before getting into higher zones or deep ravines.
- **Grassland:** Vegetation of the plain areas around the mountains and where Kanjonde village is located.

An animal identification plate was prepared for the identification of the species that could be hunted by the local population (**Appendix 8**). Species recorded in the area were included in this plate. Photographs and drawings were used for this plate.

The species included in the identification plate were the hyrax (*Procavia sp.*), greater cane rat (*Thryonomys swinderianus*), reedbuck (*Redunca fulvorufula*), common duiker (*Sylvicapra grimmia*), red-necked francolin (*Francolinus afer*), guinea fowl (*Numida meleagris*), Swierstra's francolin (*Pternistis swierstrai*), Finsch's francolin (*Francolinus finschii*) and scrub hare (*Lepus saxatilis*).

3.3.1. Wood collection and forest use

A specific survey regarding wood collection for fuel and construction use was carried out, focusing on the places where the local population went to pick up wood, the methods used and the amounts collected (**Table 3**). To quantify the amount of wood used by the local population, fire wood packs brought into the village were weighted with a spring balance.

3.3.2. Hunting activities

The hunting activity in the area was described by identifying the principal prey species, the particular places where hunting occurred (e.g., in the forest patches or in the woodland) and the methods used (**Table 4**). Even though in many places of Africa hunting may be the only way people can get some protein in their diets, they are aware that this activity is not accepted or approved by foreigners. For this reason, when asked about hunting many people might lie in order to achieve approval. In order to avoid this kind of situation, questions were done without gestures of disapproval and sometimes were reformulated in order to try to gather as much information as possible. For example, in order to initiate the conversation regarding hunting activities, interviewees were asked about bushmeat and how tasty that meat could be.

3.3.3. Fire regime (Burns)

During the 2009 surveys information about burning regime was collected. The reasons and months of the year where burns occurred were registered. In order to corroborate this information, satellite's imagery from the Web Fire Mapper (NASA/University of Maryland, 2002) was used. Four images of the fires in Angola during the year 2009 for the following periods of time: January 1st to March 31st, April 1st to June 30th, July 1st to September 30th and October 1st to December 31st were compared to the months when the local population performed burns.

Table 3. Questions and set of answers used to gather information regarding wood use for fuel and construction in Mount Moco.

Question	Answers	Observations
Where do you go to pick up wood for fire?	Forest	The vegetation type identification plate was used. The “others” alternative was used when the interviewee was unable to identify or referred to another specific place.
	Woodland	
	Grassland	
	Others	
How do you pick up wood for fire?	Wood that is in the ground	Interviewee collects wood that is already in the ground, such as dry sticks and other material, without cutting a tree.
	Cut down a tree	Interviewee cuts down a tree in order to get wood.
	Cut from a tree already down	Interviewee gets wood from a tree that has been previously cut by himself or another person.
	Cut branches from tree	Interviewee collects wood by cutting or breaking branches from a tree without killing it.
	Burnt tree	Interviewee collects wood from a tree that was burned during a fire, intentionally started or not.
How many days per week do you collect wood for fire?	A number of days per week	This question could be answered by the interviewee, when a women or when a man he could refer to his wife.
Where do you go to get wood for fire?	Forest	The vegetation type identification plate was used. The “others” alternative was used when the interviewee was unable to identify or referred to another specific place.
	Woodland	
	Grassland	
	Others	
How do you pick up wood for construction?	Cut down a tree	Interviewee, himself, cuts a tree
	Someone else cuts down a tree for me	This question was done in order to assess if there is people in the village specialized in this activity.
	Cut from a tree that is already down	No living trees are cut down in order to get wood.
	Other	Other technique is used.
How many times a year you need wood for construction?	A number of times per year	

Table 4. Questions and set of answers for the hunting activities in 2010 surveys.

Question	Answers	Observations
What animals do you hunt?	Hyrax	The animal identification plate was used for this question. Interviewees could point out the animals they hunt and this way the confusion generated by different common names was avoided. The answers were animals that are believed to be common cynegetic species in the area and also species with conservation/ research interest such as the Swierstra's and Finsch's francolins.
	Greater cane rat	
	Shrub hare	
	Common duiker	
	Reedbuck	
	Guinea fowl	
	Swierstra's Francolin	
	Red necked Francolin	
Where do you hunt?	Finch's Francolin	
	Forest	Vegetation Type identification plate was used in this question. The "Other" alternative was used when the interviewee was unable to identify or referred to another specific place.
	Woodland	
	Grassland	
	Other	
How do you hunt?	Slingshot	This question aimed at finding out the techniques used for hunting in the area. "Other" was marked when people referred to the use of other method (e.g., hunting dogs)
	Traps	
	Shotgun	
	Other	
Can we see your hunting gear?	Yes	This question was done in order to get photographs of the hunting gear used by the people in the area.
	No	
How often do you hunt?	Daily	Interviewee hunts every day.
	Weekly	Interviewee hunts from 1 to 5 times per week.
	Monthly	Interviewee hunts once a month.
	Occasionally	Interviewee hunts with no regular basis or whenever he feels like hunting.
How many preys do you get in each hunting trip?	A number of preys	
Do you hunt for	Myself/ my family	This question was done in order to find out if they are people in the area that are exclusive hunting and make a profit from this activity.
	To sell/ to others	

3.3.4. Statistical analyses of socio-economic variables

Statistical analyses were performed with socio-economic and biodiversity threats variables from the 2009 and 2010 surveys. The software **PASW Statistic 18.0.1** was used. The major objective of these analyses was to establish possible relations between socio-economic and biodiversity threats variables, in order to know if the characteristics of the local population influence the use of the natural resources and the pressures to the biodiversity.

Simple Matching and Jaccard similarity indexes (Legendre & Legendre, 1998) were used to compare different binary variables from the 2009 and 2010 surveys. These variables

indicate the presence or absence of a particular activity or characteristic. Dendrograms were built with the information obtained from these analyses, using the UPGMA (Unweighted Pair Group Method with Arithmetic Mean) method.

Simple Matching and Jaccard indexes were computed for a total of 11 variables from the 2009 surveys. These variables were:

- Education: the interviewee had any degree of education.
- Children: the interviewee had children.
- Portuguese: the interviewee speaks Portuguese.
- Umbundu: the interviewee speaks Umbundu.
- Agriculture: the interviewee does agricultural activities.
- Animal: the interviewee breeds farm animals.
- Hunt: the interviewee performs hunting activities.
- Carpentry: the interviewee performs other economical activities, such as carpentry.
- Self-supply: the products from the economical activities are for the family self-supply.
- Commerce: the products from the economical activities are for sale.
- Burns: the interviewee performs burns.

For the 2010 surveys a total of 22 variables were analyzed with the above mentioned similarity indexes. These variables were related with activities that threat Mount Moco biodiversity, such as wood collection and hunting. These variables were:

- Places where the family collects wood for fire: Forest, Woodland and Grassland.
- Methods used to collect fire wood: wood in the ground, cut a tree and breaking branches.
- Places where construction wood is collected: Forest.
- Methods for obtaining construction wood: Cut tree and Buy.
- Animals hunted: hyrax, greater cane rat, Red necked francolin, common duiker, guinea fowl, Swierstra's francolin, Finsch's francolin and hare.
- Places where hunting activities are performed: Forest, Woodland and Grassland.
- Hunting method used: Traps and Dogs.

The Optimal Scaling method (Carvalho, 2008) was used to analyze different variables from the 2010 surveys (**Table 5**). These variables were related to biodiversity threat activities such as wood collection and hunting, as well as some general characteristics of the interviewee.

Table 5. Variables from the 2010 survey for the Optimal Scaling analysis. Information regarding the variables name, description and categories is presented. A total of 10 variables with 42 categories were used.

Variable Name	Description	Categories
Age	Age of interviewee	1) 15-19 years 2) 20-24 years 3) 25-44 years 4) 45-64 years 5) > 65 years
Gender	Gender of interviewee	1) Male 2) Female
Partner	If the interviewee has a partner	1) Partner 2) No partner
FW	Places where fire wood is collected	1) Only forest 2) Only woodland 3) Only grassland 4) Forest and woodland 5) Woodland and grassland
FW_Met	Method used to collect fire wood	1) Cut a tree 2) Wood from the ground 3) Cut a tree and cut off branches 4) Wood from the ground and cut off branches 5) Wood from the ground and cut a tree 6) Wood from the ground, cut a tree and cut from a tree already down
CW	Places where construction wood is obtained	1) Forest 2) Woodland
CW_Met	Method to obtain construction wood	1) Cut a tree 2) Buy 3) People give
H_Place	Places where hunting activities occur.	1) No hunting 2) Forest 3) Woodland 4) Other 5) Forest and woodland 6) Forest and other 7) Forest, woodland and grassland 8) Woodland and grassland
H_Freq	Frequency of the hunting activities	1) None (no hunting) 2) Weekly 3) Monthly 4) Occasionally
H_Met	Hunting methods used	1) No hunting 2) Dogs 3) Traps 4) Dogs and traps 5) Other

According to the following formula the maximum number of dimensions for this data set was calculated. This formula is applied when the number of cases is higher than the number of categories (Carvalho, 2008):

$$r_{max} = p - \max(m_1; 1)$$

r_{max} = maximum dimensions

p = number of categories

max(m₁; 1) = maximum number of variables with no missing values in their cases.

A preliminary Optimal Scaling analysis was performed with the maximum number of dimensions. The information obtained in this analysis together with the “Graphic of Inertias” allowed the selection of the optimal number of dimensions and a second Optimal Scaling analysis was performed with this amount of dimensions.

3.4. Inventory of existent tourist infrastructures

Information was collected using direct observations, internet sites and literature review, for Luanda and the two principal cities closer to Mount Moco: Benguela and Huambo. The information included GPS location and altitude of the cities, types and quality of lodging, different transportation to/from the city, communications including internet and postal offices, basic services such as water and electricity, banks and ATMs, places to eat and shop, health services, police and firefighters and any other important information concerning tourist infrastructures.

3.5. Proposal of an ecotourism project for the conservation of Mount Moco

3.5.1. Potential Clients

Information regarding potential clients for an ecotourism project in Mount Moco was collected through direct observations, internet sites and a literature review. Information regarding former visitors to Mount Moco was also compiled.

3.5.2. Competition

Possible competitors of an ecotourism project in Mount Moco were assessed through internet searches and a review of the literature. Information regarding the general characteristics and activities offered by these projects is presented.

3.5.3. SWOT Analysis

The acronym SWOT stands for Strengths, Weakness, Opportunities and Threats. It consists in a strategic planning method to assess the internal and external environment of a company or project (Böhm, 2009). The internal environment includes the strengths and weakness of the project such as capacity, human resources, product, quality, etc. The

external environment includes the opportunities and threats the project might face that do not depend on itself (Ferrel & Hartline, 2008).

While the internal environment of a project can be controlled and improved, no much control can be applied to the external environment, just preparation and monitoring. For this reason, the strengths of any project have to be maximized while their weakness reduced (Dantas & Sousa Melo, 2008).

Because of the characteristics previously mentioned, the SWOT analysis presents itself as an useful tool for managing and monitoring tourism in a particular area (Dantas & Sousa Melo, 2008).

In this study a SWOT analysis was used in order to assess the implementation of an ecotourism project in Mount Moco. The *Strengths* were defined as the strong points of the project; the *Weakness* were the issues that may affect the project's performance; the *Opportunities* were the events that could bring benefits in the future; and the *Threats* were the negative external events that may threaten the viability of the project (Hayward, 2002).

Each element recognized for the SWOT analysis was assessed for its magnitude and importance. The magnitude is the measure in which the particular element affects the project in a positive or negative way (Ferrel & Hartline, 2008). **Table 6** presents the different values used to assess the elements of the SWOT analysis (Gomez, 2008).

Table 6. Values for the magnitude of the SWOT Analysis. For strengths and weakness values were from 4 (extremely strong) to 1 (extremely weak). For Opportunities and Threats, values were from 4 (very favorable element) to 1 (very risky).

Strengths and Weakness	Value	Opportunities and Threats
Extremely strong	4	Very favorable
Strong	3	Favorable
Weak	2	Risky
Extremely weak	1	Very risky

The importance was evaluated as Low (1), Normal (2), High (3) and Very high (4). The importance refers to the significance of each element regarding the total elements in the analysis. For this reason, a weighted importance was calculated for each element with the values previously mentioned and the total value of all the elements.

The weighted importance and the magnitude give a weighted average for each element in the SWOT analysis. The sum of all these values gives a final result (equal or under 4) that

allows the classification of the project as an ideal competitive company (result = 4), an average company (result >2.5) and beneath average company (result <2.5) (Gomez, 2008).

3.5.4. The Ecotourism Project

With the information generated previously two models for an ecotourism project in Mount Moco were explained and their advantages and disadvantages discussed. Models were developed based on common ecotourism/development strategies available in literature (Heher, 2003; Tyynelä & Rantala, 2004). After a comparison, the best model was explained in more detail, together with information regarding the implementation and operation of the ecotourism project.

4. RESULTS

4.1. Inventory of Tourist Resources

Mount Moco presents a high tourist potential as a natural area, with interesting resources such as the biodiversity and scenery.

4.1.1. Avian Diversity and other animals

Mount Moco is considered an Important Bird Area (IBA) and forms part of the Western Angola Endemic Bird Area (EBA) (BirdLife, 2010b, 2010a). A total of 234 bird species has been recorded in the area, with 35 species restricted to the forest patches (Mills, *et al.*, *in press*) (**Appendix 9**, for complete bird species list).

This area is extremely attractive for bird-watching, as it has Angolan endemic species together with isolated bird populations classified as endemic sub-species or even considered by some ornithologists as endemic species (**Table 7**). Most of these species are easy to observe, including the *Pternistis swierstrai* believed to be extinct until its rediscovery in Mount Moco by Michael Mills.

Table 7. Common and scientific names of endemic species and subspecies in Mount Moco. In conservation status “EN” Endangered, “NT” Near threatened and “LC” Least Concern.

Common Name	Scientific Name	Status	Endemic
Swierstra's Francolin	<i>Pternistis swierstrai</i>	EN	Angola Endemic
Angola Cave-chat	<i>Xenocopsychus ansorgei</i>	NT	Angola Endemic
Angola Slaty Flycatcher	<i>Dioptrornis brunneus</i>	LC	Angola Endemic
Ludwig's Double-collared sunbird	<i>Cinnyris ludovicensis</i>	LC	Angola Endemic
Bronzy Sunbird	<i>Nectarinia kilimensis gadowi</i>	LC	Endemic subspecies
Margaret's Batis	<i>Batis margaritae margaritae</i>	LC	Endemic subspecies
Bocage's Akalat	<i>Sheppardia bocagei bocagei</i>	LC	Endemic subspecies
Grey Apalis	<i>Apalis cinerea grandis</i>	LC	Endemic subspecies
Ruwenzori Nightjar	<i>Caprimulgus ruwenzorii koesteri</i>	LC	Endemic subspecies
Evergreen Forest Warbler	<i>Bradypterus lopezi boultoni</i>	LC	Endemic subspecies
African Hill Babbler	<i>Pseudoalcippe abyssinica ansorgei</i>	LC	Endemic subspecies
Western Tinkerbird	<i>Pogoniulus coryphaeus angolensis</i>	LC	Endemic subspecies
Wailing Cisticola	<i>Cisticola lais namba</i>	LC	Endemic subspecies
Swee Waxbill	<i>Estrilda melanotis bocagei</i>	LC	Endemic subspecies
Yellow-crowned Canary	<i>Serinus flavivertex huillensis</i>	LC	Endemic subspecies
Black-faced Canary	<i>Crithagra capistrata hildergardae</i>	LC	Endemic subspecies
Mountain Wheatear	<i>Oenanthe monticola nigricauda</i>	LC	Endemic subspecies
Rock-loving Cisticola	<i>Cisticola emini bailunduensis</i>	LC	Endemic subspecies

Different mammals have been observed in Mount Moco, such as the hyrax (*Procavia sp.*), greater cane rat (*Thryonomys swinderianus*), reedbuck (*Redunca fulvorufula*) and common duiker (*Sylvicapra grimmia*).

Little information is available regarding other animal groups in Mount Moco. Nevertheless reptiles, amphibian and arthropod communities in the area are expected to be of high biogeographic interest and need to be further surveyed.

A series of investigations had and are taking place in order to survey and record the mammals, insects and plant diversity in the area, as well as the density and diversity of birds in the forest patches.

4.1.2. Forest Patches

Mount Moco area has forest patches in the deep ravines of the mountains slopes. The forests have considerable canopies, within 10 to 15 meters and they allow the existence of the remarkable biodiversity in the area, and constitute therefore the foremost attraction from a biodiversity perspective. They are particularly important for birds dependent on this habitat for their survival. For this reason, these forest patches are an excellent destination for birdwatchers.

The biggest patch, known as Luanda, is located at approximately a four-hour walk from Kanjonde village and has an area of 20 ha. Because of its location far away from the village, this patch has not suffered the same degree of degradation than the other patches, especially the ones closer to Kanjonde. Nevertheless wood for construction is still obtained from this patch, as it has the taller trees.

In the forest patch closer to Kanjonde village, a nursery has been installed in order to grow natives trees for reforestation. A group of young and motivated villagers has been trained and hired for taking care of the plants in the nursery (**Figure 4**). The nursery can become a point of interest for any person visiting the area. It presents a conservation initiative and a unique opportunity to learn about plant species and ecological processes. Also, in the forest patch where the nursery is located, it is possible to observe most of the bird species of interest in Mount Moco.



Figure 4. (a) and (b) Kanjonde's villagers planting seeds and seedlings for the nursery.

4.1.3. Hiking routes

Mount Moco presents breathtaking scenery and the opportunity to perform interesting hiking routes. The area has many trails used by the local population. None of these trails are properly marked or have indications regarding their destinations. Also, in order to get to some points of interest (e.g., Mount Moco summit) no marked trails are available and some of the hiking has to be done through rough terrain. In particular, some hiking routes are quite strenuous because of the steep and rocky terrain – characteristics that nevertheless appeal to a specific niche of tourists: experienced hikers wanting to explore the least traveled paths.

Potential hiking routes are proposed in order to visit different points of interest in Mount Moco (**Figure 5**). The hiking routes were given the name of their destinations and their distance is measured from Kanjonde village. Some of these hiking routes are a combination of trails used by the local population and of unmarked terrain. Even in these cases they are here called 'trails', since an eco-tourism project could involve the local community in building and maintaining hiking trails where none are currently present.

The **nursery trail** is 800 meters long and takes around 30 minutes to take you from Kanjonde village to the forest patch where the nursery had been installed. The trail is slightly steep as it requires walking up the mountain into the forest patch. *Pternistis swierstrai* had been observed in this forest as well as other interesting bird species.

The **pool trail** is a 2.65 km trail that takes to a natural pool formed by the river. The trail passes through farms and two extremely reduced and damaged forest patches. Different bird species can be observed during the hike as well as some typical crops of the area.

The **viewpoint trail** allows you to get to a natural viewpoint at 2460 meters over sea level. Even though this is not Mount Moco summit, spectacular scenery in all directions can be enjoyed from this point. With a distance of 2.55 km from the village, the hiking can be quite demanding because of the steep terrain, but it is worthy in order to see great scenery. This trail is also of great value from a biodiversity perspective as it allows visiting three distinct habitats, each with different sets of species: a very interesting section of miombo woodland, an Afromontane forest patch, and montane grasslands with rock outcrops.

The **Luanda trail** leads to the biggest forest patch in Mount Moco. The trail is 3.60 km long (from Kanjonde village) and considerably steep. Access to the forest is particularly difficult, and the creation of a proper trail should be envisioned in an ecotourism project. In this forest it is possible to see all of the endemics birds of the area, including *Pternistis swierstrai*.

The elevation profiles of the four trails are presented in **Figure 6**.



Figure 5. Potentials hiking routes for Mount Moco area. In green is the nursery trail. Purple is the pool trail. The viewpoint and Luanda trail are marked in yellow (*adapted from Google Earth*).

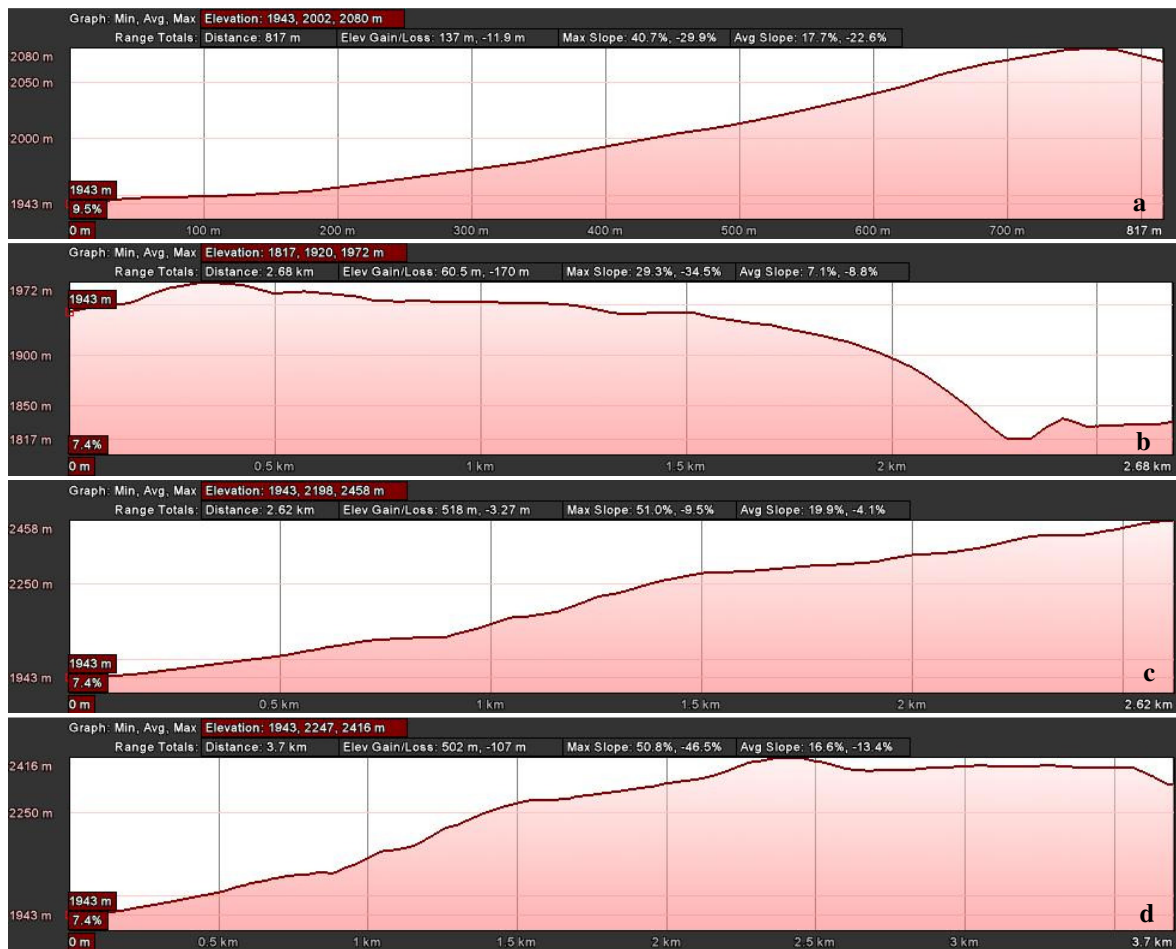


Figure 6. Elevation profiles for the trails (one way) in Mount Moco. (a) Nursery Trail, (b) Pool Trail, (c) Viewpoint Trail and (d) Luanda Trail. The profiles present information regarding distance, average and maximum slopes and different elevations through the trail's route (obtained using Google Earth options).

4.1.4. Mount Moco Summit

The Mount Moco summit is the highest point in Angola with 2620 meters over sea level. In order to get to this point a hike of approximately 6.5 km has to be performed. Even though part of the hiking is performed using existent trails, most of the hiking route is done over unmarked terrain. The hike can be quite demanding but the scenery along the way is spectacular. The hiking route will take you through grassland, rivers (where bathing in natural pools and small waterfalls is possible), miombo woodlands and forests, making it of great botanical interest. Due to its relative remoteness, it is possible to observe some of the larger mammals in the area such as reedbeek (*Redunca fulvorufula*) and klifspringer (*Oreotragus oreotragus*). The diversity of habitats visited allows for a very rewarding birdwatching experience.

4.1.5. Classification and Evaluation of Tourist Resources

In **Table 8** is presented the classification and evaluation of the tourist resources in Mount Moco.

Table 8. Classification and evaluation of tourist resources in Mount Moco. Resources were classified according to the types, subtypes and hierarchies established by the OEA. An evaluation regarding the principal characteristics of the resources were performed, obtaining a general qualification for each resource

RESOURCES	Mount Moco Summit	Natural Pool	Forest Patch (Nursery)	Forest Patch (Luanda)
Category	Natural Sites	Natural Sites	Natural Sites	Natural Sites
Type	Mountains	Rivers	Mountains	Mountains
Sub Type	Mountain Range	-	Forests	Forests
Hierarchy	4	1	2	3
Singularity	<i>Unique (3)</i>	<i>Very common (0)</i>	<i>Rare (2)</i>	<i>Rare (2)</i>
Attractiveness	<i>Very good (2)</i>	<i>Normal (0)</i>	<i>Good (1)</i>	<i>Very good (2)</i>
Conservation condition	<i>Good (2)</i>	<i>Good (2)</i>	<i>Good (2)</i>	<i>Good (2)</i>
Actual use	<i>Sometimes (2)</i>	<i>None (0)</i>	<i>Very rare (1)</i>	<i>Very rare (1)</i>
Accessibility	<i>Very difficult (0)</i>	<i>Difficult (1)</i>	<i>Normal (2)</i>	<i>Difficult (1)</i>
Setting Conservation	<i>Good (2)</i>	<i>Normal (1)</i>	<i>Bad (0)</i>	<i>Good (2)</i>
Seasons	<i>2 seasons (2)</i>	<i>2 seasons (2)</i>	<i>2 seasons (2)</i>	<i>2 seasons (2)</i>
Target public	<i>Many (2)</i>	<i>Very few (0)</i>	<i>Some (1)</i>	<i>Many (2)</i>
TOTAL	15	6	10	14
General Qualification	Very good	Normal	Good	Very Good

Even though avian diversity is considered as a high value tourist resource for Mount Moco, it was not considered separately in this evaluation. The methods used evaluated resources as a place, with a specific location. The biodiversity of Mount Moco was included as an intrinsic value of each of the resources evaluated (e.g., avian diversity increased significantly the value of the forest patches).

Although different forest patches are present in Mount Moco, only the nursery and Luanda patches were evaluated as separate resources. This was done because these forest patches differed significantly in respect to the accessibility and conservation state.

The results of the general qualification show that the Mount Moco summit and the Luanda forest patch are considered as 'very good' resources, whereas the Nursery is considered a 'good' resource.

4.2. Social and economic description of the local population

4.2.1. General Information

The Kanjonde community is made of just over c. 300 people. In 2009, surveys were conducted in 59 households (very close to the total number) to which 312 persons were associated. In 2010, 49 households, representing 260 persons, were surveyed.

Gender distribution is balanced, with slightly more females than males (males 48.46% and females 51.54%, N=260 persons, **Table 9**). The sex ratio was therefore very similar to that projected for 2010 for the whole country by the United Nations (males 49.30% and females 50.70%) (UN, 2009). Most of the population is made by the younger age classes, from 0 to 14 years (total of 54.23%, N=260 persons) while a very low percentage has ages over 65 years (**Table 9**).

An average of three children are present in each household (3.07 ± 1.25 children, N=46 interviewees).

Umbundu is the first language of Kajonde spoken by almost everyone with Portuguese as a second language for about 40% of the population (**Figure 7**). Umbundu is the language of the region, used for everyday communication. Portuguese is usually only learnt in school.

Most people in Kajonde are illiterate (61.02%, N=59 interviewees), with most of those attending school rarely going above the 3rd grade (**Figure 8**).

Table 9. Age groups and gender composition in Kanjonde village. Information was taken from the 2010 survey (N=260 persons).

Age Class	Male	Female	Total
From 0- 4 years.	9.62%	15.38%	25.00%
Youth 5-14 yr.	15.77%	13.46%	29.23%
Young Adulthood 15-24 yr.	8.08%	8.08%	16.15%
Middle Adulthood 25-44yr.	11.54%	11.54%	23.08%
Older Adulthood 45-64yr.	1.15%	2.31%	3.46%
Retirement > 65 yr.	2.31%	0.77%	3.08%
TOTAL	48.46%	51.54%	100.00%

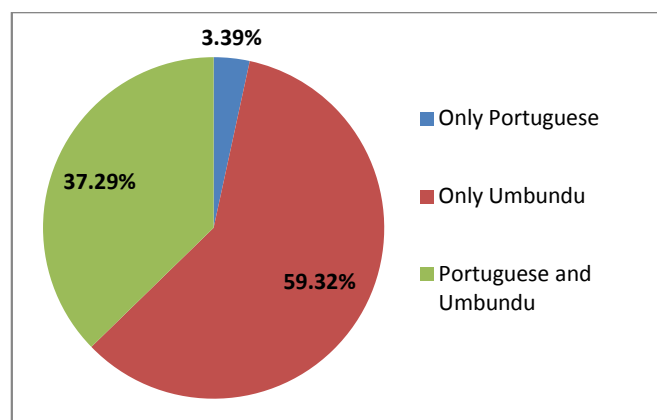


Figure 7. Percentage of people speaking “Only Portuguese”, “Only Umbundu” or “Portuguese and Umbundu” in Kanjonde (N=59 interviewee, which represents in the 2009 survey approximately 20% of total population in Kanjonde village).

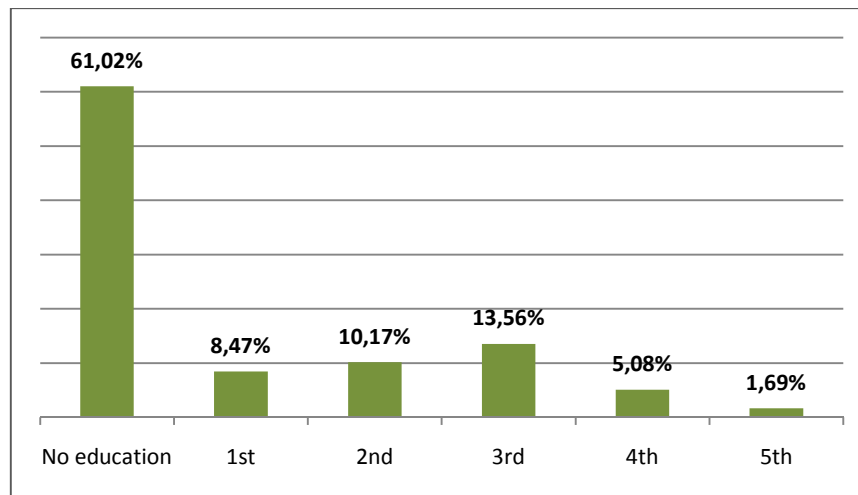


Figure 8. Degree of education in Kanjonde population. Most of the villagers have no education, while the rest only manage to go from the 1st to the 5th grade of elementary school (N=59 interviewees).

4.2.2. Village infrastructures and services

Kanjonde is the only village in the area surrounding Mount Moco with access to the forests. The village is located at 12° 25' 41.23" S, 15° 9' 9.80" E. At an altitude of 1938 m (**Figure 9**), it is the highest village in Angola.

Access to Kanjonde is done through a dirt road of 12 km departing from the outskirts of Usoque, a town located in the main asphalted road that goes from Wama to Lobito. The nearest cities to Kanjonde village are Balombo, 30 km west of Usoque, and Lumdibali, 25 km east of Usoque (**Figure 10**). A high-clearance vehicle is necessary to negotiate the 12 km dirt road; four-wheel drive is likely to be essential during the raining season. Duration of the drive can take anything between 40 min and 1.5 hours, depending on the seasonal conditions of the road.

Houses are built with adobe walls, wooden windows and doors, and metal sheet or thatched roofs (**Figure 11a**). No sewage or drinking water system is available in Kanjonde. People gather water from streams and rivers, being this activity exclusively performed by women and children. There is no electricity in the village and people use wood as fuel. Nevertheless, since 2010, one single house in the village had a generator and a satellite TV disk (**Figure 11b**). Most of the time this house was closed and with no one there. Neighbors stated that the owner lives in Usoque.

The village does not have any telephone or other communication systems (e.g., radio) but cell phone signal from Usoque antenna of the Angolan company UNITEL reaches the village.

A school is being built in the village (**Figure 12a**), but meanwhile children receive classes in the Catholic Church (**Figure 12b**). One single teacher gives classes simultaneously to the 1st, 2nd and 3rd grade of elementary school. Over 80 children from 5 to 16 years attend classes, but many others do not. In order to continue studies further than 3rd grade, children have to go to Usoque. Only the children with family in Usoque will continue studying because going there by foot takes three hours each way.

The village has no doctor, nurse or health center. The only way to get treatment for a disease is to go to the health center in Usoque or to the hospital in Balombo.

The village has a Catholic and an Adventist Church (**Figure 13**).

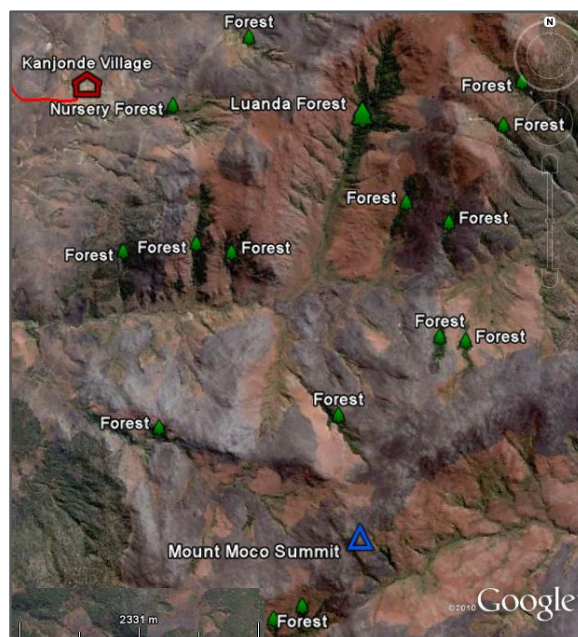


Figure 9. Kanjonde village and Mount Moco area. Mount Moco summit and forest patches are marked in the map, including the biggest patch Luanda (adapted from Google Earth).

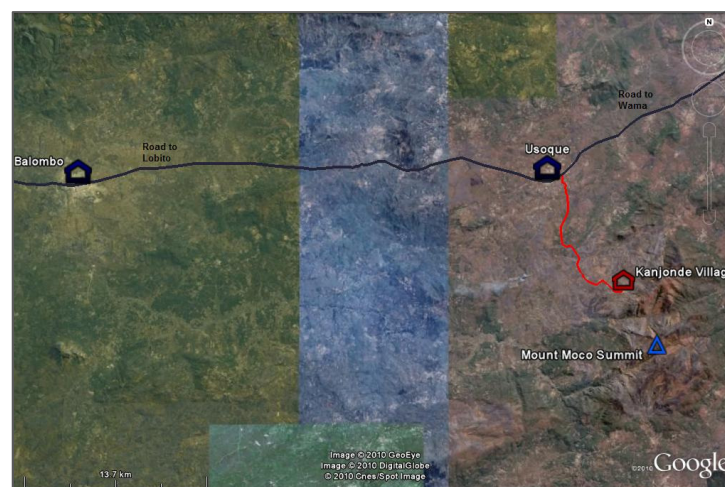


Figure 10. Location of Balombo and Usoque regarding Kanjonde village (adapted from Google Earth).



Figure 11. (a) Adobe blocks for construction in Kanjonde. (b) House with thatched roof and satellite TV disk.



Figure 12. (a) Construction site for Kanjonde school (b) Children attending class in the Catholic church of Kanjonde.



Figure 13. (a) Catholic church. (b) Interior of Adventist church.

4.2.3. Economic activities and population needs

Everyone in Kajonde farms the land, with c. $\frac{3}{4}$ of the population also rearing livestock. About 15% percent engages in hunting, and only one person performs other activities such as carpentry (**Figure 14**).

The principal crops are corn, beans and potatoes (26.22%, 23.11% and 20.89%, N=221 responses, as one interviewee can grow more than one crop). Corn is the most important part of the diet of the local population, as it is pounded into flour used to prepare “fuba” the principal part of a meal. Others crops grown in the area but in low scale are cabbage, onion, garlic, and fruit trees such as lemon, loquat and avocado (**Figure 15**). The principal livestock are chickens and goats (49.37% and 27.85% respectively, N=79 responses). Other animals include pigs, cows, rabbits and ducks (**Figure 16**).

The output of the different economic activities are mostly used for self-supply and for commerce (61.40%, N=57 interviewees). Nevertheless, more than c. $\frac{1}{3}$ of the population farms exclusively for subsistence (36.84%, N=57 interviewees). Only one person expressed that all his production was for selling.

The products most sold were beans, potatoes and corn. These results were the same for the surveys performed in 2009 and 2010 (**Figure 17**). Products more bought were salt, soap, cooking oil and clothes (**Figure 18**).

Kanjonde population usually sells their products in Usoque’s market. This market is very small and has a very limited variety of products. Occasionally people from Kanjonde travel to Balombo in order to buy or/and sell products. Balombo’s market is bigger and has more products but even though it is separated from Usoque by almost 30 km, prices are quite similar in both places (**Appendix 10**).

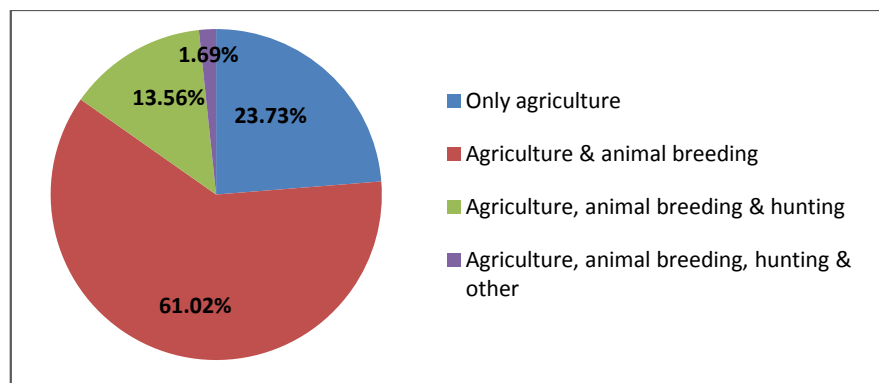


Figure 14. Different economic activities in Kanjonde. All the population does agriculture, and some of them combined it with other activities such as animal breeding, hunting and carpentry (N=59 interviewees).

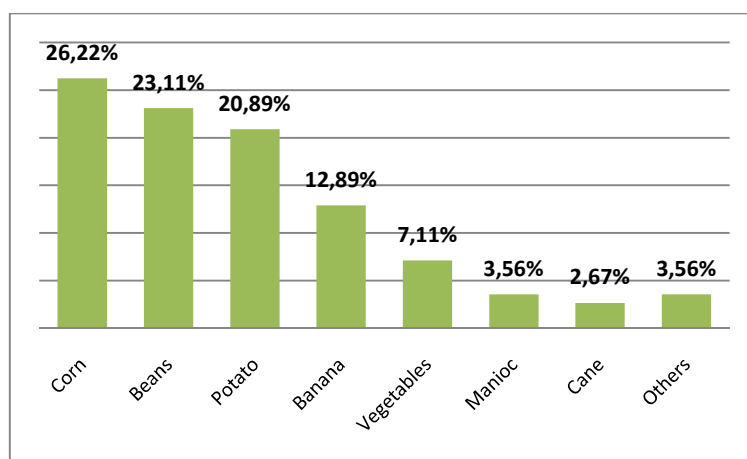


Figure 15. Different crops grow by Kanjonde population. Most families grow different crops. Corn, beans and potatoes are the principal crops (N=221 responses).

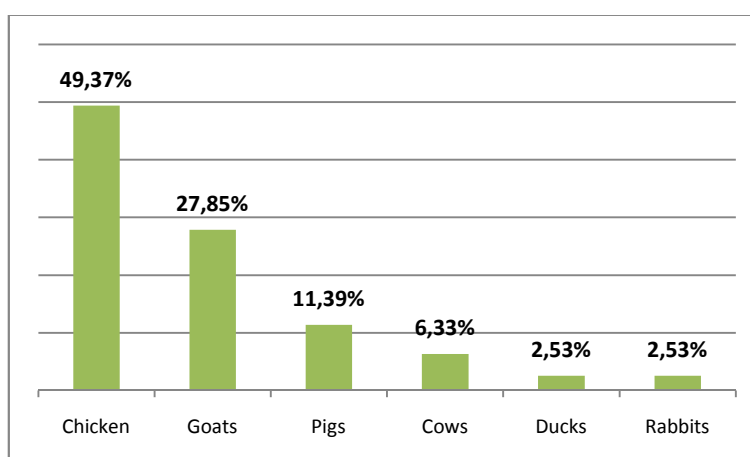


Figure 16. Animals bred by Kanjonde population. Most families can breed different animal species. Chickens and goats are the most common (N=79 responses).

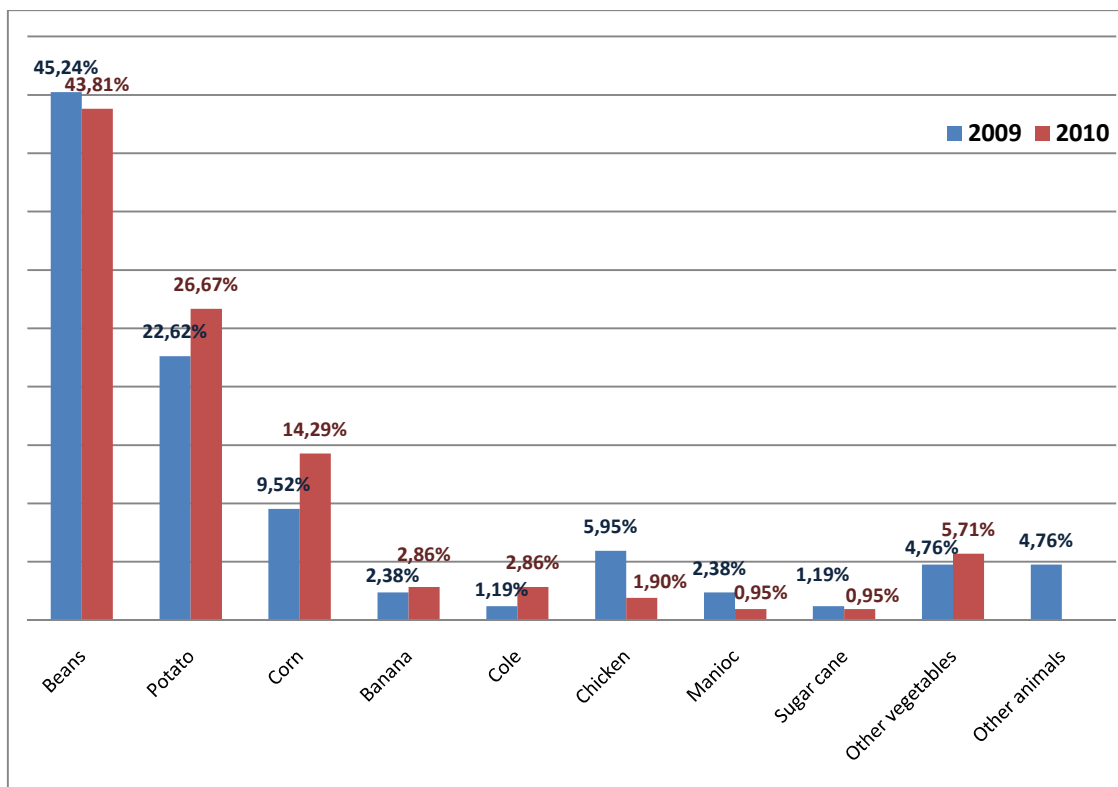


Figure 17. Products sold by Kanjonde population in 2009 (N=84 responses, as one person can sell more than one product) and 2010 (N=105 responses). The “other vegetables” category includes onions, tomatoes, garlic, etc. The “other animals” includes goat, pig and ducks.

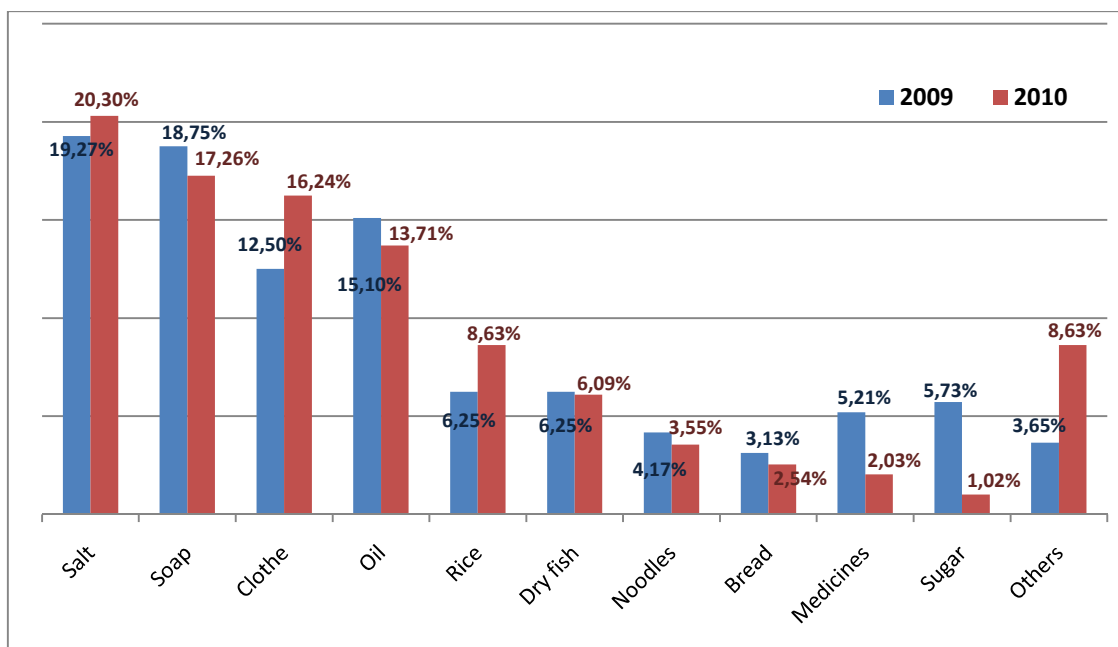


Figure 18. Products bought by Kanjonde population in 2009 (N=192 responses, as one person can buy more than one product) and 2010 (N=197 responses). The “others” category includes shoes, fuel, blankets and cooking utensils.

4.3. Evaluation of the principals threats to biodiversity

Three activities were identified as major threats to the natural environment at Mount Moco area: wood collection, hunting and intentional burns. All these activities were assessed and described during the study.

4.3.1. Wood collection and forest use

From field observations and informal conversations with the local population it was possible to determine that Kanjonde villagers use wood for two principal motives: fire-wood for coking and construction wood for the framing of doors and windows in their houses. For this reason these two activities were especially surveyed during 2010.

In Mount Moco area, wood collection for cooking and heating is extremely important for survival as the local population does not have access to other fuel alternatives. Women and/or children collect fire-wood around four times per week (2009 survey 3.97 ± 1.57 , 2010 survey 3.74 ± 2.06 , **Appendix 11** and **Appendix 12**). Personal observations indicate that this frequency depends on the amount of wood women can carry and also on particular circumstances. For example, younger women are able to carry more weight, whereas older women or women carrying children or tools have to make more wood-collecting trips. Additionally, many women pick up wood on their way back from the farm, taking small amounts more often. Women carry one pack of wood per trip and the weight of this pack can differ greatly from one person to another. A total of 20 fire-wood packs were weighted. The mean weight of these packs was 13.75 ± 7.25 Kg, with a maximum weight of 28 Kg and a minimum of 5 Kg (**Appendix 13**).

Most of the local population picks up firewood exclusively in woodlands or a combination of woodlands and forests (48.98% and 26.53% respectively, N=49 interviewees, **Figure 19**). Woodlands larger are nearer to the village than the forests, but at the same time the competition for the resource may be higher in this place because wood collection here is easier (i.e., no need to cut if you go early). This encourages some persons to go to the forests even though these are further away from the village, and has even made some of them specialized in collecting wood from the forest (only forests 18.37%, N=49 interviewees) in order to avoid competition. A small number of people collect firewood in the grassland. This situation was registered with older persons that were not able to walk to the woodland or forest.

Most of the fire-wood is obtained by cutting down a tree (66.13%, N=62 responses, **Figure 20**). Once the wood is dry, the tree is gradually chopped *in situ* according to need.

People will avoid chopping a tree that was not cut by them, as they respect very seriously the property of other members of the community.

Wood for construction is almost exclusively collected from the forests (95.24%, N=42 interviewees, **Figure 21**). In order to build door and window frames the wood has to be long and for this reason only obtainable from tall trees like the ones present in the forests patches.

People will usually cut down a tree in order to obtain wood for construction (85.71%, N=49 responses, **Figure 22**). Nevertheless they indicated that the construction of doors' and windows' frames was performed by people of other villages as they do not have anyone in the area with this skill. When building a new house, they will re-use the doors and windows of the old house instead of going to the forest to get more construction wood. The "other" method is for one particular situation where wood for construction was given from people of the community to two old women who are incapable of getting their own construction wood. These ladies did not know exactly how this wood was obtained.

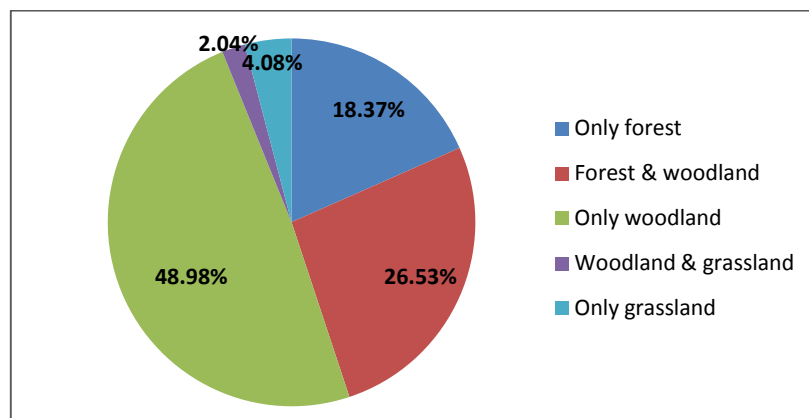


Figure 19. Habitats where the local population goes to pick up fire-wood (N=49 interviewees).

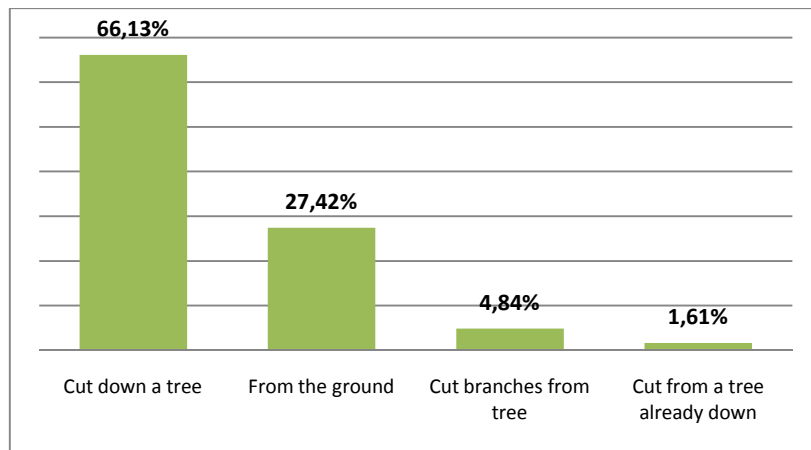


Figure 20. Fire-wood collection methods used by the population of Kanjonde (N=62 responses, as one interviewee might use more than one method).

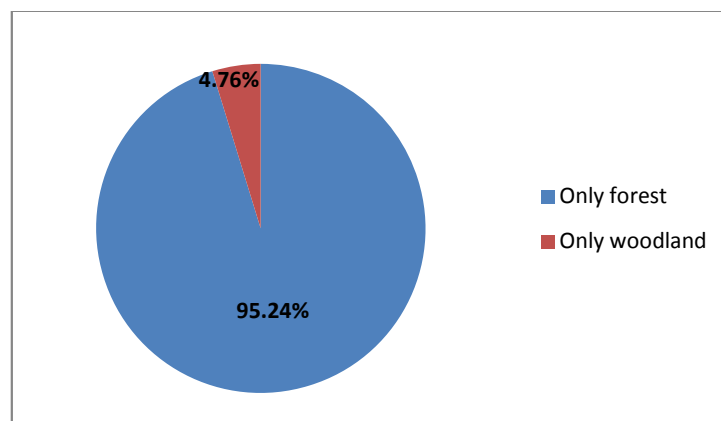


Figure 21. Habitats where local population look for construction wood (N=42 interviewees, as some of them gave no answer).

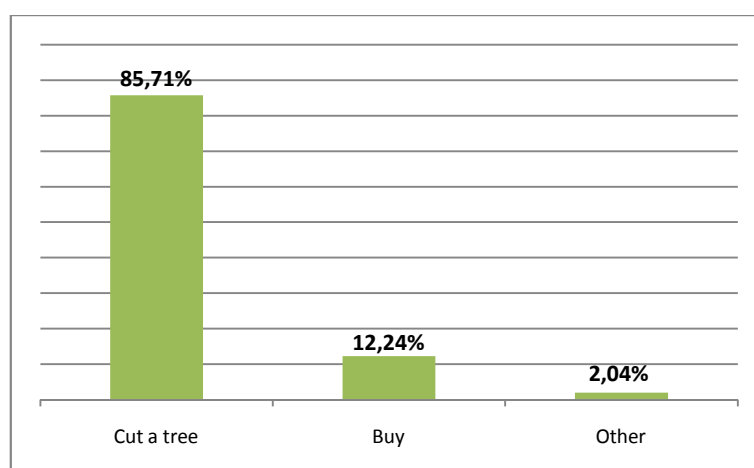


Figure 22. Construction wood collection methods used by the population of Kanjonde (N=49 responses, as one interviewee use only one method).

4.3.2. Hunting

During the 2010 surveys, 42.86% (N=49 interviewees) of the interviewees expressed that they hunt in the Mount Moco area. These results were higher than the ones obtained for 2009, where only 15.25% (N=59 interviewees) of local people performed hunting activities. Wrongly interpreted, these results could indicate that the hunting activities in the area had increased sharply in the last year, when in fact it just reflects different survey designs. As mentioned before, local people may lie in regard to their hunting activities, as they know it is often not approved by outsiders, especially foreigners studying the biodiversity of the area. In 2009, hunting was presented within a list of different economic activities, whereas in 2010 surveys were specifically designed and conducted in order to retrieve information on hunting.

There are no exclusive hunters in Kanjonde, as they perform other activities (e.g., agriculture) as their main economic activity. People hunt in order to get some protein in their diets, as can be shown by the fact that, in most cases, preys are for own consumption (85.71%, N = 21 interviewees). Less than 5% of hunters do it exclusively to sell the bushmeat. Although, no much time is dedicated to this activity, hunting is a regular component of most people's (men) time budget, performed on a weekly basis (generally on Saturdays) by more than 60% of the interviewees (**Figure 23**). For about ¼ of the interviewees, hunting is done occasionally (less than monthly) whenever the need for bushmeat arises; no one hunts on a daily basis (**Figure 23**).

The most frequently hunted preys were the red-necked Francolin (*Francolinus afer*) and the greater cane rat (*Thryonomys swinderianus*) (18.60% and 16.28% respectively, N=86 responses, **Figure 24**).

Interviewees were able to recognize different animals in the identification plates even when the pictures were similar. This was demonstrated by the fact that they gave correct details regarding the habitats preference of the animals (e.g., *Pternistis swierstrai* being more present in forest and *Francolinus afer* in open areas).

Almost half of the hunters either hunt in "forest and woodland" or in their farm plots, when animals attack the crops. Close to a fifth hunts only in the forests, which is the most important hunting ground, being used by ⅓ of the hunters, followed by the woodland, used by c. 42% of the hunters (**Figure 25**).

Almost all hunters use traps and/or dogs for hunting. Only one person mentioned to throw rocks to the preys (**Figure 26**). “Guns” are not used as they are not available, most of them were confiscated by the government when the civil war ended, and munitions are expensive. Hunting dogs are mostly used in the forests, where access is difficult and limited. They usually capture hyraxes (*Procavia sp.*). Traps are used to capture francolins and greater cane rat (*Thryonomys swinderianus*) (**Figure 27**). Hunters are not selective or specialized, as they do not go after one particular prey. Nevertheless, as the forests are both the preferred hunting ground and the habitat of the Swierstra's francolin (*Pternistis swierstra*), this endangered bird species is hunted (8.14%, **Figure 24**). One hunter reported having hunted one during our fieldwork, but this could not be verified.

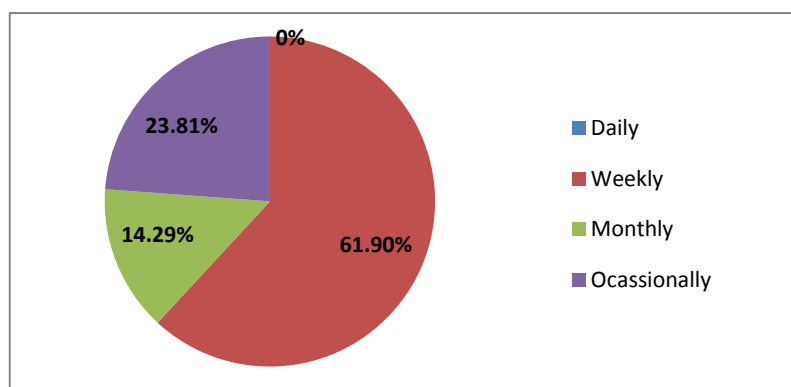


Figure 23. Hunting frequency of Kanjonde population (N= 21 interviewees).

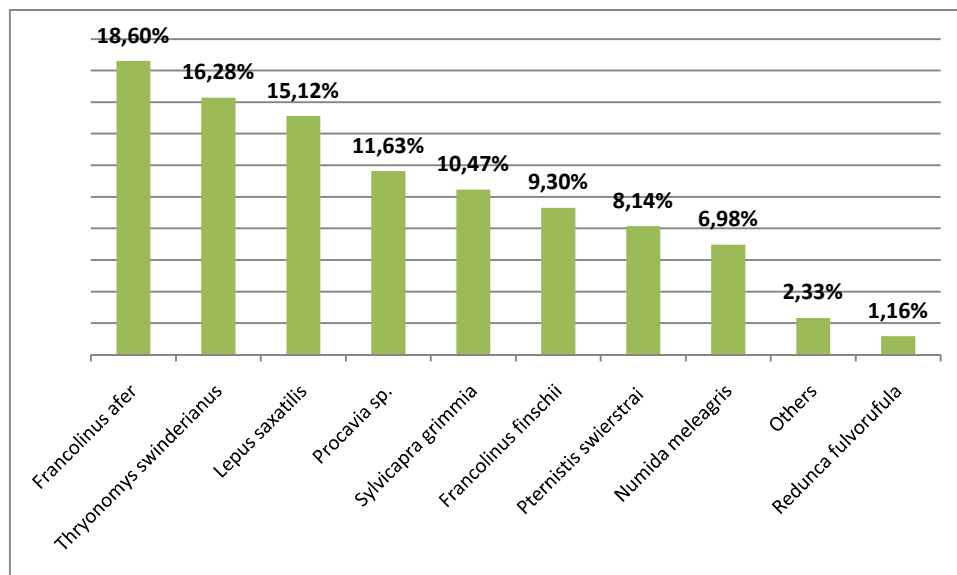


Figure 24. Species hunt in Mount Moco Area. (N=86 responses, as one person hunts different animals).

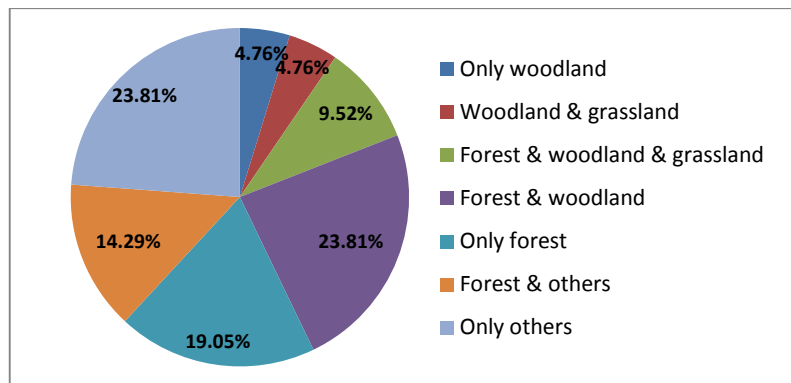


Figure 25. Places where hunting activities take place in Mount Moco (N=21 interviewees). A combination of different habitats types are used for hunting.

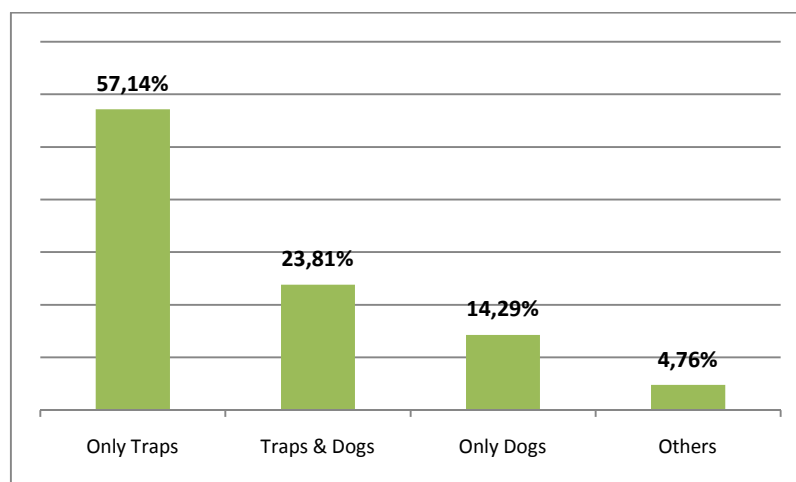


Figure 26. Hunting methods in Kanjonde population (N=21 interviewees).



Figure 27. (a) *Thryonomys swinderianus* captured with trap. (b) Trap in detail.

4.3.3. Fire regime (Burns)

Most of the Kanjonde population performs burns (84.48%, N=58 interviewees). Having no access to fertilizers, burning the fields after harvest is a widespread practice with the aim of improving soil quality (87.76%, N=49 interviewees doing burns). Burning is also done as an easy way to clear the fields and also the overgrown areas on the way to the farm plots, wood collecting areas and hunting grounds. These uncontrolled burns often turn into big wildfires that can reach the forests patches – such event was observed in the 2009 field season, and can be seen in the scars surrounding the forests and in the burnt stumps inside them. Burns are performed especially in the dry season, from May to September, being June the month in which most burns occur (32.99%, N=97 responses, **Figure 28**). Satellite's imagery for 2009 clearly illustrates that fires in Angola peak during the dry season, from April to September (**Figure 28**).

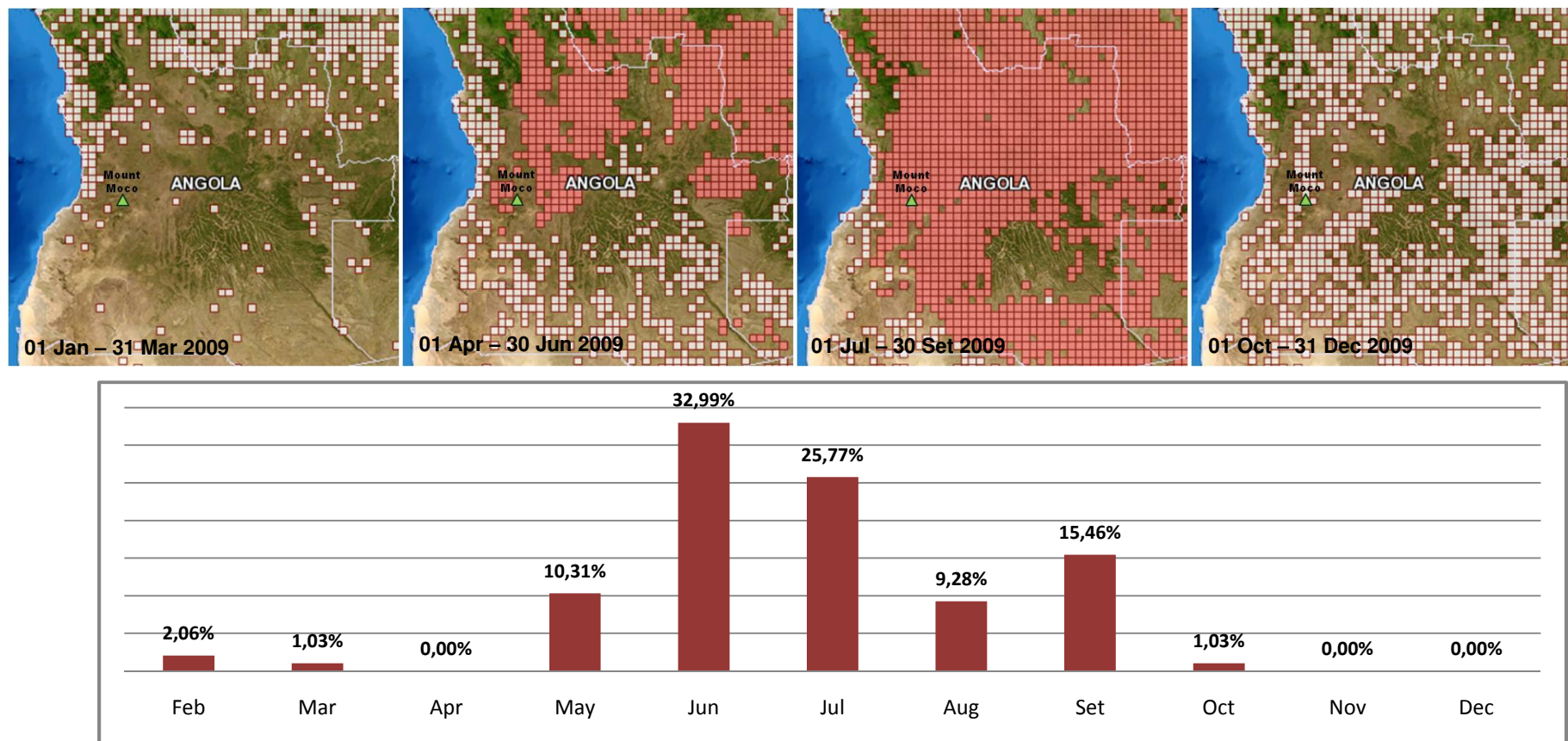


Figure 28. Satellite imagery from Web Fire Mapper with the numbers and location of fires in Angola during 2009. Mount Moco area is marked with a green triangle. Pixels from the grid have a size of 1 km² and each color represents the number of fires (white <10 fires; pink 101-1000 fires). Most fires are registered from April to September. The same pattern applies to Kajonde, where burns start in May, peak in June-July and are mostly over by the end of September, (bottom histogram, N=97).

4.3.4. Statistical analyses of socio-economic variables

The dendrograms corresponding to the similarity matrixes obtained with the Simple Matching (**Figure 29**) and the Jaccard indexes (**Figure 30**) indicate three groups for the variables of the 2009 surveys.

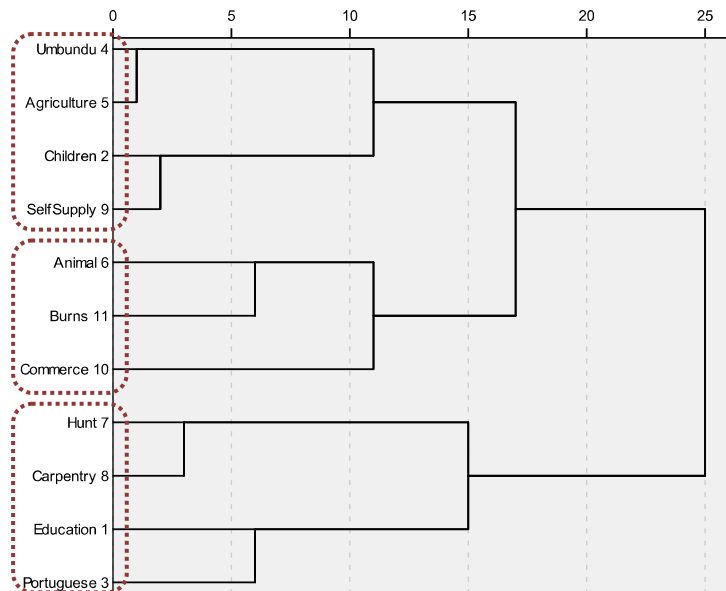


Figure 29. Dendrogram for the 2009 surveys variables. The dendrogram corresponds to a similarity matrix obtained with the Simple Matching index. Three groups of variables can be recognized in this dendrogram.

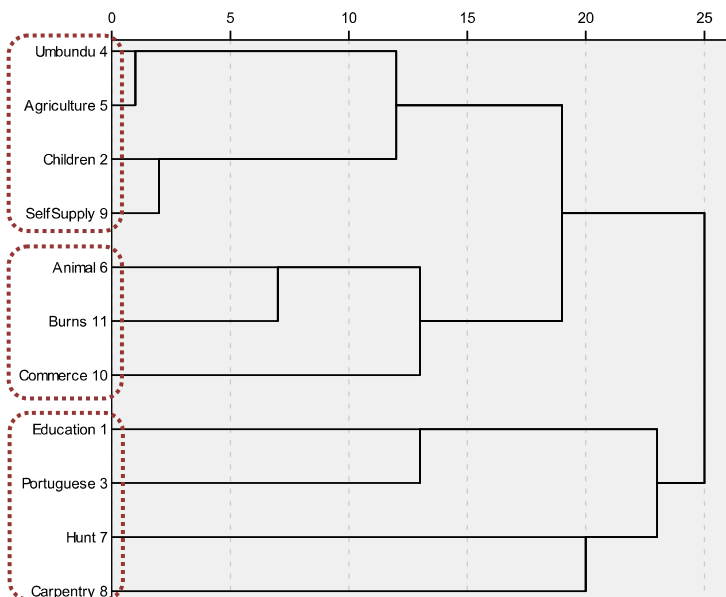


Figure 30. Dendrogram for the 2009 survey variables. The dendrogram corresponds to a similarity matrix obtained with the Jaccard index. Three groups of variables can be recognized in this dendrogram.

The first group is formed by the variables Umbundu, Agriculture, Children and Self-Supply. The variables Animal, Burns and Commerce make the second group. Finally, the third group is formed by the variables Hunt, Carpentry, Education and Portuguese. The education is directly related to the capacity of speaking Portuguese, as this language is learned in the school.

Even though burns have an agricultural purpose, they can also be related with the intention of local population of generating pastures for their animals, this could explain the relation between the variables burns and animal breeding. Also, most of the animals bred in the area are commonly used for commerce, explaining the possible inclusion of the variable commerce in this group. Most of the activities in this area are for subsistence, so it was expected that agriculture would be related to self-supply. Also, most Umbundu speakers are probably in disadvantage for selling their products, as markets are next to the roads, and travelers passing by usually speak Portuguese. This could explain the relation between the variables Umbundu and Self-supply.

In **Figure 31** and **Figure 32** the dendrograms for the variables of the 2010 surveys based on simple matching and Jaccard indexes respectively. Different groups of variables are suggested by these two dendrograms. However the variables Fire-wood Cut tree, Construction-wood Forest, Fire-wood Woodland and Construction-wood Cut tree form a group in both dendrograms. Construction wood is usually obtained from the forests by cutting trees. The same method is used to collect fire wood in the woodlands surrounding Kanjonde village.

A group is also formed by Fire-Wood Ground and Fire-wood Forest. It is very difficult to explain the relation between these variables, as it was expected that fire wood collected in the forest would be by cutting a tree and not by picking up wood from the ground. Nevertheless, some people mentioned that the wood usually collected from the ground was from burned areas, some of them probably forests.

Regarding hunting activities, according to the simple matching index most of the preys cluster with forest and traps, although, unexpectedly the forest-restricted Swierstra's francolin is excluded from this group (**Figure 31**). The Jaccard index does place this species within the forest cluster, which also includes dogs, used to hunt fast moving preys in areas of difficult access (**Figure 32**).

Some relations can be observed between some variables that formed different groups in the two dendrograms (**Figure 31** and **Figure 32**) like Hyrax and Hunting in Forest, and Duiker and Hunting with Traps. The hyrax (*Procavia sp.*) can be related with hunting in the forest, because even though this species is not exclusive from this habitat, it can probably be hunted in this area using dogs, as mentioned before. It is also probable that the common duiker (*Sylvicapra grimmia*) is hunted using traps rather than dogs.

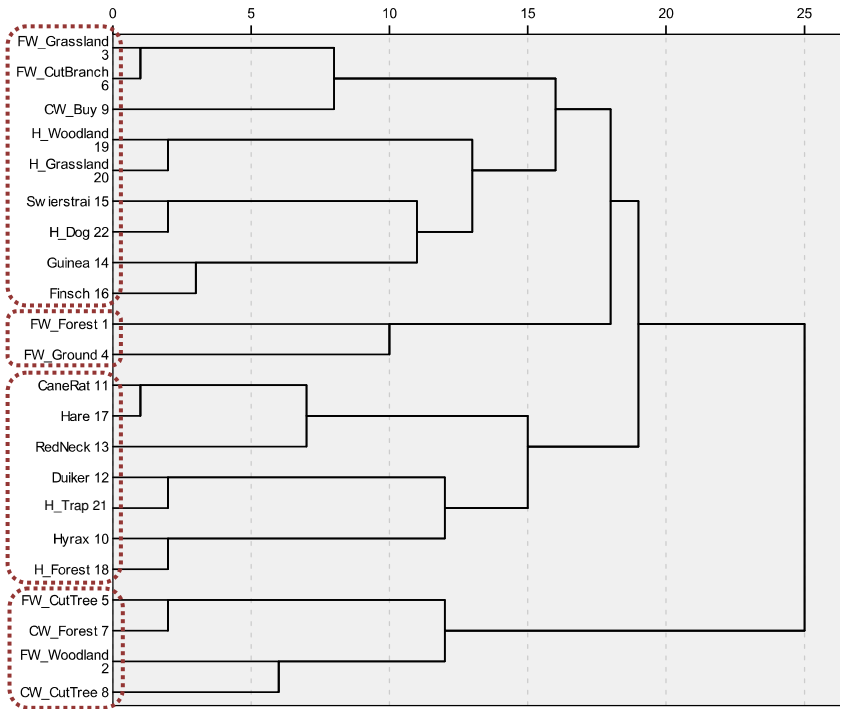


Figure 31. Dendrogram for the 2010 surveys variables. The dendrogram was built from a similarity matrix obtained with the Simple matching index. Four groups of variables can be recognized in this dendrogram.

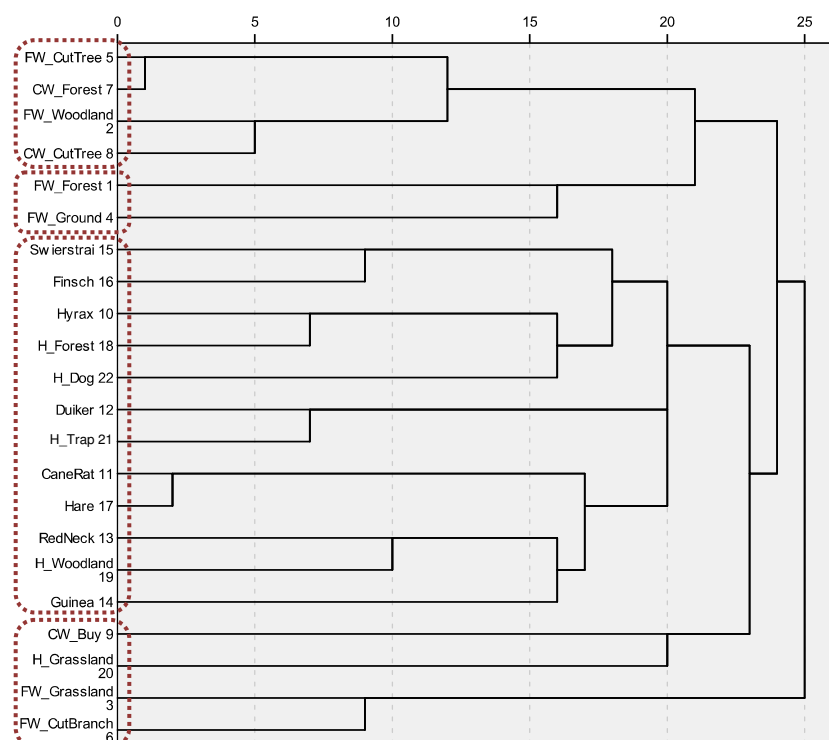


Figure 32. Dendrogram for the 2010 surveys variables. The dendrogram was built from a similarity matrix obtained with the Jaccard index. Variables were grouped in four groups in this dendrogram.

A total of 33 dimensions were calculated for the 2010 surveys data set with the Optimal Scaling method (**Appendix 14**). Nevertheless the Graphic of Inertias (**Figure 33**) indicated that three dimensions were the most significant.

The Optimal Scaling analysis for three dimensions (**Appendix 15** for complete SPSS output) suggests the existence of two groups among the different interviewees (**Figure 34**). These results show that even though two groups are formed when dimension 1 is compared with dimension 2 and 3, this does not happen when dimension 2 and 3 are compared. This demonstrates that dimension 1 might be responsible for the formation of these two groups, corresponding to the major gradient implicit in the data. The hunting variables (place, methods and frequency) group together and explain most of the dimension 1 (**Figure 35**).

In fact, the analysis was able to separate the population in “hunters” and “no hunters”. Also, when these variables are compared with the age of the interviewees the presence of two groups is maintained (**Figure 36**), being the hunters in the younger group.

Outliers are present in this analysis (**Figure 34**). These outliers represent the people that had very different behaviors from the rest of the local population interviewed. These outliers stand mainly for elderly persons who are not able to get their own resources (mainly wood) and receive help from the community; young couples with no children and hunters who apparently only hunt in specific habitats such as woodland.

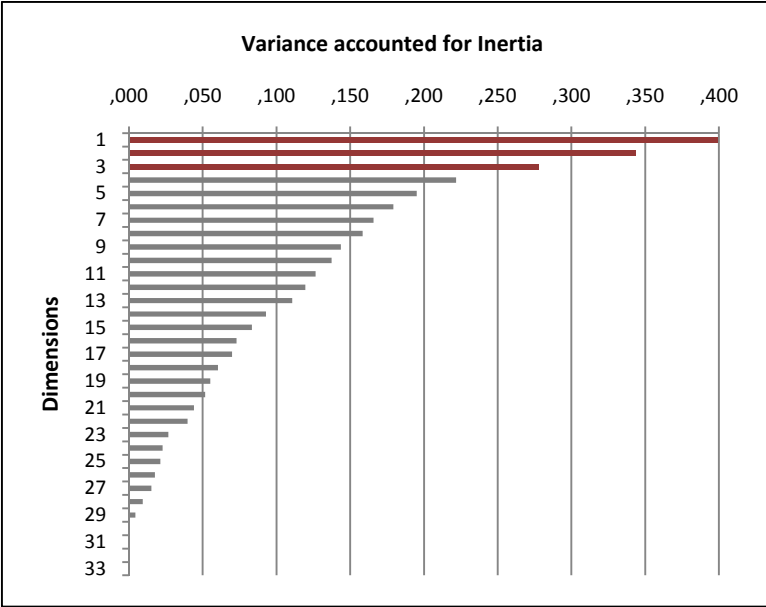


Figure 33. Graphic of Inertias. The graphic presents the variance accounted for inertia of each dimension. The first three dimensions (colored in red) present most of the variation.

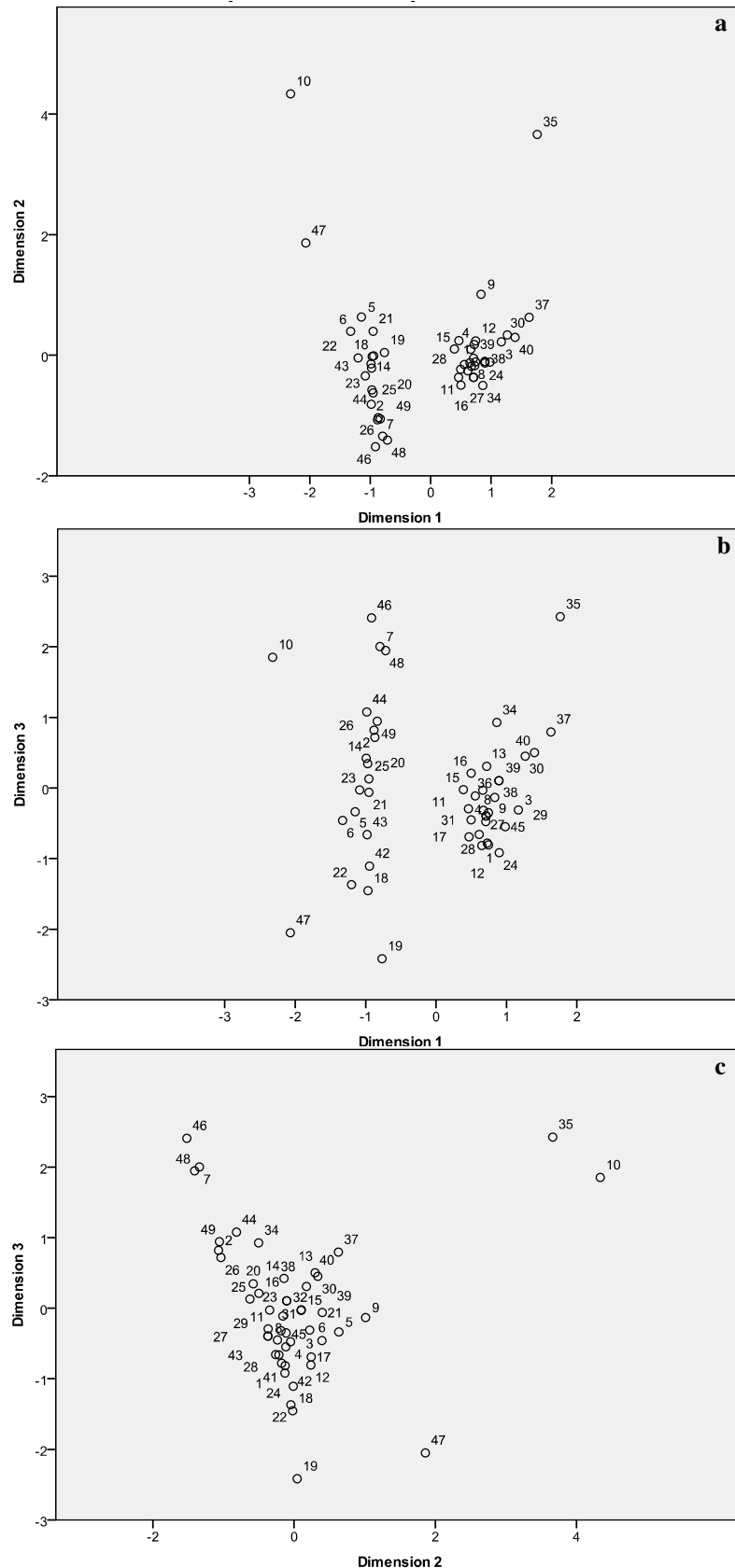


Figure 34. Plots of case numbers. (a) Dimension 1 vs. Dimension 2. (b) Dimension 1 vs. Dimension 3. (c) Dimension 2 vs. Dimension 3. In figures (a) and (b) the observations form two groups. This indicates that the Dimension 1 corresponds to the main gradient underlying the observed data. Also, outliers can be recognized such as the case numbers 10, 35 and 47.

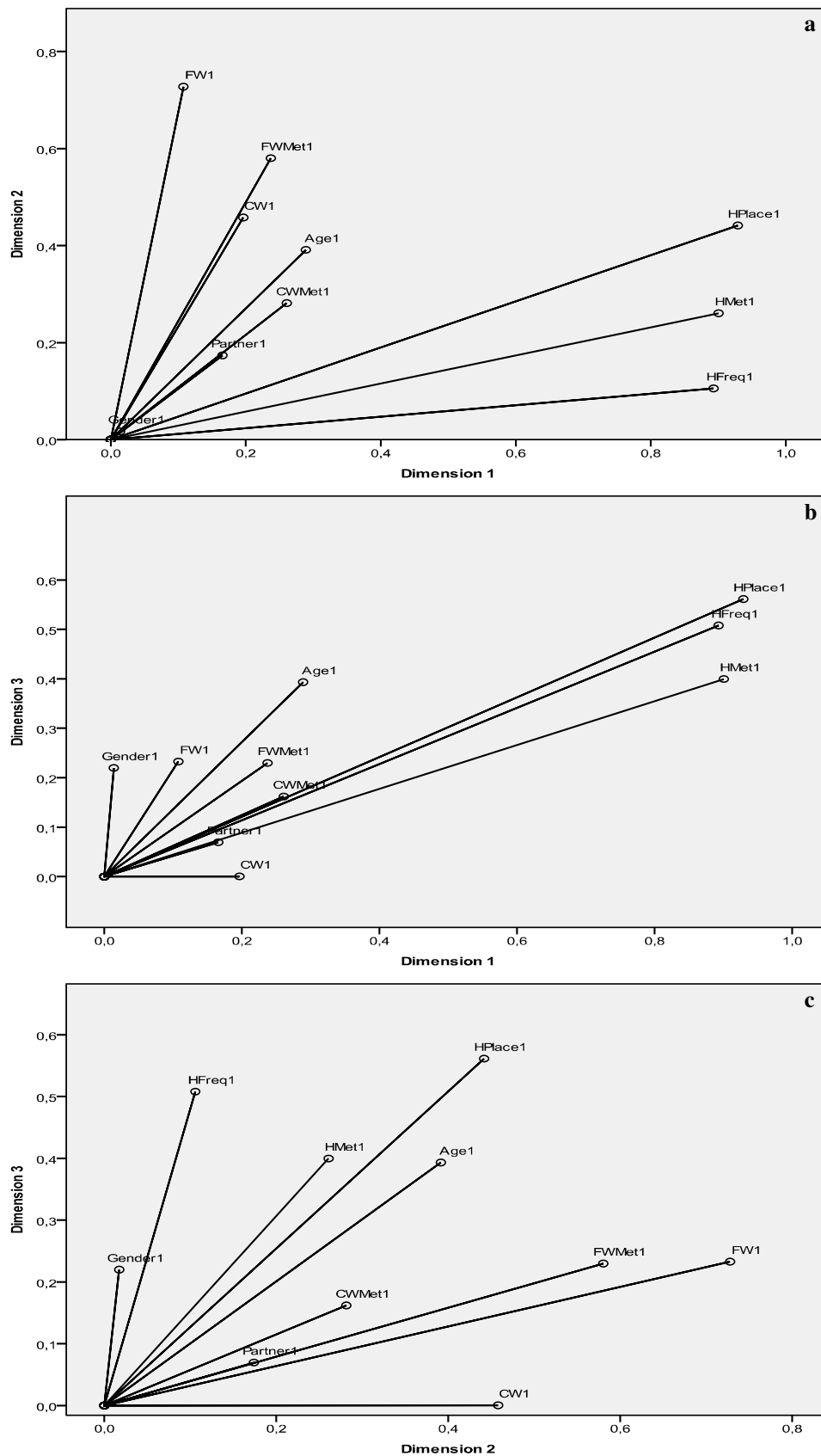


Figure 35. Discrimination measures of the variables. (a) Dimension 1 vs. Dimension 2. (b) Dimension 1 vs. Dimension 3. (c) Dimension 2 vs. Dimension 3. Variables related with hunting activities (places, methods and frequency) form a group as show by figures (a) and (b). No groups can be identified in figure (c).

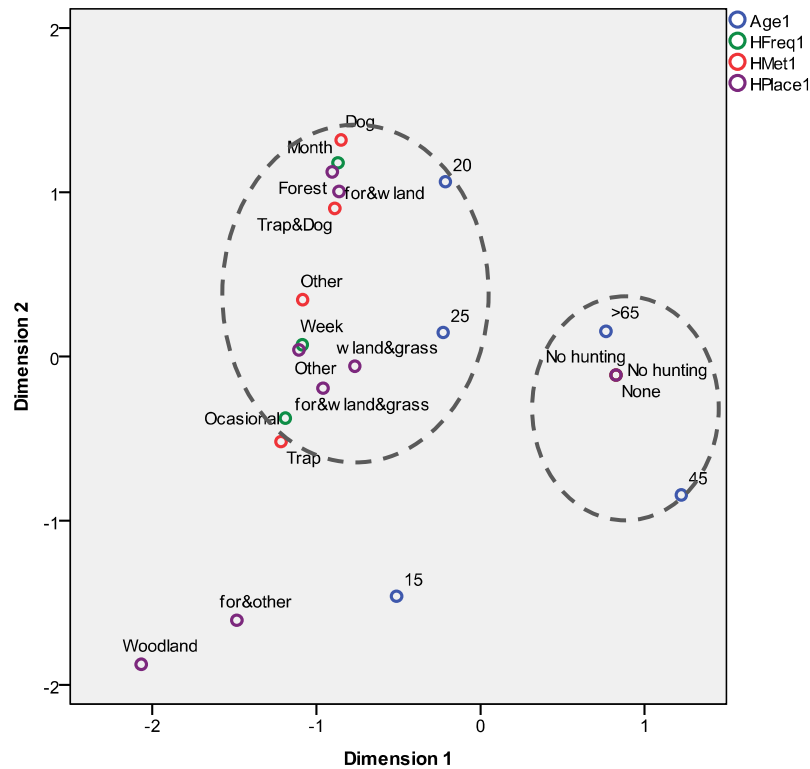


Figure 36. Combined plot for age, hunting place, method and frequency. Two groups can be identified in this plot (marked with a circle). Hunters are usually younger than the population that does not perform this activity.

4.4. Inventory of existent tourist infrastructures

Information regarding tourist infrastructure are presented for three principal cities in Angola: Luanda, Benguela and Huambo. Even though Luanda is located relative far away from Mount Moco it was considered in this evaluation because it is the capital and main entry point for international tourists. Benguela and Huambo are located closer to Mount Moco, approximately 2 to 3 hours by car (**Figure 37**).



Figure 37. Angola map with location of Luanda, Benguela, Huambo and Mount Moco (Morro do Moco) (source: Travel Notes).

4.4.1. Luanda

Luanda is Angola's capital and the principal entry point for international visitors. The city is located in 8° 51' 18.27"S, 13° 16'5.81"E and is 77 m over sea level and next to the ocean.

The demand for hotel rooms in Luanda far exceeds the availability, resulting in exceedingly high prices. Because the star rating in Angola does not follow international standards, quality can be considerably lower when compared with other destinations. For these reasons lodging in Luanda is expensive regardless of quality. For example, a standard room in a reasonable business hotel costs c. 450 USD per night and needs to be reserved with three or four months of anticipation (Stead & Rorison, 2009). Nevertheless, several hotels are currently being constructed and this should correct the actual situation.

Luanda 4 de Fevereiro International Airport has flights to Addis Ababa, Brazzaville, Beijing, Brussels, Cape Town, Douala, Dubai, Frankfurt, Harare, Havana, Johannesburg, Kinshasa, Lisbon, London, Lusaka, Maputo, Nairobi, Paris, Rio de Janeiro, São Paulo, São Tomé and Príncipe Islands and Windhoek. These flights are operated by Air France, Air Namibia, British Airways, Brussels Airlines, Emirates Airlines, Ethiopian Airlines, Hainan Airlines, Kenya Airways, LAM (Mozambique airlines), Lufthansa, South African Airways, TAAG and TAP (Portugal airlines) (**Appendix 16**). Domestic destinations are Benguela, Cabinda, Catumbela, Huambo, Lubango, Luenha, Menongue, Namibe, Ondjiva, Saurimo and Soyo operated by Air26, Air Gemini, Diexim Expresso, SonAir and TAAG.

Other transportation services are buses companies such as SGO and Macon that go to different destinations around the country. Angola also has a railroad system that was ruined during the war. The reparation and rehabilitation of this system is being performed and the only passengers' trains available go from Luanda to Viana, 20 km southeast of the city (Stead & Rorison, 2009). Taxis companies are available in Luanda such as Afritaxis, Taxis Alibolense and Rogerius Taxis. Also rent-a-car companies such as Hertz and Avis are present in Luanda. Nevertheless renting a car in Luanda can be extremely expensive (e.g., 200 USD per day for a 4x4) and the car cannot be used to travel outside the city (Stead & Rorison, 2009). Informal transportation is common in Luanda and other cities of Angola. Known as "Candongueiros", this is the most common mean of transportation for local people. They are usually Toyota Hiace that make set routes within cities or from one city to another. One major concern with this

kind of transportation is that they are not safe and are involved in a considerable number of accidents. Another way of transportation for short distances is motorcycle taxis, known as the “Kupapatas”.

Even though the city has electricity and water systems, failures in these services are quite common. In order to overcome this inconvenient many buildings and establishments have generators and water deposits.

Telephone, cell phone and internet services are available in Luanda. Public phone booths are not common in the city and they function with pre-paid phone cards that can be bought in the post office and shops. Two cell phones companies are available in Angola, Movitel and Unitel, and it is possible to buy a pre-paid cell phone or SIM cards from any of their stores. Internet cafes are not common in the city and the service is considerably slow (Stead & Rorison, 2009).

Luanda has health services in the form of public hospitals and private clinics. Public hospitals are quite limited in Angola regarding equipment, services and professionals. Private clinics can take care of basic health problems and have some specialist services but more severe situations are usually evacuated to South Africa (Stead & Rorison, 2009). Laboratories for clinical analyses operate in the city as well, and pharmacies are widespread in the city.

Many restaurants, cafés and bakeries are available, as well as supermarkets and informal markets. Informal markets are generally recommended to be avoided by foreigners because of safety issues. Informal trade is common in the city’s streets. Prices of food items are higher than in the rest of Angola; meals in restaurants can be extremely high.

The city has several banks where you can exchange money, and ATMs are readily available – at present these only accept Visa or Visa Electron cards but some should soon accept MasterCard.

Although most of the touristic services can be found in Luanda (**Table 10**), these are of difficult access due to scarce availability and/or expensive prices. Comparing the relationship between quality and prices, services in Luanda are very expensive and some of them of very low quality. This kind of situation is prevalent all over Angola.

4.4.2. Benguela

Benguela is located in 12° 36' 46.72"S, 13° 24'24.40"E and in the coast. It is considered the second most important city of Angola. The city has a civilian airport and a military/civilian airport in Catumbela that receives domestic flights especially from Luanda (Stead & Rorison, 2009). No international flights arrive to these airports.

Thirty kilometers to the north of Benguela is the port of Lobito, the second most important port of Angola. Even though no passengers' ships arrive to this port, merchandise ships are quite common. For this reason supermarkets and stores are common and well-stocked in Lobito and Benguela.

Taxis, car-rentals and informal transportation are available in Benguela. Different restaurants and cafeterias are presented in the city. The city has telephone, cell phone and internet services as well as different types of accommodation.

Table 10 presents in details the different services and infrastructures available in the city.

4.4.3. Huambo

Huambo, former Nova Lisboa, is located in the Central Highland at 12° 46' 35.84"S, 15° 44'4.68"E and 1720 m over sea level. The city was heavily destroyed during the civil war, but has been actively reconstructed in the last years. The city has a domestic airport with flights from/to Luanda, Lubango, Benguela, Ondjiva and Menongue.

No taxis service is available and only informal transportation can be used to move around the city. Few supermarkets operate in the city and limited products are sold. Product variety and availability depends on the capacity of these supermarkets to get supplies. Restaurants and cafeterias are not as common as in Luanda and Benguela.

No running water is available in the city and water is usually obtained from wells and tankers. Electricity is available in the city but with some problems such as cuts or unexpected changes in tensions. Telephone and cell phone services are available.

More information regarding the services and infrastructures in Huambo is presented in **Table 10**.

Table 10. Tourist Services and Infrastructures in Luanda, Benguela and Huambo.

Services - Infrastructures	Luanda	Benguela	Huambo
Lodging			
Hotels	x	x	x
Guesthouses	x	x	x
Food			
Restaurants	x	x	x
Snack bar	x	x	x
Supermarkets	x	x	x
Markets	x	x	x
Transportation			
Domestic Airport	x	x	x
International Airport	x		
Bus Company	x	x	x
Railroad for passengers	x		
Port – Merchandise transportation	x	x (Lobito)	
Port – Passengers transportation			
Rent-a-car	x	x	
Taxis	x	x	
Communications			
Telephone	x	x	x
Cell phone	x	x	x
Internet	x	x	x
Health Services			
Public Hospital	x	x	x
Private Clinic (no emergency service)	x	x	limited
Basic Services			
Water (system)	x	x	
Water (tanker)			x
Electricity	x	x	x
Other Services			
Police station	x	x	x
Firefighter station	x	x	x
Travel Agencies	x	x	x
Banks ATM	x	x	x
Post office	x	x	x

4.5. Proposal of an ecotourism project for the conservation of Mount Moco

4.5.1. Potential clients

Three major clients groups can be identified for any tourist project in Angola. Nevertheless not all the people in these three groups might become potential clients for an ecotourism project in Mount Moco.

4.5.1.1. National Clients, residents in Angola: Angolans

After the war, the vast amount of resources and business opportunities in Angola led to the rapid appearance of an elite with high purchasing power. Most live in the main

cities, especially Luanda, and are extremely demanding regarding comfort. For this reason, this niche might not always be interested in the concept of ecotourism or rural tourism. Nevertheless, Mount Moco can still be of interest for the most demanding tourists because of holding the title of the highest point of Angola. The much cooler climate of Mount Moco in relation to that of the main cities may also constitute a sought out value in a future tourist development.

Although there are no tourist infrastructures in place, Mount Moco regularly attracts Angolans. These visits often have educational purposes and have included groups of scouts and students from the Luanda International School. Mount Moco could become an interesting destination for student groups, from primary to tertiary levels, as the place offers a great opportunity to learn about some of the biodiversity of Angola and the need for its conservation. Church groups have also used Moco as a “peregrination” site, not for it holding any particular religious significance but for requiring hardship to climb and providing a removed place for meditation. The 2010 “World Aid Awareness Expedition” hiked the summit of Mount Moco with the objective to create awareness regarding HIV/AIDS.

4.5.1.2. International Clients, residents in Angola: Expatriates

Angola is having a very strong national reconstruction policy. All over the country different big construction projects are taking place. Angola is experiencing one of the highest economic growths in the continent (GDP annual growth of 13% in 2008) (World Bank, 2011) attracting therefore an increasing number of businesses. Because there is still a lack of national professionals, companies have to hire qualified overseas professionals, which has led to the creation of a significant foreign community in the country. Most of the expatriates live in the cities or in construction areas (e.g., roads in different provinces) and are keen to get away from these stressful areas in their free time.

The destination of travel is partly related with the fact of the expatriates being alone or living with their families in Angola. Expatriates with family in the country will prefer to have holidays in countries that offer better conditions and infrastructures. For example, they will probably prefer to travel to South Africa or Kenya to perform a nature based tourist experience. For them these countries offer more safety conditions and better services. Still, most expatriates will end up by traveling within Angola, even if only for weekends or short holidays, both out of curiosity and in order to flee the cities and enjoy the natural wonders the country has to offer.

Mount Moco has been visited by the German Ambassador and other expatriates interested in going to Angola's highest point. Keen birders have also started trickling to the area as well as people from the Angola Field Group, an association of expatriates and Angolans interested in knowing more about the country (M. Mills *pers. comm.*).

4.5.1.3. International Clients, residents abroad

Angola is rebuilding and showing great interest in their tourism industry, which seems to be growing. The amount of tourists that visited the country increased in 55% from 2008 to 2009, being tourists from Europe and America the most abundant (AngoNoticias, 2010). A considerable number of foreigners are interested in visiting Angola, and the numbers will probably keep growing together with the development of the country and the improvement of services.

The reasons for these visits can be quite different. As a former Portuguese colony, many Portuguese, living in different parts of the world, desire to travel to Angola, in order to know the place where their parents, grandparents or even they were born. The political instability in the country until some years ago had made impossible for them to perform those trips.

Angola is also a magnet for nature focused visitors, having something of a mythical aura in this group due both to the extremely rich biodiversity it holds (being the country with the highest habitat diversity in Africa) and the fact that it has been virtually inaccessible for over 40 years. These tourists usually do not look for luxury and extreme comfort, but to experiment the nature and culture of a place. Birdwatchers have been the most regular visitors in this group, albeit still in small numbers, with "Birding Africa" leading a couple of tours in the country.

Scientific research expeditions, including the data collection for this study, have visited Mount Moco with the objective to survey the flora and fauna of the area and perform conservation actions. These expeditions were composed by people from different nationalities such as Brazilian, Portuguese, South African and Peruvian, among others

4.5.2. Competition

At present, there are no tourist or ecotourist projects in Mount Moco or surrounding areas. Nevertheless different tourist projects are present in other provinces of the country, such as:

The **Kissama National Park** is the most accessible national park in Angola (Stead & Rorison, 2009). It is located at an one hour car trip south from Luanda. In the early 2000s a wildlife relocation project took place allowing the repopulation of a section of the park with large African mammals such as elephants, zebras, giraffes and wildebeest among others. Lodging and meals are offered in the “Pousada Caua”, inside the national park, with prices from 200 to 300 USD per night per person including breakfast (Stead & Rorison, 2009). Mini safaris and boat trips are offered in the park.

The **Kwanza River Lodge** is located in the mouth of the Kwanza River, Luanda province. The place is popular for fishing activities and weekend outings for Luanda residents. Lodging is available in bungalows and meals are served in a restaurant. The place offers fishing and birdwatching trips. Prices vary from 100 to 200 USD per night per person without meals (Stead & Rorison, 2009).

The **Flamingo Lodge** is located in Namibe province, in the northern part of the Namib Desert. Lodging is available in rustic huts with flush toilets and showers. Fishing activities, parasailing, diving and quad biking is possible and 4x4 trips to the Cunene River’s mouth can be organized (Stead & Rorison, 2009).

The **Omauha Lodge** is located 150 km south from the city of Namibe, between Iona National Park and the Cunene River’s mouth. Lodging is provided in bungalows built with granite and stones. Activities offered include hiking, 4x4 trips, photographic safaris and fishing. Wildlife in the area includes kudu, antelopes, oryx, cheetah and mountain zebra, among others (Stead & Rorison, 2009).

4.5.3. SWOT Analysis

Table 11 presents the SWOT analysis for an ecotourism project in Mount Moco. The total result of this analysis was 2.64, which classifies the project as average.

Table 11. SWOT Analysis. Each element was evaluated for Magnitude (M) with values from 1 (extremely weak/very risky) to 4 (extremely strong/very favorable) and Importance from 1 (Low) to 4 (Very high). The total value obtained from this analysis (2.64) ranks the project as average.

ELEMENTS		I	M	Subtotal
STRENGTHS	Privileged natural area with high biodiversity and endemism.	4	4	0.198
	Important area for the country: Angola highest point.	4	4	0.198
	Only and first ecotourist project in the area and maybe in the country.	4	4	0.198
	Contacts and interest of national and international organizations in order to promote Mount Moco area and the project.	3	3	0.111
	Project will allow socio and economic development of the local population.	4	4	0.198
	Conservation of Mount Moco area and its biodiversity.	4	3	0.148
	Geographical location, between two major cities of Angola: Huambo and Benguela.	2	3	0.074
WEAKNESS	Difficult access to the area, because of bad shape of the road.	1	2	0.025
	Poor local population with little or no education.	3	1	0.037
	Low qualified local labor.	4	1	0.049
	High investment in building capacity with local population in order for them to take an active part in the project.	3	2	0.074
	Need of high investment to implement the project, because of expensive goods and services in Angola.	4	1	0.049
	No basic services and infrastructures in the area or surroundings.	3	2	0.074
	Afromontane forests are being reduced and destroyed by the local population.	3	2	0.074
OPPORTUNITIES	Increase of the demand for nature-based destinations.	3	4	0.148
	No tourist services or projects of any kind in Mount Moco area.	4	4	0.198
	Economical development of the country. More companies and expatriates might be arriving to the country and increasing that client group.	3	4	0.148
	Development of roads and other services.	2	3	0.074
	Increasing of tourist flow to the country	4	4	0.198
	Development of other tourist areas, making possible to include Mount Moco as part of a circuit	2	3	0.074
THREATS	National legislation might present issues regarding the implementation of a project in the area.	2	2	0.049
	Lack of a protected area status for Mount Moco, area could be given for other kind of project.	3	2	0.074
	Unexpected and aggressive entrance of competitors to the area.	4	1	0.049
	High prices for products and transportation, making logistics expensive.	3	1	0.037
	Limited services (transport, communications, health)	3	1	0.037
	Difficulties in visas' applications to visit the country.	2	2	0.049
TOTAL				2.64

4.5.4. The Ecotourism Project

Several characteristics, such as the high biodiversity and natural scenery, make Mount Moco an ideal location for an ecotourism project (**Figure 38**). The natural characteristics, together with the presence of Afromontane forest patches allows the existence of a spectacular and unique biodiversity. This is most clearly illustrated with the high diversity and endemism of birds species, like the *Pternistis swierstrai* with its only viable population inhabiting this area.

The mountains and the forests present in their deep ravines give the area a breathtaking scenery. Afromontane forest, miombo woodland and grassland compose the landscape, captivating any visitor. Also, Mount Moco is the highest point in Angola, fact that by itself makes this a place of high general interest.

Nevertheless, no tourist services and infrastructures are available in Mount Moco area. Only the main cities (Luanda, Benguela and Huambo) have tourist services and infrastructures, and with some limitations as mentioned previously.

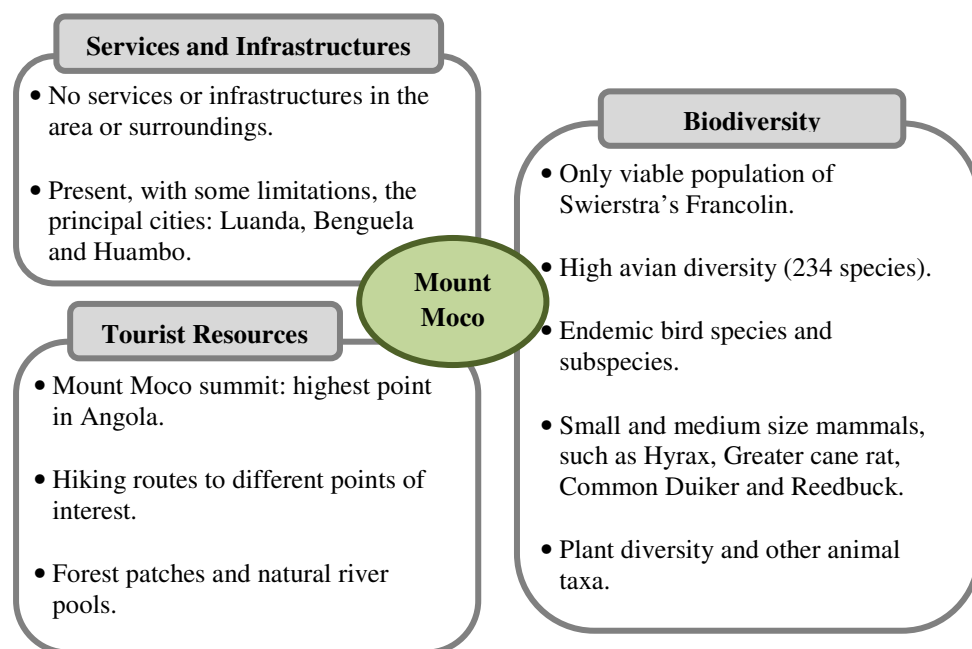


Figure 38. Characteristics of Mount Moco regarding biodiversity, tourist resources, and services and infrastructures. Even though the area presents interesting tourist resources and biodiversity, the lack of services and infrastructures can be a considerable problem.

For an ecotourism project to be a successful conservation tool it is very important to involve the local population in its implementation and operation. This way the population can take decisions regarding the management of the project and at the same time they perceive the benefits the project might generate. Nevertheless, in order

for a local community to be able of conceiving and implementing their own ecotourism project some characteristics have to be fulfilled.

The local community needs to have education and qualified labor. In this way they will be able to implement, manage and maintain an ecotourism project in Mount Moco. Also, the local community needs to have an economical capital in order to implement the project. Even though it is possible for them not to have this capital, at least they should have means of obtaining it (e.g., bank loan). Unfortunately the population of Kanjonde does not fulfil these characteristics (**Figure 39**). The population is poorly educated and presents no qualified labor. Most of the population lives from subsistence economic activities and has very little or no economic income.

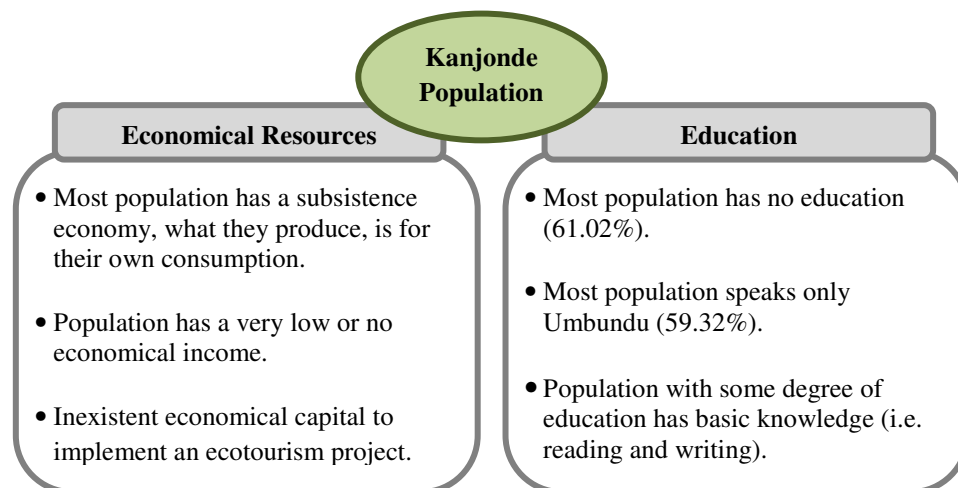


Figure 39. Characteristics the population of Kanjonde regarding education and economic resources. Population has poor or no education and no economic income or capital to implement an ecotourism project.

Kanjonde population presents a solid social organization, with the presence of a “Soba”, or chief of the village, and a Council of elders. The “Soba” is an extremely important person in any Angolan village. He will always be interested in the needs and well being of the community, solving problems and making decisions. He is the most respected and obeyed person in the village.

This kind of social organization would indeed be advantageous for the implementation of an ecotourism project. Many ecotourism projects have failed because of internal conflict between different groups in a community. The discussions and personal interests of these different groups can overcome the common wellbeing of the entire community regarding the ecotourism project.

Two possible alternatives are presented for the implementation of an ecotourism project in Mount Moco. The lack of education and economic capital make impossible for the local community to implement a project by themselves. For this reason capacities and economic investment from outside the area need to be used.

The first alternative is the implementation of the project by a private enterprise. Different companies are showing an increasing interest in the tourism business in Angola. A company will indeed have the economic capital needed to start and maintain a tourism or ecotourism operation but can present several disadvantages (**Table 12**). These disadvantages are especially related with the major need of a company to produce economic profit and recover any investment they have made. Ecotourism initiatives are risky investments, usually with low return in long periods of time. This is due to the initial investment and other additional costs and the fact that the recovery of these expenses relies in small groups of visitor and operations in remote areas (Heher, 2003).

The local population will be excluded from the project due to their lack of education and qualified labor and will probably not perceive any benefit from the project. Nevertheless, with correct policies and strategies, a private enterprise can run a successful ecotourism project in cooperation with local communities, achieving the conservation of the area and the socio-economic development of the local population (Gordillo, *et al.*, 2008).

Also, it is believed that the best model for an ecotourism project managed by a private enterprise would be a large company with different projects running in different areas. This way they are able to incorporate the specific project to a market they already have and include it in their marketing strategies (Heher, 2003). Nevertheless, small operations, implemented by phases have shown to work because they do not need to have a big initial investment.

The second alternative is the implementation of the project through an NGO, a non-profit organization or private donors. This model has been used successfully in other areas of Africa (Tyynelä & Rantala, 2004) but has also presented some failure experiences due to the lack of a proper assessment of the viability of ecotourism projects and lack of experience (Heher, 2003).

The major benefit is that the organization will not have the extreme pressure of producing profits. These profits can be used to implement new projects for conservation and social development of the area. One major disadvantage (**Table 13**) is the fact that the funding of these organizations usually depends on external sources and for this reason not all the initial investment needed for the project can be assured. Another problem is the establishment of unrealistic objectives and the lack of a financial purpose, making sometimes impossible to objectively assess the failure of a project (Heher, 2003). Nevertheless the opportunity of the active participation and building capacities in the local population are indeed extremely important advantages. This alternative will be analyzed in more detail.

Table 12. Advantages and disadvantages of an ecotourism project directed by a private company. Economic income will go probably entirely for the company and due the lack of qualified labor in the area, little employment will be offered to the local population.

Advantages	Disadvantages
<ul style="list-style-type: none"> • Economic capital for total implementation of a project. • Generation of employment among local population (<i>e.g.</i>, construction). • Experience working in the country (know-how) and important contacts that could allow the marketing of the area. • Present more problems dealing with local community and government. 	<ul style="list-style-type: none"> • Major objective is to produce economic profit and recover initial investment. • Hiring of outside people to work in the project because of the low education and unqualified labor in local population. • No direct participation or involvement of local population in any decision making for the project. • Benefits do not enter in local economy, as labor, products and profits come and go to the exterior.

Table 13. Advantages and disadvantages of an ecotourism project directed by a NGO. Even though funding might not be as big and constant than in a private company, local population can actively be involve in the project.

Advantages	Disadvantages
<ul style="list-style-type: none"> • Ultimate goal of the project would not be the generation of economical revue, but the conservation and socio-economical development of the area. • Local population development and education. Through educational projects and building capacities. • Local population direct participation in the project. • Profit would go to fund projects that will help develop the local population and conservation of the area. 	<ul style="list-style-type: none"> • Funding depends on external sources. Total initial investment cannot be available or funding can be cut in the middle of the project, before achieving self economic sustainability. • Lack of experience and contacts in the country. • Unrealistic objectives, trying only to achieve conservation and forgetting about economical viability of the project.

A system is proposed for the implementation and operation of an ecotourism and other projects in Mount Moco area (**Figure 40**). The ecotourism project will be executed in phases, as probably not all the initial investment would be available for the reasons mentioned before. One interesting way to get the initial investment would be through the “green venture capital funds”. These funds introduce social and environmental concerns into the decision making process, and have much more extended return time for the investment. Some of these funds are the Kijani capital fund from Conservation International, the Nature Conservancy’s EcoEnterprises, Terra Capital Fund, EcoLogic Enterprise Ventures and the Environmental Enterprises Assistance Fund (Heher, 2003).

Preceding the implementation of the project, the local community has to be informed. It is very important to explain the implementation and operation of the project, as well as the benefits and the challenges the project might present (e. g., conservation of the forests). Their opinions and feelings regarding the project have to be listened and considered.

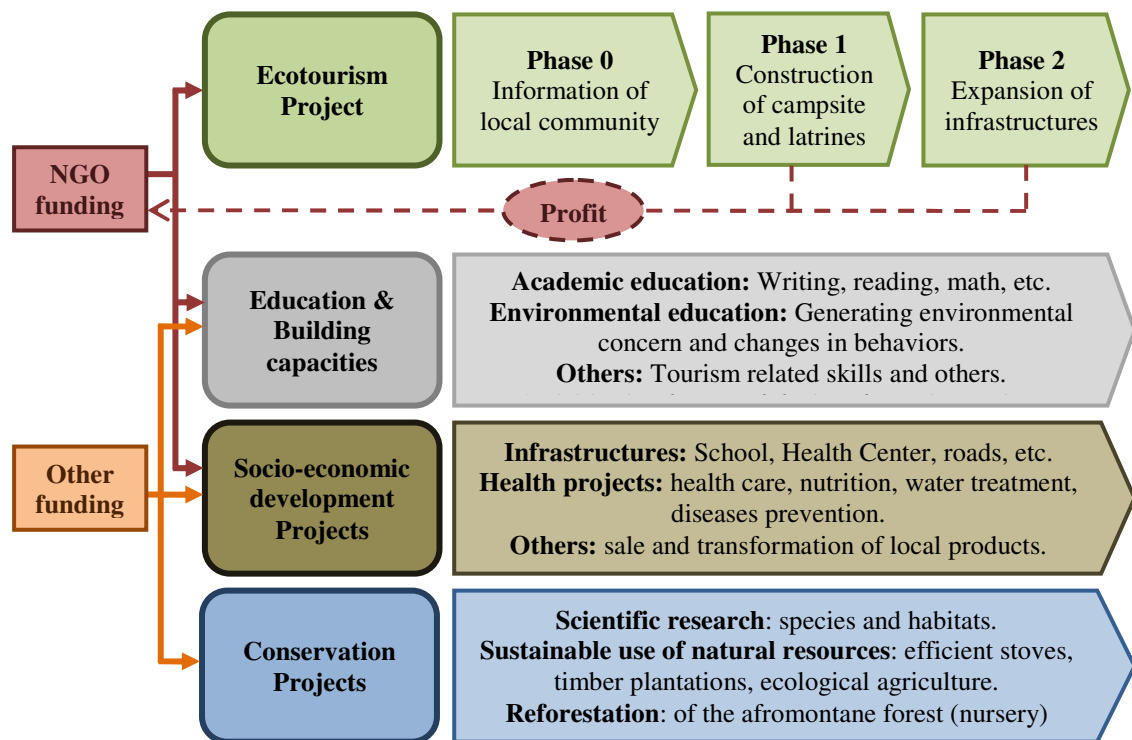


Figure 40. System proposed for an ecotourism and other projects in Mount Moco. The ecotourism project will be developed in phases and the NGO will finance it together with the education and socio-economic development projects. All the initial profit generated by ecotourism will go to the funding of these projects. Funding from other sources can be used to finance these and the conservation projects.

The first phase of the project will include the construction of very basic infrastructures such as a campsite and latrines. The maintaining of these infrastructures will be performed by people of the community. The second phase will include the expansion of the infrastructures, such as the construction of other lodging accommodations.

Education and building capacities projects will be performed before and during the ecotourism project. Reading, writing, Portuguese and basic mathematical skills have to be increased in the population. Other capacities will be developed especially those related to tourism (e.g., natural guides). The idea is to gradually involve the population and give them the tools to, eventually, manage the project by their own.

Environmental education will be an important part of these projects. The major objective is to generate concern regarding the conservation of the Afromontane forest and its biodiversity. Local population has an intrinsic knowledge of the natural resources in the area and their use, but the importance of Mount Moco has to be highlighted and generate pride regarding this unique place. Also, new behaviors regarding the natural environment have to replace the old behaviors. Changes in conduct have to be achieved in order to ensure the conservation of Mount Moco.

Socio-economic projects will focus in improving the living conditions of the local population. Health issues will be especially addressed, such as the prevention and treatment of diseases, water quality and nutrition. These projects can start after the ecotourism project is implemented and operating.

Natural resources unsustainable use and the dependence of the local population in them, make impossible for an ecotourism project by itself to achieve the conservation of Mount Moco. For this reason, conservation projects have to be closely developed with any ecotourism project.

Conservation projects should focus in generating information, ending the disappearance of the forests and contributing to its recovering. Scientific research is extremely important to understand the needs and threats of the species and ecosystems present in the area and to generate the best plans to conserve them. Unsustainable use of natural resources by the local population has to be changed to sustainable alternatives, such as the use of fuel effective stoves, timber plantations and eco friendly agricultural practices that end with the slash and burn techniques. Finally, reforestation projects have to take place in order to recover the Afromontane forest

patches to their former extend. It is important to mention that some of these projects (fuel effective stoves and the implementation of a nursery for reforestation) are already being developed in Mount Moco.

The NGO will fund the ecotourism project. The profits produced (*e.g.*, fixed fees covered to visitors and voluntary contributions) will be used to fund the education and socio-economic development projects. The funding of these projects directly from any profit generated by ecotourism is extremely important as they will show the benefit of this activity to the local community.

Funding from other organizations can be used to finance conservation projects. Different grants and organizations are available for the economical support of conservation projects, such as Conservation International, Rufford Small Grant Foundation, A. P. Leventis Ornithological Research Institute, BirdLife International, National Geographic, MacArthur Foundation, etc. The education and socio-economic development projects can also be founded by organizations working in those areas, such as Food and Agriculture Organization (FAO), United States Agency for International Development (USAID), World Vision and Calouste Gulbenkian Foundation among others.

The ecotourism project will also generate a market for different products sell by Kanjonde population. Locals can sell their products (*e.g.*, beans, potatoes, corn, etc.) to the ecotourism project or directly to the tourist visiting the area.

The implementation of an ecotourism project had to achieve the active involvement of the Government in order to accomplish the recognition of Mount Moco as a natural protected area. Land legislation in Angola is based in the main principle that the State is the original holder of all the lands in the country (Angola Land Legislation, Lei 9/04). For this reason, as long as Mount Moco does not have a protection status, it cannot be assured that the area will not be assigned to other activities that accelerate its degradation (*e.g.*, mining, farming, cattle ranching, etc.).

The involvement with the government can also help to avoid the appearance of aggressive competition to the ecotourism project and control the access to the tourist resources. This way, projects or companies with no conservation objectives will not appear in the area and the carrying capacities of the resources will not be exceeded.

Marketing strategies to promote the project could be through the contact of national and international companies, organizations and education institutions. Also through the website of the conservation project that is being developed in the area (www.mountmoco.org) and through presentations and publications done by different scientific researchers in the area.

An ecotourism project implemented by a NGO or other type of non-profit organization will indeed have some problems, especially economic, when compared to a private company. It is possible that the development of the project would be slower due the lack of a strong initial capital. Nevertheless this model is more likely to include the local population and make them active participants of the ecotourism project. This way the most important objective of this project will be achieved: the conservation of Mount Moco.

5. DISCUSSION

Regarding Mount Moco importance and tourist resources

Mount Moco is a very important area for the conservation of biodiversity and endemism in Angola. It could be considered, perhaps, the most important area in Angola for bird conservation (Mills, *et al.*, *in press*). This importance had been already recognized by international organizations, like the attribution of the status of IBA (Important Bird Area) by BirdLife International (BirdLife, 2010b).

Nevertheless Mount Moco does not have any conservation status by the Angolan government, even though the implementation of a natural protected area of 60 km² had been proposed (Huntley & Matos, 1994; Mills, *et al.*, *in press*). Mount Moco is a threatened and fragile ecosystem with unique characteristics and part of the Afromontane forests archipelago, and for these reasons its conservation is of extreme importance.

The breathtaking scenery, the presence of forest patches and being Angola's highest point are attributes that transform Mount Moco in an extremely interest place to be visit by tourist.

The evaluation of the tourist resources in the area qualified them as “good” and “very good”, and attributed different hierarchies (**Table 8**). Even though the methodologies used could somehow seem subjective, they make possible the comparison of the different resources and therefore the attribution of priorities. The most important resource is the Mount Moco summit that, as expected, will attract and already attract tourist to the area. The forest patches and their biodiversity are the second most important resources, and they indeed attract other type of tourist to the area, those more nature focused such as bird watchers.

Regarding the local population

Population in the surrounding area of Mount Moco is reduced to Kanjonde village. Even though other villages are registered within the area, they do not have access to the forest patches in Mount Moco.

Kanjonde is composed mostly by young population (70.38% from 0 to 24 years). Developing countries usually have a trend toward younger population. Angola is the tenth country with the youngest population in the world, with a median age of 17.3

years, quite low when compared to the median age of Portugal that is 40.6 years (UN, 2009).

The presence of a large young population and a reduced elder population is commonly related to high fertility and low life expectancy rates. Angola has one of the highest total fertility rates in the world with 5.79 children per woman, nevertheless the country also has one of the lowest life expectancy at birth with 46.8 years (UN, 2009). Even though the country has a high amount of birth, life expectation for these persons is quite low, making the population being composed mostly of young people. For example, Portugal has a very low total fertility (1.38 children per woman), but life expectancy at birth is 78.8 years, c. 30 years higher than in Angola (UN, 2009), for this reason most of Portuguese population is elder.

The difference between the amount of children in Kanjonde's household (3.07 ± 1.25 children, N= 46 interviewees) and the total fertility rate for the country (5.79 children per woman) (UN, 2009) could be explained by the prominent infant mortality and under-five mortality rates Angola has. Many births can occur, but the high mortality rates reduced the amount of children present in each household.

The population is poorly educated and most of them do not speak Portuguese. The capacity of speaking Portuguese in the local population is related with the education (according to Simple Matching and Jaccard indexes, **Figure 29** and **Figure 30**). The local language in Mount Moco area is Umbundu. Portuguese is learned in school, for this reason people with some degree of education are expected to speak Portuguese. Education is very limited with a single teacher giving classes to several grades and without any school infrastructure.

The village has a major lack of amenities and services. No drinkable water, electricity or health center are available in Kanjonde.

They have a subsistence economy based in agriculture. Other activities might be performed such as animal breeding and hunting, but the livelihood of a household is based mostly on the agricultural products. Even though most of the products are for self-supply, part of the population manages to sell some of their products, mainly those that are produce in bigger amounts or have a surplus. For example, the main crops produced by the population are corn, beans and potatoes, in that order (**Figure 15**). Nevertheless when selling, the order of preference changes: beans, potatoes and corn

(**Figure 17**). Even though corn is the principal crop in the area it is not the most sold product. This could be due to the fact that corn is the core part of the local population diet or no market is available for this crop, being the most farmed in the area.

Mount Moco area is rainy in the wet season and quite windy in the dry season. The soil is hard and difficult to farm on. When compared to populations in other areas of the country, where the environmental conditions are more human friendly, Kanjonde population seems to be in worse shape, especially regarding health condition and nutrition.

Because of the environmental conditions, the population has to perform more work in order to obtain agricultural products. Also the variety of products they can grow is quite limited when compared to other areas in the country. This can make their diets quite simple and probably with low nutritional inputs.

Regarding the principals threats to biodiversity

Kanjonde population uses Mount Moco natural resources for their subsistence. They collect wood for fuel and construction from the forests and woodlands. To prepare and fertilize the soil for agriculture, they perform burns that destroy the forest patches. They hunt in the different habitats of the area to obtain meat for their self-supply or to sell. All these activities, some of them vital for the local population survival, represent major threats to the conservation of the habitats and biodiversity of Mount Moco.

The use of fire-wood is extremely important. No other alternative sources of energy are available in Kanjonde village. For this reason, local population has to gather wood for cooking from the Miombo woodland and forests. Fire-wood collection demands time effort and considerable quantities, taking into account the amount of villagers and their needs for fuel. Also, the method used for cooking does not take the most of the heat produced by burning wood because most of the heat is loss and more wood is needed in order to prepare a meal.

Fire-wood collection cannot be restricted or prohibited, unless viable alternatives are given to Kanjonde population in order to fulfill its fuel needs. Sustainable use of natural resources needs to be introduced. In this case, fuel effective stoves will definitely reduce the consumption of fire-wood and make population save time (a lot of time is invested in collecting fire-wood), that can be used in other activities. A project that aims to provide fuel effective stoves to the local community is already being implemented.

The collection of construction wood threatens directly the Afromontane forest patches. In order to build houses' structures timber has to be long. For this reason the wood is obtained from the forests, where the tallest trees are found. Fortunately, construction activities do not seem to happen frequently and when building a new house, population uses the wooden structures (doors and windows' frames) of the old house. Nevertheless, alternatives have to be proposed in order to protect the Afromontane forests, such as the implementation of timber plantations or the use of alternative construction materials.

Burns are a major threat for the Afromontane forest patches. Most local population indicated that they perform burns for agricultural purposes. Nevertheless these burns can usually get out of control and destroy huge amounts of terrain, including the forests and woodlands. Alternatives have to be implemented, such as the application of eco-agricultural practices that include the use of organic fertilizers and education regarding the threats these fires represent to the forests.

Hunting activities are usually performed by the younger male population. The Optimal Scaling analysis separated the population into two groups: hunters and no hunters. The group of the hunters is usually younger population from 20 to 44 years, while the older population generally does not perform hunting activities (**Figure 36**). This could be explained by the fact that this activity can be exhausting depending on the hunting method used. For example, when hunting with dogs, hunters have to run behind them while the animals are chasing a prey in areas of difficult access. Some elder persons stated that they used to hunt in their youth but that they do not do it anymore.

No person in the village is a restricted hunter, as they perform other activities such as agriculture and animal breeding. Sometimes, hunting is done to defend the crops from the attacks of animals. Also, hunters are not specialist in the preys as they do not focus in hunting a determine species or group. Hunting is performed in a very opportunistic way, as many times people will hunt "whatever is caught in the traps". A major problem is that sometimes "whatever" can be threatened species, such as the *Pternistis swierstrai*.

Hunters have an intrinsic knowledge of the animals inhabiting Mount Moco. They are capable to identify different species, some of them with similar appearance, and even indicate habitat and feeding preferences (e.g., *Pternistis swierstrai* presents in forests). This kind of knowledge can be used in non-extractive activities such as wildlife

observation. Many ecotourism projects have successfully trained former hunters to become nature guides, that use their skills to track down animals in order to be photographed and observed by tourists (Gordillo, *et al.*, 2008).

Kanjonde population needs to use the natural resources in the area in order to survive. The major problem, as mentioned previously, is they made an unsustainable use of these resources. This is causing all the conservation problems present in Mount Moco. Unless sustainable alternatives for natural resources use are given and a way to provide benefits from the protection of Mount Moco, no conservation initiatives will ever work in the area.

Regarding tourist infrastructures and services

Tourist infrastructures and services are inexistent in Mount Moco area. The main cities in the country, such as Benguela, Huambo and Luanda, have a series of tourist services and infrastructures. Nevertheless a major problem of these services is the expensive prices and the low quality they present. This is probably caused by the limited offer and high demand of these services. For example, accommodation in Luanda has low capacity, making prices extremely high. This also happen with other services in the city, making Luanda the most expensive city for expatriates to live in the world (Mercer, 2010).

Tourist services and infrastructures are important in the attraction of tourists to a specific place. Nevertheless ecotourism focuses on intrinsic rather than extrinsic values of an area, meaning that the importance of an activity is in the natural resources rather than the services surrounding it (Ceballos-Lascrain, 1996). In Mount Moco, even though no major services are present, its importance as Angola's highest point and the amazing biodiversity of birds can indeed attract tourists to the area.

Tourism market is growing in Angola. Around c. 365 000 tourists entered the country in 2009, representing an increase of 55% when compared to 2008. Most of the tourists were from Europe and America (AngoNoticias, 2010). Nevertheless this numbers could be tricky, as many expatriates enter the country using tourist visas. However an interest and growing in the tourism industry is taking place in the country. Tourist infrastructures, such as hotels and restaurants, are being constructed in different cities. Travel guides, tourist websites and companies are offering information and tours to the country (e.g., The Bradt Travel Guide of Angola). More people seem to be interested in

visiting the country. This increase in the amount of tourist and development of this sector will indeed benefit any ecotourism project develop at Mount Moco.

Regarding an ecotourism project for the conservation of Mount Moco

Different tourist projects are being developed in Angola. Some of them are usually located in coastal areas, where the visitors can enjoy the activities of beach and sun tourism (e.g., Flamingo Lodge). The others are associated with Natural Protected Areas, where big game can be observed (e.g., Kissama National Park and Omahua Lodge). Nevertheless, at the moment none of these initiatives represent a direct competition to any ecotourism project in Mount Moco. They could, in some degree, influence the decision of a more general tourist regarding a place to visit based in the services available (i.e., these initiatives offer more and better services than the ones present or that will be present in Mount Moco). However, tourists visiting Mount Moco, do so because of the natural beauty and importance of the area, rather than the services present. At the same time, these places can also motivate the tourist to stay more days visiting the different natural areas the country has to offer.

According to the SWOT analysis (**Table 11**) an ecotourism project in Mount Moco is considered average. Most of the strengths and opportunities of the project are closely related with the natural beauty and conservation importance of Mount Moco, as well as the unique characteristics and the lack of any other projects in the area. The major threats are related to the low qualified labor, the expensive values of logistics in Angola and the possible entrance of unexpected and aggressive competition. Some projects in order to stay economically viable trend to reduce costs and try to increase profits when competition appears. They will increase the amount of tourists visiting the natural area even though the carrying capacity is exceeded, and decrease the costs of conservation and protection of the environment (Issacs, 2000). For this reason it is important to achieve the recognition of Mount Moco as a natural protected area by the Angolan government and the establishment of an ecotourism project with exclusive rights to it.

Because of the land legislation in Angola and the lack of a conservation status of Mount Moco it is very important to involve the government in the ecotourism project. With the generation of economic revenue directly and indirectly (i.e., more tourists arriving to the area and injecting money to the local economy) and the increasing of Mount Moco importance, the government could be more motivated to give a conservation status to the area.

Two models were present for the implementation of an ecotourism project in Mount Moco. One major difference relies in the availability of funds for implementing the ecotourism project. While a private enterprise can probably have all the investment capital at once, an NGO will depend on external sources of funding.

A major inconvenient a private enterprise presents is the need to recover its investment and generate profit. Ecotourism initiatives are consider risky inversions with long time of return and no collateral security (e.g., an ecolodge build in a remote area cannot be used for another thing that is not tourism to this area) (Heher, 2003). For this reason high pressure for maximizing profits and reducing cost can be involve in this kind of project when managed by a private company.

Even though the implementation of an ecotourism project through a private company seems more economically viable, the characteristics of the population and the major objective of conserving Mount Moco made the intervention of a NGO more appealing. The lack of education and qualified labor in the local population make extremely probable that they will be excluded of any initiative managed by a private company. It is important to have in mind that a NGO presents a series of disadvantages that have to be carefully taken into account such as the lack of experience and sometimes unrealistic goals (Heher, 2003).

The active participation of the local population is extremely vital and as long as a project managed by a NGO can assure this, it will always appear as the best option. Ecotourism will never work as a conservation tool if the local population is not actively involved. When population do not perceive the benefits (economical and social) of ecotourism, they can turn against any conservation intent and even increase the exploitation of natural resources in order to send foreigners away (Kruger, 2005). Also as a private company needs to recover its initial investment it is probable that profits will go outside the local community.

The private enterprise model does not appear as the most appealing option, due its financial implications, especially regarding the return of the investment. As well the NGO model presents itself with serious disadvantages that have to be taken into account, especially regarding the lack and dependence of funding from external sources. An hybrid investment model had been proposed for ecotourism projects (Heher, 2003). In this model the investment is secure through green venture funds,

which are funds social and environmental oriented, and the objectives and management guidance of the projects are those proposed and intend by an NGO.

Education is a major component for the success of conservation. Education projects have to be developed before and during the implementation of the ecotourism project in order to achieve two important goals: (i) build capacities in the local population and (ii) raise awareness regarding the biodiversity and conservation of Mount Moco. Many ecotourism projects have failed because of the lack of participation of the local populations (Kruger, 2005). For this reason it is important to provide the local community with the skills needed to manage and operate an ecotourism project, making them actively involved on it. Kanjonde population understands the importance of Mount Moco in their subsistence. The older population is aware that the forests patches are shrinking. Education has to make population aware and proud of the biodiversity in the area and encourage positive changes in their behavior, especially those related with the use of natural resources.

Sustainable alternatives have to be presented to the local population for the use of the natural resources (e.g., fuel effective stoves, timber plantations, eco-agricultural practices, etc.). The population depends on the natural environment for their subsistence and unless viable alternatives are given they will continue with their traditional unsustainable use of the resources. They also need to perceive the benefits of conserving the forests, not only as the intangible well-being produced by a healthy environment but principally as tangible benefits associated with the improvement of their quality of life.

For the reasons previously mentioned, conservation projects have to be developed and are actually being developed in Mount Moco (www.mountmoco.org). Ecotourism and conservation have to go hand by hand in order to achieve the major goal of protecting Mount Moco. Ecotourism will give the area an economical value, but the conservation projects are the ones that will actually stop and reverse the degradation of the forests. Ecotourism can generate an economic income for the local population, but if implemented without any conservation project it will never stop the degradation of Mount Moco and can even worsen the situation.

It is a relief to note that an interest regarding the conservation of Mount Moco is present and appearing in national and international organizations and individuals. For example, Luanda International School is taking student groups to the area in order to

build awareness regarding its importance. The USAID (United States Agency for International Development) had proposed the legal recognition as a protected natural area of Mount Moco as well as expressed their interest in helping with the implementation and training for this protected area to be successful (USAID, 2008).

Finally...

“The survival of Afromontane vegetation [forest] is an ongoing struggle between the daily necessities of poverty-stricken Africa, and the values perceived by those more fortunate” (Grimshaw, 2001). Nevertheless ecotourism together with conservation initiatives show that no constant struggle must be undertaken in order to preserve Mount Moco, but rather an alliance. In which it is imperative to attend the needs of the local population and value their ancient relation with this natural area, and extremely important to remember that “it is difficult to conserve on an empty stomach” (*Abel Barasa*).

6. CONCLUSIONS

- The most important tourist resources in Mount Moco are the summit of Angola's highest point and the impressive and interesting bird diversity present in the forest patches. For this reason, the groups of tourists that an ecotourism project will look forward to attract are birdwatchers and nature focused tourist, and a more general group that is interested in visiting the highest point of Angola.
- The recognition of Mount Moco as a natural protected area by Angola government has to be achieved in order to assure its conservation. It is believed that ecotourism initiatives and the benefits they produced can motivate the government to provide Mount Moco with this conservation status.
- Kanjonde is the only village in Mount Moco area with access to the forests. Most of the population is young. This is because of the high total fertility rate and the low life expectancy. Even though the population might have a considerable amount of births, no all those persons get to the elder group ages, and for this reason the elder population is quite reduced when compared to the young population.
- The local population is poorly educated. Most of them are illiterate and are not able to speak Portuguese. This characteristic of Kanjonde population is a major problem when considering an ecotourism project in the area that has to count with their active involvement.
- No basic services are available in the village and most population survives from a subsistence economy based in agriculture for self-supply. The principal crops grown in the area are corn, potatoes and beans. Some of the population performed other activities such as livestock breeding.
- Hunting, collection of wood for fuel and construction, and burns are the principal threats to Mount Moco biodiversity and habitats. The forest patches are especially threat by the wood collection for construction and the uncontrolled fires originated from the burns with agricultural purposes. The unsustainable use of the natural resources of the area is the major threat for its conservation.
- Hunters in Mount Moco are not restricted and not specialized in the preys they hunt, however sometimes they might hunt endangered species (e.g., *Pternistis swierstrai*).

They also have an intrinsic knowledge of the area and their species. They could be trained as nature guides for the ecotourism project, using their skills to track down animals in order for tourists to see them and photograph them.

- Tourist services and infrastructures are inexistent in Mount Moco. The main cities of Angola have a series of services but their prices are quite high when compared with their quality. This situation is expected to change, with the development of the country and the increase of the importance and interest in the tourism sector.
- An ecotourism project managed by a NGO is the most adequate model for Mount Moco. The lack of education of the local population and the urgent conservation needs of the area make vital that an organization that have these objectives in mind is the one operating an ecotourism project. A NGO will ensure the active participation of the local population, achieving the conservation objectives for the area. Nevertheless the disadvantages and problems this kind of model can present have to be carefully exanimate and avoid.
- Education is extremely important for the development and success of any ecotourism and other type of project in Mount Moco. Education will allow the local population to develop the skills they need to be part of the ecotourism project and to create awareness and positive behavior that will benefit the conservation of Mount Moco.
- An ecotourism project can be used as a tool for the conservation of the Afromontane forest in Mount Moco. Nevertheless this project has to always go together with the active participation of the local population and conservation initiatives. The conservation initiatives have to be focus in presenting alternatives to the population for the sustainable use of natural resources. The local population needs to use the resources in the area in order to survive and for this reason is extremely important to present alternatives to them. No ecotourism project by itself will ever succeed in achieving the conservation of Mount Moco. The ecotourism project gives an economical value to the area but do not stop or reverse the degradation of the forest, this is achieved through the implementation of conservation projects.

7. REFERENCES

- Angola Field Group. (no date). Accessed 11 November 2010. Available in <http://angolafieldgroup.com/>.
- Angola Global. (no date). Directório de Informação de Angola. Accessed 20 November 2010. Available in <http://www.angolaglobal.net/>.
- Angolan Adventure Safaris. (no date). Accessed 21 December 2010. Available in http://aasafaris.com/travel_angola/.
- AngoNoticias. (2010). Mais de 365 mil turistas visitaram Angola em 2009. Accessed 26 January 2011. Available in http://www.angonoticias.com/full_headlines_.php?id=28888.
- Aniah, E., Eja, E., Out, J. & Ushie, M. (2009). Patronage of ecotourism potentials as a strategy for sustainable tourism development in Cross River state, Nigeria. *Journal of Geography and Geology*. **1**: 20-26.
- Aylward, B., Allen, K., Echevarria, J. & Tossi, J. (1996). Sustainable ecotourism in Costa Rica: the Monteverde Cloud Forest Preserve. *Biodiversity and Conservation*. **5**: 315-343.
- Ayotte, A. (2009). *Ecotourism as a form of sustainable development in South Africa*. Unpublished Mater Thesis. Queen's University. Ontario, Canada. 168 pages.
- BirdLife. (2010a). *Endemic Bird Area factsheet: Western Angola*. Accessed 30 November 2010. Available in <http://birdlife.org>
- BirdLife. (2010b). *Important Bird Areas factsheet: Mount Moco*. Accessed 30 November 2010. Available in <http://birdlife.org>
- Blanco, M. (2008). *Guía para la Elaboración del Plan de Desarrollo Turístico de un Territorio*. Instituto Interamericano de Cooperación para la Agricultura. San José, Costa Rica.
- Brandon, K. 1996. *Ecotourism and Conservation: A Review of Key Issues*. Environment Department Paper #33. World Bank. Washington DC.
- Brandon, K., & Margolius, R. (1996). The bottom line: getting conservation back into ecotourism. In E. Malek-Zadeh (Ed.), *Bulletin 99: The Ecotourism Equation: Measuring the Impacts*. Yale Publications.
- Brightsmith, D. (2008). Rainforest Expeditions and Earthwatch as funding partners for Macaw (*Ara spp.*) research in Southeastern Peru. *Ornitologia Neotropical*. **19**: 173-181.
- Brightsmith, D., Stronza, A., & Holle, K. (2008). Ecotourism, conservation biology and volunteer tourism: A mutually beneficial triumvirate. *Biological Conservation*. **141**: 2832-2842.
- Böhm, A. (2009). *The SWOT Analysis*. GRIN Verlag.

- Bookbinder, M., Dinerstein, E., Rijal, A., Cauley, H. & Rajouria, A. Ecotourism's support of biodiversity conservation. *Conservation Biology*. **12**: 1399-1404.
- Carvalho, H. (2008). *Análise multivariado de dados qualitativos: utilização da análise de correspondências múltiplas com o SPSS*. Edições Sílabo.
- Ceballos-Lascurain, H. (1996). *Tourism, Ecotourism and Protected Areas: The State of Nature-based Tourism Around the World and Guidelines for its Development*. IUCN. Cambridge.
- CIA, Central Intelligence Agency. (2010). The World Factbook. Accessed 01 November 2010. Available in <https://www.cia.gov/library/publications/the-world-factbook/geos/ao.html>
- Collins, N. & Wall, G. (2007). Evaluating tourism potential: A SWOT analysis of the Western Negev, Israel. *Tourism Review*. **55**: 51-63.
- Cowling, R. M., Richardson, D. M., & Pierce, S. M. (2004). *Vegetation of Southern Africa*. Cambridge University Press. Cambridge.
- Cunha, L. (2008). Avaliação do Potencial Turístico. *COGITUR Journal of Tourism Studies*. Accessed 20 November 2010. Available in <http://revistas.ulusofona.pt/index.php/jts/article/view/22>.
- Dantas, N., & Sousa Melo, R. (2008). O método SWOT como ferramenta para promover o diagnóstico turístico de um local: o caso do município de Itabaiana. *Caderno Virtual de Turismo*. **8**: 118-130.
- Dean, W. R. J. (2001). Angola. In L. D. C. Fishpool & M. I. Evans (Eds.). *Important Birds Areas in Africa and associated islands: priority sites for conservation*. Pisces Publications and BirdLife International. Cambridge.
- de Vasconcellos Pêgas, F. & Stronza, A. (2008). Ecotourism equations: do economic benefit equal conservation? In A. Stronza & W. Durham (Eds.). *Ecotourism and Conservation in the Americas*. CABI International. Reading.
- Doan, T. (2000). The effects of ecotourism in developing nations: an analysis of case studies. *Journal of Sustainable Tourism*. **8**: 288-304.
- Embassy of the Republic of Angola in Washington DC (no date). Accessed 20 November 2010. Available in <http://www.angola.org/tourism.html>.
- Fennel, D. & Weaver, D. (2005). The Ecotourism concept and Tourism-Conservation symbiosis. *Journal of Sustainable Tourism*. **13**: 373-390.
- Ferrel, O. C., & Hartline, M. D. (2008). *Marketing Strategy*. 4th edition. Cengage Learning. USA.
- FlightStats: Fly Smarter. (no date). 4 de Fevereiro Airport Departures. Accessed 20 November 2010. Available in <http://www.flightstats.com/>.
- Glewwe, P. (2005a). Overview of the implementation of household surveys in developing countries. In *Household Sample Surveys in Developing and Transition Countries*. United Nations. New York. Accessed 26 April 2010. Available in <http://unstats.un.org/unsd/hhsurveys/>.

- Glewwe, P. (2005b). An overview of questionnaire design for household surveys in developing countries. In *Household Sample Surveys in Developing and Transition Countries*. United Nations. New York. Accessed 26 April 2010. Available in <http://unstats.un.org/unsd/hhsurveys/>
- Gobena, A. (2008). *Assessment of ecotourism potentials for sustainable natural resources management in and around Aijata-Shala Lakes National Park in Central Ethiopian Rift Valley*. Unpublished Mater Thesis. Addis Ababa University. Addis Ababa, Ethiopia. 95 pages.
- Gomez, V. (2008). Identificación y Evaluación de Recursos Turísticos. *Diplomado en Gestión de Turismo Rural: Modulo IV*. Universidad Nacional Agraria La Molina. Lima, Perú.
- Gordillo, J., Hunt, C., & Stronza, A. (2008). An ecotourism partnership in the Peruvian Amazon: The case of Posada Amazonas. In A. Stronza & W. Durham (Eds.). *Ecotourism and Conservation in the Americas*. CABI International. Reading.
- Gossling, S. (1999). Ecotourism: a means to safeguard biodiversity and ecosystems functions? *Ecological Economics*. **29**: 303-320.
- Google™ Earth
- Grimshaw, J. M. (2001). What do we really know about the Afromontane Archipelago? *Systematics and Geography of Plants*. **71**: 949-957.
- Halstead, L. (2003). *Making community-based tourism work: An assessment of factors contributing to successful community-owned tourism development in Caprivi, Namibia*. DEA Research Discussion Paper N°60. Ministry of Environment and Tourism. Windhoek, Namibia.
- Harbott, L. (2002). The Value of Ecotourism: An Ecological Perspective. *New Zealand Journal of Outdoor Education*. **1**: 38-42.
- Haviland, W. A., Prins, H. E. L., Walrath, D., & McBride, B. (2009). *The Essence of Anthropology*. 2nd edition. Cengage Learning. Wadsworth.
- Hayward, P. (2002). *GCSE Leisure and Tourism: Heinemann Vocational Series*. Heinemann Publications.
- Heher, S. (2003). *Ecotourism Investment and Development Models: Donors, NGOs and Private Entrepreneurs*. Cornell University.
- Huntley, B. J. (1974). Outlines of wildlife conservation in Angola. *J. S. Afr Wildl. Management Assoc.* **4**: 157-166.
- Huntley, B. J., & Matos, E. M. (1994). Botanical diversity and its conservation in Angola. *Stelitzia*. **7**: 53-74.
- International Monetary Fund. (no date). Report for Selected Countries and Subjects: Angola. Accessed 01 November 2010. Available in <http://www.imf.org/>.
- Issacs, J. C. (2000). The limited potential of ecotourism to contribute to wildlife conservsation. *Wildlife Society Bulletin*. **28**: 61-69.

- Kruger, O. (2005). The role of ecotourism in conservation: panacea or Pandora's box? *Biodiversity and Conservation*. **14**: 579-600.
- Legendre, P., & Legendre, L. (1998). *Numerical Ecology*. 2nd edition. Elsevier Scientific Publishing Company. Amsterdam.
- Lei 9/04 from 9 November 2004. Angola Land Legislation.
- Mercer. (2010). *Mercer's 2010 Cost of Living survey highlights - Global*. Accessed 25 January 2011. Available in <http://www.mercer.com/costofliving>.
- Mills, M. & Dean, W.R.J. (2007). Notes on Angolan birds: new country records, range extensions and taxonomic questions. *Ostrich*. **78**: 55-63.
- Mills, M., Olmos, F., Melo, M., & Dean, R. J. (*in press*). Mount Moco: its importance to the conservation of Swierstra's Francolin *Pternistis swierstrai* and the Afromontane avifauna of Angola.
- Moraes, E. (2008). *Uma perspectiva socioeconómica sobre a potencialidade do turismo na economia angolana*. 1^o Encontro Luso-Angolano em Economia, Sociologia e Desenvolvimento Rural. Evora, Portugal. 16-18 October 2008.
- Mount Moco.org. (no date). Accessed 30 June 2010. Available in <http://www.mountmoco.org/>.
- Munn, C. (1992). Macaw Biology and Ecotourism or "When a Bird in the Bush is Worth Two in the Hand". In S. R. Beissinger & N. F. R. Snyder (Eds.). *New World Parrot in Crisis: Solutions for Conservation Biology*. Smithsonian Institution Press.
- NASA/University of Maryland. (2002). MODIS Hotspot / Active Fire Detections. Data set. MODIS Rapid Response Project, NASA/GSFC [producer], University of Maryland, Fire Information for Resource Management System [distributors]. Accessed 10 November 2010. Available in <http://firefly.geoq.umd.edu/firemap/>.
- Ngece, K. (2002). Community based ecotourism: What can the people of East Africa learn from success stories elsewhere? East African Ecotourism Development and Conservation Consultants.
- Ofosu-Amaah, N. (2007). *Conservation for sustainable development? Ecotourism in Tanzania*. Unpublished Bachelor Thesis. Harvard College. Cambridge, USA. 123 pages.
- Ogotu, Z. A. (2002). The impact of ecotourism on livelihood and natural management in Eselenkei, Amboseli ecosystem, Kenya. *Land Degradation and Development*. **13**: 251-256.
- Okello, F. (2003). *Ecotourism in Uganda: A Case Study of the Mgahinga National Park*. Unpublished Master Thesis. University of Gothenburg. Göteborg. 64 pages.
- Omauha African Safaris. (no date). Accessed 21 December 2010. Available in <http://www.omauha.com/homepage.html>.
- OMT, Organización Mundial de Turismo. (1998). *Introducción al Turismo*. Editora Roca. Madrid.

- Ross, S., & Wall, G. (1999a). Ecotourism: towards congruence between theory and practice. *Tourism Management*. **20**: 123-132.
- Ross, S., & Wall, G. (1999b). Evaluating ecotourism: The case of North Sulawesi, Indonesia. *Tourism Management*. **20**: 673-682.
- Sandbrook, C. (2010). Local economic impact of different forms of nature-based tourism. *Conservation Letters*. **3**: 21-28.
- Scott, P. (1998). *From conflict to collaboration: people and forests at Mount Elgon, Uganda*. IUCN.
- Sillignakis, K. (no date). *Ecotourism; what it is and what it does, the case of Africa*. Accessed 30 June 2010. Available in <http://sillignakis.com/PDF/ECOTOURISM.pdf>.
- Spenceley, A. (2003). *Managing sustainable nature-based tourism in Southern Africa: A practical assessment tool*. Unpublished PhD Thesis. University of Greenwich. Greenwich, UK. 334 pages.
- Stead, M., & Rorison, S. (2009). *The Angola Bradt Travel Guide*. Bradt Travel Guides Ltd. Bucks.
- Stronza, A. (2008). The bold agenda for ecotourism. In A. Stronza & W. Durham (Eds.). *Ecotourism and Conservation in the Americas*. CABI International. Reading.
- Terborgh, J. (2002). *Making parks work: strategies for preserving tropical nature*. Island Press. Washington DC.
- The Washington Post. (2002). Features International Spotlight: Angola. Accessed 22 December 2010. Available in <http://www.washingtonpost.com/wp-adv/specialsales/spotlight/angola/article24.html>.
- TIES, The International Ecotourism Society. (1990). What is Ecotourism. Accessed 19 October 2010. Available in http://www.ecotourism.org/site/c.orLQKXPCLmF/b.4835303/k.BEB9/What_is_Ecotourism_The_International_Ecotourism_Society.htm.
- Travel Notes. (no date). Accessed 01 November 2010. Available in <http://www.travelnotes.org>.
- Tyynelä, T., & Rantala, S. (2004). *Linking ecotourism to the future of Lake Malawi National Park*. Paper presented at the Human Dimensions of Family, Farm and Community Forestry International Symposium, Washington State University.
- Uddhammar, E. (2006). Development, conservation and tourism: conflict or symbiosis. *Review of International Political Economy*. **13**: 656-678.
- UN, United Nations. (1982). *Provisional Guidelines on Standard International Age Classifications*. Department of International Economic and Social Affairs. New York.
- UN, United Nations. (2005). *Designing Household Survey Samples: Practical Guidelines*. New York.

- UN, United Nations. (2009). *World Population Prospect: The 2008 Revision*. Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat. New York.
- USAID, United States Agency for International Development. (2008). *Biodiversity and Tropical Forest Assessment for Angola*. Biodiversity Analysis and Technical Support Program. Chemonics International Inc.
- US Department of State. (2010). Background Note: Angola. Accessed 1 November 2010. Available in <http://www.state.gov/r/pa/ei/bgn/6619.htm>.
- Wall, G. (1994). Ecotourism: old wine in new bottles? *Trends*. **31**: 4-9.
- Wall, G. (1997). Is Ecotourism Sustainable? *Environmental Management*. **21**: 483-491.
- Watkin, J. (2003). The evolution of ecotourism in East Africa: From an idea to an industry. *Summary of the Proceedings of the East African Regional Conference on Ecotourism*. Nairobi, Kenya. 19-23 March 2002. 28 pages.
- Wearing, S., & Neil, J. (1999). *Ecotourism: Impacts, Potentials and Possibilities*. 2nd edition. Elsevier Scientific Publishing Company. Oxford.
- White, F. (1978). The Afromontane Region. In M. J. A. Werger (Ed.). *Biogeography and ecology of southern Africa*. Junk. The Hague.
- White, F. (1981). The history of the Afromontane archipelago and the scientific need for its conservation. *Afr. J. Ecol.* **19**: 33-54.
- World Bank. (2011). World databank for Angola Accessed 25 January 2011. Available in <http://data.worldbank.org/country/angola>.
- World Geographic. (no date). Accessed 01 November 2010. Available in <http://www.world-geographics.com/maps/africa/map-of-angola/>.
- World Wildlife Fund; McGinley, M. (Topic Editor). (2008). Angolan montane forest-grassland mosaic. In C. Cleveland (Eds). *Encyclopedia of Earth*. Washington DC. Accessed 25 May 2010. Available in http://www.eoearth.org/article/Angolan_montane_forest-grassland_mosaic.
- Yansaneh, I. (2005). Overview of sample design issues for household surveys in developing and transition countries. In *Household Sample Surveys in Developing and Transition Countries*. United Nations. New York. Accessed 26 April 2010. Available in <http://unstats.un.org/unsd/hhsurveys/>.

Ecotourism in Mount Moco
93

Appendix 2. Tourist Resources Classification according to the OAS.

Each major category is divided into different types and sub types.

Class	Category	Type	Subtype	
Natural	1. Natural Sites	1.1. Mountains	1.1.1. High mountain 1.1.2. Mountain range 1.1.3. Volcanoes 1.1.4. Valleys and fields	1.1.5. Plateau 1.1.6. Snow areas 1.1.7. Glaciers 1.1.8. Forests
		1.2. Plains	1.2.1. Prairie 1.2.2. Deserts	1.2.3. Salt sites 1.2.4. High plains
		1.3. Coasts	1.3.1. Beach 1.3.2. Cliff 1.3.3. Reef 1.3.4. Keys 1.3.5. Islands	1.3.6. Water channels 1.3.7. Fiord 1.3.8. Peninsula 1.3.9. Bays and coves
		1.4. Lakes, lagoons and estuaries		
		1.5. Rivers		
		1.6. Waterfalls		
		1.7. Caves		
		1.8. Places for wildlife and flora observation		
		1.9. Places for hunting and fishing		
		1.10. Quaint paths		
		1.11. Thermal springs		
		1.12. National parks and wildlife and flora reserves		
	2. Museums and cultural manifestations	2.1. Museums		
		2.2. Art and Technical works	2.2.1. Painting 2.2.2. Sculpture 2.2.3. Decorative art	2.2.4. Urban art 2.2.5. Engineering works
		2.3. Historical places		
		2.4. Ruins and archaeological sites		
Artificial	3. Folklore	3.1. Religious manifestations and popular beliefs		
		3.2. Fairs and Markets		
		3.3. Music and dances		
		3.4. Arts and Handicraft	3.4.1. Pottery 3.4.2. Textiles 3.4.3. Metals 3.4.4. Leather goods 3.4.5. Wood 3.4.6. Stones	3.4.7. Basketwork 3.4.8. Musical instruments 3.4.9. Masks 3.4.10. Ritual objects 3.4.11. Paintings 3.4.12. Images
		3.5. Typical food and beverages		
		3.6. Ethnic groups		
		3.7. Popular and spontaneous architecture		
	4. Contemporary Technical, Scientific and artistic manifestations	4.1. Mining sites		
		4.1. Farming sites		
		4.3. Industrial sites		
		4.4. Art and Technical works	4.4.1. Painting 4.4.2. Sculpture 4.4.3. Handicraft 4.4.4. Industrial design	4.4.5. Architecture 4.4.6. Urban art 4.4.7. Engineering works
		4.5. Scientific and Technical centers	4.5.1. Zoos and aquariums 4.5.2. Research centers	
	5. Scheduled events	5.1. Artistic	5.1.1. Musicals 5.1.2. Theaters	5.1.3. Film festivals
		5.2. Sports		
		5.3. Others	5.3.1. Religious & popular festivities	5.3.7. Amusement parks
			5.3.2. Beauty pageant	5.3.8. Markets
			5.3.3. Conventions	5.3.9. Night life
			5.3.4. Bull fight	5.3.10. Gastronomy
			5.3.5. Fairs and expositions	5.3.11. Rodeos
			5.3.6. Lottery games	5.3.12. Carnivals

Appendix 3. 2009 Survey for Kanjonde population.

INQUÉRITO À POPULAÇÃO DA ALDEIA DO KAJONDE-MORRO DO MOCO

1. DADOS GERAIS DA FAMÍLIA

Ficha n.º 1 Data 29 / 07 / 2009

Idade: 35 Sexo: ☒ M ☐ F Entrevistador: Poliana José Tavares

Escolaridade 32

N.º de pessoas da família 5 N.º de filhos: 3 N.º Homens 1 N.º Mulheres 1 N.º Crianças 1-2

ORIGEM DA FAMÍLIA

Local ☒ Emigrante ☐ Refugiada ☐ Outras _____

LÍNGUAS FALADAS:

Português ☒ Umbundu ☒ Outras _____

2. ASPECTOS SOCIAIS

Escola ☒ Posto de Saúde ☐ Igreja ☒

As crianças vão à escola? Sim (8) É escola Primária? Sim É escola secundária _____

Onde fica a escola? Na Aldeia Como é que vão à escola? A pé

Onde fica o posto de saúde? Na Aldeia

Quais são os principais problemas de saúde na família? doenças da gripe e febre

Como é que são adquiridos os medicamentos? Na farmácia

Quais são as principais necessidades na família? Medicamentos e alimentos

3. PRINCIPAIS ACTIVIDADES DA FAMÍLIA

Agricultura ☒ Criação de animais ☒ Caça ☐ Pesca ☐ Outra _____

Onde caça? _____ Que animais e pássaros caça? _____

Que uso faz aos produtos animais? Venda Sim Consumo Sim Decorativo _____ Medicinal _____

TIPO DE CULTURAS

Milho ☒ Feijão ☒ Batata ☒ Banana ☒ Hortaliças ☒ Outras _____

TIPOS DE ANIMAIS

Bois ☐ Cabritos ☒ Porcos ☐ Coelhos ☐ Galinhas ☒ Patos ☐

FINALIDADE DOS PRODUTOS DA SUA ACTIVIDADE

Consumo ☒ Comércio ☐ Outras Sim

Que produtos costuma vender? batata, batata frita e feijão

Que produtos costuma comprar? azeite, açúcar, óleo, arroz, sal, feijão, leite

Onde se comercializa? Na comunidade de São João, também vende na Huancho e Jacaré

4. RECURSOS NATURAIS USADOS PELA FAMÍLIA

Medicinal ☒ Alimentar ☐ Artesanato ☐ Outra _____

Construção: Madeira ☒ Capim ☐ Outras _____

Combustíveis: Carvão ☐ Lenha ☒ Outros _____

Onde vai buscar lenha (indicar no mapa)? na mata Quanto tempo demora lá a chegar? 2h

Quantas vezes por semana vai buscar lenha? 15 vezes Quanto tempo leva para apanhar lenha 2h

Quanto molhos de lenha apanha a cada viagem? 1 molho

Você compra Não ou vende Não (S/N)

O local onde vai buscar lenha hoje é mais distante que há dois anos atrás? Não

Acha que a floresta que se vê da Aldeia pode desaparecer? Não Em quantos anos? 1

Como utiliza a lenha para cozinhar? na chapa

Tem interesse em usar outros fornos que gastem menos lenha? Sim

Costumam fazer queimadas? Não Em que época do ano? Não

Com que finalidade?

OBSERVAÇÕES:

[illegible]

Appendix 5. Village Information Data Sheet

VILLAGE INFORMATION DATA SHEET									
Date						Observer			
Village Name									
GPS location						Others:			
		Altitude							
COMMUNICATIONS									
Distance from main road (km)						Distance in time (car)			
Condition of principal access									
Phone or cell phone facilities?									
Notes:									
EDUCATION									
School		Yes	No	Observations:					
Permanent teacher?		Yes	No						
Took pictures?		Yes	No						
Notes:									
HEALTH									
Health Center		Yes	No	Observations:					
Doctor / nurse		Yes	No						
Notes:									
WATER									
River / water course		Yes	No	Observations:					
Well		Yes	No						
Notes:									
RELIGION									
Church						Observations:			
Construction									
Notes:									
OTHERS:									

Appendix 6. Questionnaire for biodiversity threats in Mount Moco.

BIODIVERSITY THREATS DATA SHEET									
Date					Observer				
Data sheet number									
1. Where do you go to pick up wood for a fire? (<i>Show vegetation plate</i>)									
Forest	Woodland	Grassland	Others						
2. How do you pick up wood for a fire?									
Wood that is around in the ground	Cut down a tree	Cut from a tree that is already down	Cut branches from trees	Burned wood					
3. How many days per week do you collect wood for fire? (n° days/week)									
4. Where do you go to pick up wood for construction? (<i>Show vegetation plate</i>)									
Forest	Woodland	Grassland	Others						
5. How do you pick up wood for construction?									
Cut down a tree	Someone else cut a tree for me	Cut from a tree that is already down	Others (describe)						
6. How many times a year you need wood for construction? (n° times/year)									
7. What animals do you hunt? (<i>Show Animals plate</i>)									
Dassie	Cane rat	Scrub hare	Common duiker	Reedbuck					
Guinea fowl	Swierstra's francolin	Red necked Francolin	Finsch Francolin						
8. Where do you hunt? (<i>Show vegetation plate</i>)									
Forest	Woodland	Grassland	Others						
9. How do you hunt?									
Sling shot	Tramps	Shootgun	Others (describe)						
10. How often do you hunt?									
Daily	Weekly	Monthly	Irregular (n° times/year)						
11. How many preys do you get in each hunting trip?					12. Do you hunt for:				
					Myself/my family		To sell/to others		
13. Can we see your hunting gear?					Yes	No	(Picture Taken?)	Yes	No
Notes:									

Appendix 7. Identification Plate for Vegetation Types in Mount Moco.

The plates used during the interviews had no names in them and only letters to identify each picture as follows: A=Forest, B=Woodland and C=Grassland.



A












B



C

Appendix 8. Identification Plate for Animals present in Mount Moco.

The plates used during the interviews had no names in them and only letters to identify each picture as follows: AA= *Procavia sp.*, BB= *Thryonomys swinderianus*, CC= *Redunca fulvorufula*, DD= *Sylvicapra grimmia*, EE= *Francolinus afer*, FF= *Numida meleagris*, GG= *Pternistis swierstrai*, HH= *Francolinus finschii* and II= *Lepus saxatilis*.

 <p>AA</p>	 <p>BB</p>
 <p>CC</p>	 <p>DD</p>
 <p>EE</p>	 <p>FF</p>
 <p>GG</p>	 <p>HH</p>
 <p>II</p>	

Appendix 9. Mount Moco Bird Species List.

Common and scientific name (in italics) for the 234 bird species recorded in Mount Moco. Taken from www.mountmoco.org.

- 1 Helmeted Guineafowl *Numida meleagris*
- 2 Coqui Francolin *Peliperdix coqui*
- 3 Finsch's Francolin *Scleroptila finschi*
- 4 Swierstra's Francolin *Pternistis swierstrai*
- 5 Red-necked Spurfowl *Pternistis afer*
- 6 African Black Duck *Anas sparsa*
- 7 Western Cattle Egret *Bubulcus ibis*
- 8 African Cuckoo-Hawk *Aviceda cuculoides*
- 9 Black-winged Kite *Elanus caeruleus*
- 10 Black Kite *Milvus migrans*
- 11 Brown Snake Eagle *Circaetus cinereus*
- 12 African Marsh Harrier *Circus ranivorus*
- 13 African Harrier-Hawk *Polyboroides typus*
- 14 Dark Chanting Goshawk *Melierax metabates*
- 15 Gabar Goshawk *Micronisus gabar*
- 16 African Goshawk *Accipiter tachiro*
- 17 Shikra *Accipiter badius*
- 18 Little Sparrowhawk *Accipiter minullus*
- 19 Ovambo Sparrowhawk *Accipiter ovampensis*
- 20 Lizard Buzzard *Kaupifalco monogrammicus*
- 21 Red-necked Buzzard *Buteo auguralis*
- 22 Augur Buzzard *Buteo augur*
- 23 Martial Eagle *Polemaetus bellicosus*
- 24 Long-crested Eagle *Lophaetus occipitalis*
- 25 Crowned Eagle *Stephanoaetus coronatus*
- 26 Rock Kestrel *Falco rupicolus*
- 27 Lanner Falcon *Falco biarmicus*
- 28 Peregrine Falcon *Falco peregrinus*
- 29 Black-bellied Bustard *Lissotis melanogaster*
- 30 Red-chested Flufftail *Sarothrura rufa*
- 31 African Crane *Crex egregia*
- 32 Kurrichane Buttonquail *Turnix sylvaticus*
- 33 Spotted Thick-knee *Burhinus capensis*

- 34 African Wattled Lapwing *Vanellus senegallus*
- 35 African Olive Pigeon *Columba arquatrix*
- 36 Red-eyed Dove *Streptopelia semitorquata*
- 37 Ring-necked Dove *Streptopelia capicola*
- 38 Tambourine Dove *Turtur tympanistria*
- 39 Meyer's Parrot *Poicephalus meyeri*
- 40 Schalow's Turaco *Tauraco schalowi*
- 41 Ross's Turaco *Musophaga rossae*
- 42 Coppery-tailed Coucal *Centropus cupreicaudus*
- 43 Levaillant's Cuckoo *Clamator levaillantii*
- 44 Jacobin Cuckoo *Clamator jacobinus*
- 45 Klaas's Cuckoo *Chrysococcyx klaas*
- 46 Black Cuckoo *Cuculus clamosus*
- 47 Red-chested Cuckoo *Cuculus solitarius*
- 48 Spotted Eagle-Owl *Bubo africanus*
- 49 African Wood Owl *Strix woodfordii*
- 50 Fiery-necked Nightjar *Caprimulgus pectoralis*
- 51 Ruwenzori Nightjar *Caprimulgus ruwenzorii*
- 52 Freckled Nightjar *Caprimulgus tristigma*
- 53 Square-tailed Nightjar *Caprimulgus fossii*
- 54 Pennant-winged Nightjar *Macrodipteryx vexillarius*
- 55 Scarce Swift *Schoutedenapus myoptilus*
- 56 Alpine Swift *Tachymarptis melba*
- 57 Common Swift *Apus apus*
- 58 Fernando Po Swift *Apus sladeniae*
- 59 Bradfield's Swift *Apus bradfieldi*
- 60 Little Swift *Apus affinis*
- 61 Horus Swift *Apus horus*
- 62 White-rumped Swift *Apus caffer*
- 63 Red-backed Mousebird *Colius castanotus*
- 64 Bar-tailed Trogon *Apaloderma vittatum*
- 65 Grey-headed Kingfisher *Halcyon leucocephala*
- 66 Brown-hooded Kingfisher *Halcyon albiventris*
- 67 Striped Kingfisher *Halcyon chelicuti*
- 68 Little Bee-eater *Merops pusillus*
- 69 White-fronted Bee-eater *Merops bullockoides*
- 70 Crowned Hornbill *Tockus alboterminatus*

- 71 Pale-billed Hornbill *Tockus pallidirostris*
- 72 Southern Ground Hornbill *Bucorvus leadbeateri*
- 73 Naked-faced Barbet *Gymnobucco calvus*
- 74 Anchieta's Barbet *Stactolaema anchietae*
- 75 Western Tinkerbird *Pogoniulus coryphaeus*
- 76 Yellow-fronted Tinkerbird *Pogoniulus chrysoconus*
- 77 Black-collared Barbet *Lybius torquatus*
- 78 Black-backed Barbet *Lybius minor*
- 79 Cassin's Honeybird *Prodotiscus insignis*
- 80 Green-backed Honeybird *Prodotiscus zambesiae*
- 81 Lesser Honeyguide *Indicator minor*
- 82 Greater Honeyguide *Indicator indicator*
- 83 Red-throated Wryneck *Jynx ruficollis*
- 84 Bennett's Woodpecker *Campethera bennettii*
- 85 Cardinal Woodpecker *Dendropicos fuscescens*
- 86 Olive Woodpecker *Dendropicos griseocephalus*
- 87 Margaret's Batis *Batis margaritae*
- 88 Chinspot Batis *Batis molitor*
- 89 Black-throated Wattle-eye *Platysteira peltata*
- 90 White-crested Helmetshrike *Prionops plumatus*
- 91 Retz's Helmetshrike *Prionops retzii*
- 92 Grey-headed Bushshrike *Malaconotus blanchoti*
- 93 Orange-breasted Bushshrike *Chlorophoneus sulfureopectus*
- 94 Gorgeous Bushshrike *Chlorophoneus viridis*
- 95 Marsh Tchagra *Bocagia minuta*
- 96 Black-crowned Tchagra *Tchagra senegalus*
- 97 Black-backed Puffback *Dryoscopus cubla*
- 98 Tropical Boubou *Laniarius aethiopicus*
- 99 Brubru *Nilaus afer*
- 100 White-breasted Cuckooshrike *Coracina pectoralis*
- 101 Black Cuckooshrike *Campephaga flava*
- 102 Souza's Shrike *Lanius souzae*
- 103 Common Fiscal *Lanius collaris*
- 104 Black-headed Oriole *Oriolus larvatus*
- 105 Fork-tailed Drongo *Dicrurus adsimilis*
- 106 African Paradise Flycatcher *Terpsiphone viridis*
- 107 Pied Crow *Corvus albus*

- 108 White-tailed Blue Flycatcher *Elminia albicauda*
- 109 White-winged Black Tit *Parus leucomelas*
- 110 Rufous-bellied Tit *Parus rufiventris*
- 111 Miombo Tit *Parus griseiventris*
- 112 Grey Penduline Tit *Anthoscopus caroli*
- 113 Angola Lark *Mirafraga angolensis*
- 114 Flappet Lark *Mirafraga rufocinnamomea*
- 115 Red-capped Lark *Calandrella cinerea*
- 116 Dark-capped Bulbul *Pycnonotus tricolor*
- 117 Yellow-throated Leaflove *Chlorocichla flavicollis*
- 118 Cabanis's Greenbul *Phyllastrephus cabanisi*
- 119 Black-collared Bulbul *Neolestes torquatus*
- 120 Black Saw-wing *Psalidoprocne pristoptera*
- 121 Grey-rumped Swallow *Pseudhirundo griseopyga*
- 122 Banded Martin *Riparia cincta*
- 123 Barn Swallow *Hirundo rustica*
- 124 Angola Swallow *Hirundo angolensis*
- 125 Black-and-rufous Swallow *Hirundo nigrorufa*
- 126 Pearl-breasted Swallow *Hirundo dimidiata*
- 127 Rock Martin *Ptyonoprogne fuligula*
- 128 Greater Striped Swallow *Cecropis cucullata*
- 129 Lesser Striped Swallow *Cecropis abyssinica*
- 130 Mosque Swallow *Cecropis senegalensis*
- 131 Red-throated Cliff Swallow *Petrochelidon rufigula*
- 132 Laura's Woodland Warbler *Phylloscopus laurae*
- 133 Willow Warbler *Phylloscopus trochilus*
- 134 Dark-capped Yellow Warbler *Chloropeta natalensis*
- 135 Fan-tailed Grassbird *Schoenicola brevirostris*
- 136 Evergreen Forest Warbler *Bradypterus lopezi*
- 137 Red-faced Cisticola *Cisticola erythrops*
- 138 Rock-loving Cisticola *Cisticola emini*
- 139 Wailing Cisticola *Cisticola lais*
- 140 Winding Cisticola *Cisticola marginatus*
- 141 Croaking Cisticola *Cisticola natalensis*
- 142 Short-winged Cisticola *Cisticola brachypterus*
- 143 Neddicky *Cisticola fulvicapilla*
- 144 Wing-snapping Cisticola *Cisticola ayresii*

- 145 Tawny-flanked Prinia *Prinia subflava*
- 146 Grey Apalis *Apalis cinerea*
- 147 Miombo Wren-Warbler *Calamonastes undosus*
- 148 Salvadori's Eremomela *Eremomela salvadorii*
- 149 Green-capped Eremomela *Eremomela scotops*
- 150 Black-necked Eremomela *Eremomela atricollis*
- 151 Moustached Grass Warbler *Melocichla mentalis*
- 152 Red-capped Crombec *Sylvietta ruficapilla*
- 153 African Hill Babbler *Pseudoalcippe abyssinica*
- 154 Arrow-marked Babbler *Turdoides jardineii*
- 155 Hartlaub's Babbler *Turdoides hartlaubii*
- 156 Garden Warbler *Sylvia borin*
- 157 African Yellow White-eye *Zosterops senegalensis*
- 158 Yellow-bellied Hyliota *Hyliota flavigaster*
- 159 Spotted Creeper *Salpornis spilonotus*
- 160 Sharp-tailed Starling *Lamprotornis acuticaudus*
- 161 Violet-backed Starling *Cinnyricinclus leucogaster*
- 162 Orange Ground Thrush *Zoothera gurneyi*
- 163 Groundscraper Thrush *Psophocichla litsitsirupa*
- 164 African Thrush *Turdus pelios*
- 165 Kurrichane Thrush *Turdus libonyanus*
- 166 Bocage's Akalat *Sheppardia bocagei*
- 167 White-browed Robin-Chat *Cossypha heuglini*
- 168 Angola Cave Chat *Xenocopsychus ansorgei*
- 169 White-browed Scrub Robin *Erythropgia leucophrys*
- 170 African Stonechat *Saxicola torquatus*
- 171 Capped Wheatear *Oenanthe pileata*
- 172 Mountain Wheatear *Oenanthe monticola*
- 173 Familiar Chat *Cercomela familiaris*
- 174 Sooty Chat *Myrmecocichla nigra*
- 175 Miombo Rock Thrush *Monticola angolensis*
- 176 Angola Slaty Flycatcher *Dioptrornis brunneus*
- 177 Southern Black Flycatcher *Melaenornis pammelaina*
- 178 Pale Flycatcher *Bradornis pallidus*
- 179 Spotted Flycatcher *Muscicapa striata*
- 180 Ashy Flycatcher *Muscicapa caerulescens*
- 181 African Dusky Flycatcher *Muscicapa adusta*

- 182 Böhm's Flycatcher *Muscicapa boehmi*
- 183 Anchieta's Sunbird *Anthreptes anchietae*
- 184 Western Violet-backed Sunbird *Anthreptes longuemarei*
- 185 Olive Sunbird *Cyanomitra olivacea*
- 186 Amethyst Sunbird *Chalcomitra amethystina*
- 187 Scarlet-chested Sunbird *Chalcomitra senegalensis*
- 188 Bocage's Sunbird *Nectarinia bocagii*
- 189 Bronzy Sunbird *Nectarinia kilimensis*
- 190 Miombo Double-collared Sunbird *Cinnyris manoensis*
- 191 Ludwig's Double-collared Sunbird *Cinnyris ludovicensis*
- 192 Oustalet's Sunbird *Cinnyris oustaleti*
- 193 Variable Sunbird *Cinnyris venustus*
- 194 Copper Sunbird *Cinnyris cupreus*
- 195 Yellow-throated Petronia *Gymnoris superciliaris*
- 196 Spectacled Weaver *Ploceus ocularis*
- 197 African Golden Weaver *Ploceus xanthops*
- 198 Red-headed Weaver *Anaplectes melanotis*
- 199 Black-winged Red Bishop *Euplectes hordeaceus*
- 200 Yellow Bishop *Euplectes capensis*
- 201 Yellow-mantled Widowbird *Euplectes macrourus*
- 202 White-winged Widowbird *Euplectes albonotatus*
- 203 Red-collared Widowbird *Euplectes ardens*
- 204 Orange-winged Pytilia *Pytilia afra*
- 205 Dusky Twinspot *Euschistospiza cinereovinacea*
- 206 Blue Waxbill *Uraeginthus angolensis*
- 207 Grey Waxbill *Estrilda perreini*
- 208 Sweet Waxbill *Estrilda melanotis*
- 209 Fawn-breasted Waxbill *Estrilda paludicola*
- 210 Common Waxbill *Estrilda astrild*
- 211 Bronze Mannikin *Lonchura cucullata*
- 212 Black-and-white Mannikin *Lonchura bicolor*
- 213 Village Indigobird *Vidua chalybeata*
- 214 Pin-tailed Whydah *Vidua macroura*
- 215 Cuckoo Weaver *Anomalospiza imberbis*
- 216 Cape Wagtail *Motacilla capensis*
- 217 Mountain Wagtail *Motacilla clara*
- 218 Fülleborn's Longclaw *Macronyx fuellebornii*

- 219 African Pipit *Anthus cinnamomeus*
- 220 Long-billed Pipit *Anthus similis*
- 221 Wood Pipit *Anthus nyassae*
- 222 Plain-backed Pipit *Anthus leucophrys*
- 223 Tree Pipit *Anthus trivialis*
- 224 Striped Pipit *Anthus lineiventris*
- 225 Yellow-crowned Canary *Serinus flavivertex*
- 226 Black-faced Canary *Crithagra capistrata*
- 227 Black-throated Canary *Crithagra atrogularis*
- 228 Yellow-fronted Canary *Crithagra mozambica*
- 229 Brimstone Canary *Crithagra sulphurata*
- 230 Streaky-headed Seedeater *Crithagra gularis*
- 231 Thick-billed Seedeater *Crithagra burtoni*
- 232 Cinnamon-breasted Bunting *Emberiza tahapisi*
- 233 Golden-breasted Bunting *Emberiza flaviventris*
- 234 Cabanis's Bunting *Emberiza cabanisi*

Appendix 10. Products' prices and quantities in Usoque and Balombo markets.

The prices presented are the average of the prices given to two Angolans and one foreigner in the markets. Prices are presented in Angola's national currency, Kwanzas (AON) and Euros (EUR). Some products quantities were stacks. Exchange rate was taken from Angola National Bank (www.bna.ao) 1 EUR = 127.903 AON.

Product	Quantity	Price (AON)	Price (EUR)
Bread	1 unit	10.00	0.08
Charcoal	1 stack	22.50	0.18
Cole	1 unit	40.00	0.31
Corn	1 Kg	40.00	0.31
Manioc	1 unit	40.00	0.31
Tomatoes	1 stack	40.00	0.31
Salt	1 Kg	50.00	0.39
Cabbage	1 unit	70.00	0.55
Noodles	0.5 Kg	100.00	0.78
Pineapple	1 unit	116.67	0.91
Rice	1 Kg	120.00	0.94
Fresh Fish	3 units	125.00	0.98
Potatoes	1 stack	133.33	1.04
Beans	1 Kg	150.00	1.17
Dry fish	8 units	150.00	1.17
Peanut	1 Kg	150.00	1.17
Soap	1 bar	156.67	1.22
Diesel	5 L	175.00	1.37
Oil	1 L	200.00	1.56
Sugar	1 Kg	225.00	1.76
Metal sheet	3 meters	650.00	5.08
Blanket	1 unit	766.67	5.99
Chicken	1 unit	1,100.00	8.60
Goat	1 unit	7,500.00	58.64
Pig	1 unit	7,750.00	60.59

Appendix 11. Frequency of fire-wood collection in Kanjonde Population 2009.

Results of 2009's Surveys regarding the amount of times per week population went to pick up fire-wood. Information regarding the age and gender (Male or Female) are presented. When no information was given by interviewee *nd* (standing for "no data") was registered. Mean and standard deviation are presented as well. N = 59.

Interviewee Number	Age	Gender	Times/ week
1	35	M	5
2	25	F	4
3	22	M	4
4	30	F	3
5	32	F	4
6	25	F	4
7	37	M	3
8	<i>nd</i>	F	4
9	31	M	3.5
10	46	F	3.5
11	59	M	2.5
12	50	F	2
13	21	F	2.5
14	45	M	3
15	24	F	2
16	32	F	2
17	52	M	2.5
18	60	F	5
19	30	F	5
20	31	M	5
21	<i>nd</i>	F	5
22	85	M	5
23	56	M	7
24	43	F	5
25	65	M	7
26	70	M	3.5
27	35	F	4
28	51	M	3.5
29	30	F	2
30	26	M	4
31	67	M	7
32	25	M	7
33	42	M	3
34	60	M	2
35	32	M	3
36	32	M	3
37	21	M	7
38	21	M	4
39	35	F	2
40	43	M	7
41	47	M	7
42	23	M	3
43	65	F	5
44	35	M	7
45	18	M	4
46	18	M	3
47	50	F	3
48	50	F	3
49	27	M	4
50	26	F	3
51	18	M	3
52	30	F	3
53	33	<i>nd</i>	3
54	27	F	3
55	40	M	3
56	25	F	5
57	27	<i>nd</i>	3
58	25	M	7
59	59	M	2
MEAN			3.97
SD			1.57

Appendix 12. Frequency of fire-wood collection in Kanjonde Population 2010.

Results of 2010's surveys regarding the amount of times per week population went to pick up fire-wood. Information regarding the age and gender (Male or Female) are presented. When no information was given by interviewee *nd* (standing for "no data") was registered. Mean and standard deviation are presented as well. N = 48.

Interviewee Number	Age	Gender	Times/ week
1	33	M	3
2	35	M	2
3	45	M	1.5
4	nd	F	1
5	25	M	2
6	28	F	2.5
7	23	F	3
8	32	F	7
9	19	M	7
10	18	F	6
11	25	M	2
12	68	M	2
13	60	F	3
14	28	M	4
15	19	M	3
16	24	M	3
17	38	M	7
18	43	M	2.5
19	33	M	2.5
20	30	M	4
21	15	F	2
22	26	M	1.5
23	33	F	7
24	66	M	2.5
25	30	M	2
26	37	M	2
27	79	M	2.5
28	35	M	7
29	69	M	4
30	35	F	7
31	40	M	3
32	52	M	7
33	27	F	7
34	20	F	7
35	50	F	7
36	30	F	7
37	49	F	2
38	28	F	2.5
39	25	F	3
40	50	F	7
41	35	M	2
42	32	F	2
43	40	M	nd
44	25	F	3
45	33	F	2.5
46	20	F	3
47	43	M	2
48	23	F	4
49	28	M	3
MEAN			3.74
SD			2.06

Appendix 13. Weight of Fire-wood packs in Kanjonde village.

Mean weight and standard deviation for fire-wood pack in Kanjonde village. A total of 20 fire-wood packs (N=20) were weighted and information regarding age and gender of their carriers collected. When no information was given, *nd* (standing for “no data”) was registered.

Number ID	Gender	Age	Weight (Kg)	Observations
1	M	10	16	Child
2	F	<i>nd</i>	10	coming from the farm
3	F	<i>nd</i>	26	
4	F	40	9	
5	M	10	7	Child
6	F	13	6	Carrying farm's instruments
7	F	33	15	
8	F	40	14	
9	F	<i>nd</i>	28	
10	F	20	10	
11	F	<i>nd</i>	5	
12	F	25	25	
13	F	18	20	
14	F	<i>nd</i>	25	
15	F	<i>nd</i>	10	
16	F	9	12	Child
17	F	20	12	Pregnant
18	F	<i>nd</i>	7	
19	F	33	8	coming from the farm
20	M	10	10	Child
MEAN		21.62	13.75	
SD		11.56	7.25	

Appendix 14. SPSS Output for the Optimal Scaling Analysis with 33 dimensions.

Case Processing Summary

Valid Active Cases	42
Active Cases with Missing Values	7
Supplementary Cases	0
Total	49
Cases Used in Analysis	49

Iteration History

Iteration Number	Variance Accounted For		Loss
	Total	Increase	
dimensio 3 ^a	,989579	,000000	9,010421

a. The iteration process stopped because the convergence test value was reached.

Model Summary

Dimension	Cronbach's Alpha	Variance Accounted For	
		Total (Eigenvalue)	Inertia
1	,833	3,993	,399
2	,788	3,438	,344
3	,711	2,776	,278
4	,610	2,217	,222
5	,541	1,951	,195
6	,491	1,793	,179
7	,441	1,658	,166
8	,410	1,584	,158
9	,337	1,436	,144
10	,303	1,374	,137
11	,233	1,265	,127
12	,182	1,196	,120
13	,107	1,107	,111
14	-,084	,930	,093
15	-,224	,832	,083
16	-,414	,728	,073
17	-,480	,698	,070
18	-,731	,603	,060
19	-,907	,551	,055
20	-1,040	,517	,052
21	-1,416	,440	,044
22	-1,689	,397	,040
23	-3,056	,267	,027
24	-3,764	,228	,023
25	-4,110	,213	,021
26	-5,192	,176	,018
27	-6,173	,153	,015
28	-10,824	,093	,009
29	-24,785	,043	,004
30	,000	,000	,000
31	,000	,000	,000
32	,000	,000	,000
33	,000	,000	,000
Total		32,656	3,266
Mean	-,012 ^a	,990	,099

a. Mean Cronbach's Alpha is based on the mean Eigenvalue.

Appendix 15. SPSS Output for the Optimal Scaling Analysis with 3 dimensions.

Case Processing Summary

Valid Active Cases	42
Active Cases with Missing Values	7
Supplementary Cases	0
Total	49
Cases Used in Analysis	49

Iteration History

Iteration Number	Variance Accounted For		Loss
	Total	Increase	
dimension 18 ^a	3,402285	,000007	6,597715

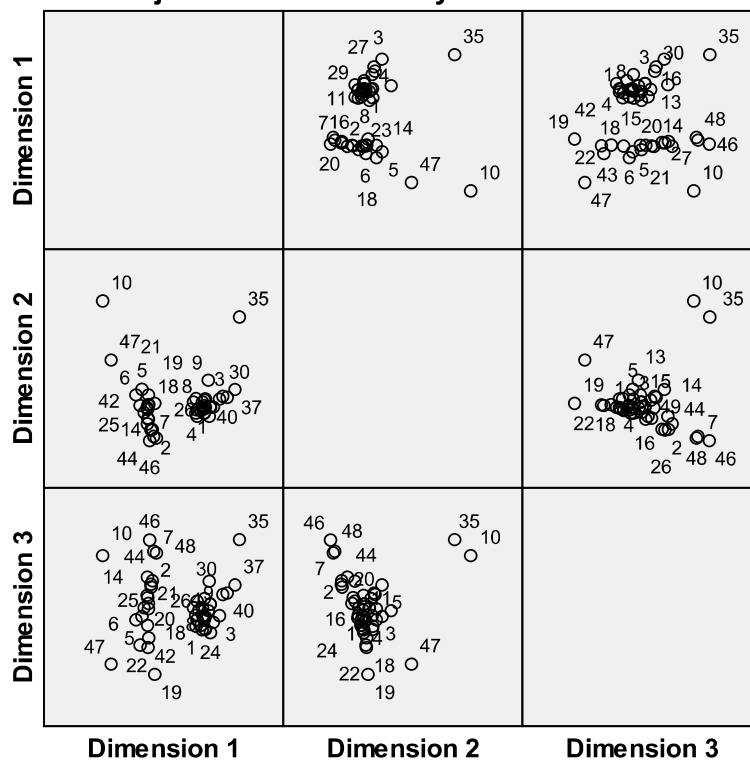
a. The iteration process stopped because the convergence test value was reached.

Model Summary

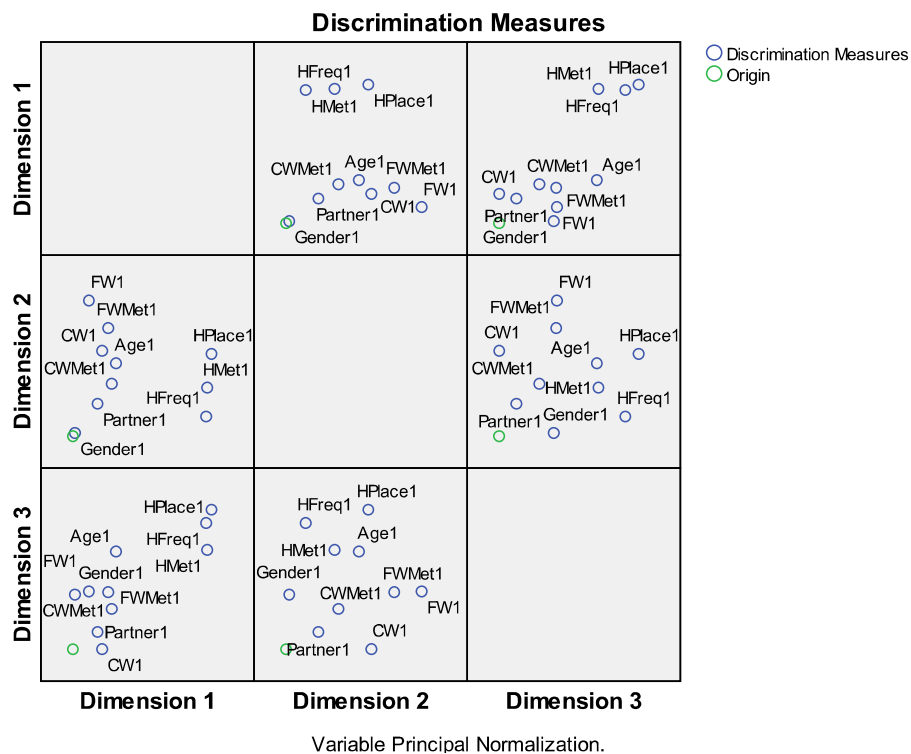
Dimension	Cronbach's Alpha	Variance Accounted For	
		Total (Eigenvalue)	Inertia
1	,833	3,993	,399
2	,788	3,438	,344
3	,711	2,776	,278
Total		10,207	1,021
Mean	,785 ^a	3,402	,340

a. Mean Cronbach's Alpha is based on the mean Eigenvalue.

Object Points Labeled by Casenumbers



Variable Principal Normalization.



Discrimination Measures				
	Dimension			Mean
	1	2	3	
Age1	,289	,391	,393	,358
Gender1	,014	,017	,220	,084
Partner1	,166	,174	,069	,136
FW1	,108	,728	,233	,356
FWMet1	,237	,580	,230	,349
CW1	,196	,458	,000	,218
CWMet1	,261	,281	,162	,235
HPlace1	,929	,442	,561	,644
HFreq1	,893	,106	,508	,502
HMet1	,901	,261	,400	,520
Active Total	3,993	3,438	2,776	3,402

Appendix 16. International destinations from Luanda's airport.

Destination	Country	Airline
Addis Ababa	Ethiopia	Ethiopian Airlines
Bangui	Central African Republic	TAAG
Beijing	China	Hainan Airlines TAAG
Brazzaville	Republic of Congo	TAAG
Brussels	Belgium	Brussels Airlines TAAG
Cape Town Johannesburg	South Africa	South African Airways TAAG
Douala	Cameroon	TAAG
Dubai	United Arab Emirates	Emirates Airlines Hainan Airlines TAAG
Frankfurt	Germany	Lufthansa TAAG
Harare	Zimbabwe	TAAG
Havana	Cuba	TAAG
Kinshasa	Democratic Republic of Congo	TAAG
Lisbon	Portugal	TAAG TAP
London	England	British Airways TAAG
Lusaka	Zambia	TAAG
Maputo	Mozambique	LAM TAAG
Nairobi	Kenya	Kenya Airways
Paris	France	Air France TAAG
Rio de Janeiro São Paulo	Brasil	TAAG
São Tomé Islands	São Tomé e Príncipe	TAAG
Windhoek	Namibia	Air Namibia TAAG