THE BIODIVERSITY OF BUHANGA RELICT FOREST

S. J. Nsengimana, C. Nsabagasani, E. Nsanzurwimo, M. Ndimukaga & I. Runyambo

ARCOS NETWORK

ASSOCIATION POUR LA CONSERVATION DE LA NATURE AU RWANDA A.C.N.R

ORTPN OFFICE RWANDAIS DU TOURISME ET DES PARCS NATIONAUX

EXECUTIVE SUMMARY

The relict forest of Buhanga is located in Musanze District in Northern Province. Buhanga, also called Gihondohondo is at 7 km from Musanze District administrative center. It is a site of depression tectonics, originally corresponding to the former Nyabarongo Valley and is bounded on the East by strong …….against Bugarura (Musanze District) and west by the escarpment fault of Buhoma (Nyabihu District).

Gihondohondo is a rocky site which indicates the presence of volcanic materials resulting from strombolian eruption. It is characterized by gigantic Ficus and dracaena species. This forest used to serve as a place of spiritual investiture for Rwandan Kings. This forest was recently recognized as a protected area by the government of Rwanda and given to the Rwanda office of Tourism and National Parks (ORTPN).

……

This quick survey was done to assess the biodiversity of the forest; identify the birds; plants and the Mammal species of the area. An ethno-botanical survey was also done to record the cultural values attached to the forest by the neighboring community. The survey was done during the months of June and July 2008 by the ACNR team. The team consisted of the senior researchers (ornithologist, mammalogist, and ethnobotanist) based at Kigali and Karisoke. The team employed various scientific research techniques to carry out the various surveys. They used point counts and opportunistic sampling to record the birds in the forest. The Birds' survey enabled the team to compile a comprehensive list of the birds living or spending part of their life in the forest. The mammalogy task involved the use of direct and indirect observation. Dung and footprints were part of the indirect observation techniques used. This also enabled the team to document the species of mammals in the forest. The local people were also interviewed and their responses were used to determine the actual mammals living in the forest. Plant and ethnobotanical surveys were done to establish the community perceptions of the forest resources and the actual extent of utilization. Participatory interviews, semi-structured questionnaires and observation were the techniques used. Phanelogams were used for plant survey. Existing literature was used to identify the plants. Photos were also taken to help in identifying plants that could not be immediately identified.

The forest contains a rich biodiversity of flora and fauna and holds some very important cultural secrets of the community in Buhanga. Some animal species that have been said to be extinct in the neighboring Volcanoes National Park (like leopards) were said to be living in Buhanga forest. The sacred places and other cultural sites have benefited from community conservation efforts, embedded in the cultural importance attached to the forest.

There is need for more research to establish and identify the actual biodiversity of the area and design a conservation strategy. Since the community's traditional values, beliefs and practices associated with the forest have led to its conservation thus far, the government should recognize, appreciate, protect and reward these local people's culture and integrate it in the conservation strategy.

ACKNOWLEDGEMENTS

The “Association pour la Conservation de la Nature au Rwanda (ACNR)”, is grateful to the Rwandan Government and the Office of Tourism and National Parks (ORTPN) for permission to conduct surveys in Buhanga relict forest.

We are especially grateful to Albertine Rift Conservation Society (ARCOS) for the financial support provided to carry out this work.

Our thanks to all those who participated in the surveys. Field work was carried out by a team of dedicated Research Assistants and National University of Rwanda students. Members of Birds team included Mr Claudien Nsabagasani (team leader) and Jean Paul Kubwimana. Botany team included Mr Aimable Nsanzurwimo (team leader) and Madeleine Usabyimbabazi. Members of mammals’ team included Mr Marc Ndimukaga (team leader) and Emmanuel Ndayisaba. The ethno-botany survey was conducted by Mr Runyambo Irakiza Claude.The work has been supervised by Mr Serge Joram Nsengimana of ACNR who also did the final editing of this report.

Our acknowledgment goes to the Biology Department of the National University of Rwanda (NUR) for authorising three students to participate in this survey and benefiting from ACNR’s capacity building program.

TABLE OF CONTENTS

Page

List of Tables

List of Figures

CHAPTER ONE: THE BUHANGA RELICT FOREST

1. Introduction

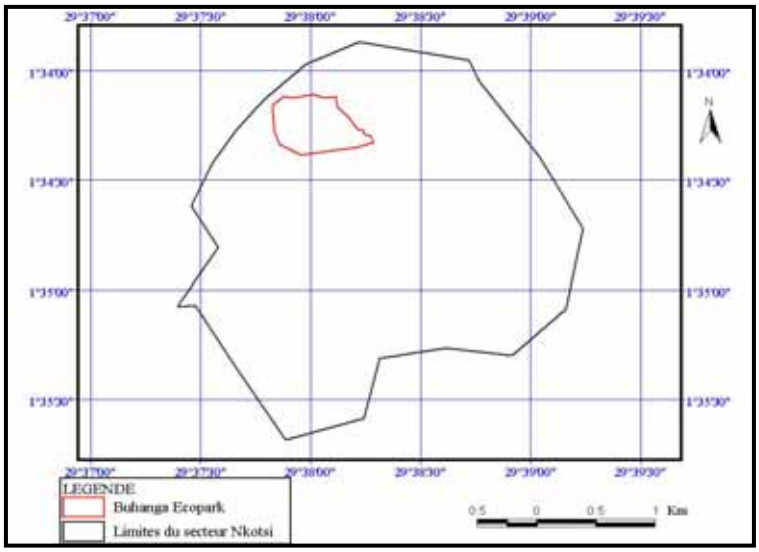
1.1. Location

The relict forest of Buhanga also called Gihondohondo is located in Northern Province at 7 km from Musanze District administrative center. It is a site of depression tectonics, originally corresponding to the former Nyabarongo Valley and is bounded on the East by Bugarura sector and on west by the escarpment fault of Buhoma (Nyabihu District).

1.2. History

For reasons of culture or adherence to the traditions, Gihondohondo has not yet been cleared but its borders are threatened today. The site is marked by the presence of giant *Ficus sp* and old houses used as places of spiritual investiture for the various monarchs of Rwanda. The monarchs were required to make the pilgrimage before they took office. It is said that the forest is home to a snake (*Python*) with extraordinary power. This snake is a spiritual guardian of the place and sometimes it blocks the road to any unwanted incursion. Local people have long revered this sacred place so far and ensure its ecological integrity (reported in Iraguha, 2004).

Figure 1: Locating Buhanga Ecopark



Source: from the database of Rwanda and GPS points by Iraguha, 2004.

1. 3. Climate

The Buhanga forest environment experiences a wet tropical climate tempered by altitude. Temperatures fluctuates around 20 º c. The upward orographic and convection heat can, especially in the afternoons, give rise to abundant rainfall when moisture is sufficient.

1. 4. Flora and fauna

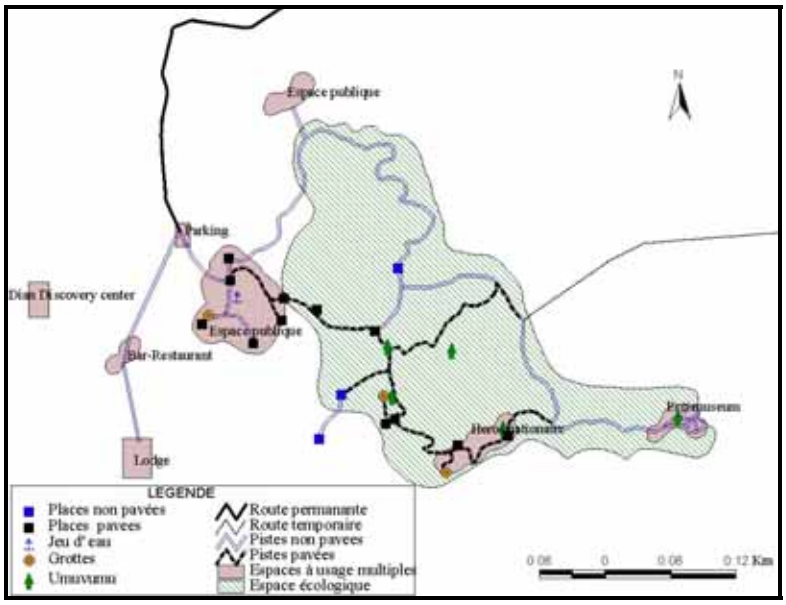
Buhanga relict forest is composed of a rich biodiversity. The vegetation climax calls back to the vegetation in Mukura, Nyungwe and Volcanoes National park. The oviparous fauna is impressive in its variety. A dozen species are identified. Some animal species threatened with extinction appear from time to time in this ecosystem. Such include the porcupine, the jackal, the partridge, and leopard.

1. 5. Gihondohondo tourist site

The rational exploitation of tourism in Rwanda is an economic imperative for the country's development. Despite the immense tourism potential, the tourism industry in Rwanda is limited in its operation to visit national parks. It is therefore a monotone tourism product that could become an ephemeral face of modern tourism; increasingly demanding in visitors' tastes and cultural aspirations and scientists.

With its touristic assets, Buhanga mini Park presents natural and cultural opportunities for the promotion of scientific cultural and ecological tourism. It is with a greatest originality by the fact that it is seen by history and folk traditions as the cradle of Rwandan civilization.

Figure 2: Buhanga ecological and cultural map



Source: from the database of Rwanda and GPS points, Iraguha 2004

For tourists seeking to know the geological history of Rwanda, they will find at Gihondohondo many scientific sights on the formation of relief. It is a region where the phenomena of folds, collapse tectonics, volcanism, escarpment fault, disruption of drainage, adaptation of the drainage network to the tectonic structure and even inappropriate by overtaxation are very visible. We can finally mention that the site is

easily accessible; it is located within 20 km of Volcanoes National Park and Lakes Ruhondo and Burera.

CHAPTER TWO: BIRDS' SURVEY

1. Introduction

An ornithological survey was carried in Buhanga Relict Forest during the months of June and July 2008 to produce information on birds of the site. Emphasis was placed on producing a bird checklist and documenting categories of birds to help develop a conservation strategy for Buhanga relict forest. This survey also served as a training exercise for a member of the Association pour la Conservation de la Nature au Rwanda (ACNR, Birdlife Partner in Rwanda), a student from National University of Rwanda, to help and mentor him undertake research in ornithological field. Birds were detected by use of sight and calls in point counts. Opportunistic records were considered to maximize a number of birds encountered. The observers used 10 x 40 pairs of binoculars and a telescope. Birds were identified using a standard text for East Africa (Stevenson and Fanshawe, 2002) and a field guide of Birds of Prey of Africa and its Islands (Alan & Meg Kemp, 1998).

2. Study sites

Buhanga relict Forest is a secondary forest of 33.3ha. Three transects were selected according to the direction South-North of the forest. The first transect was a rock path located in the center of the forest, the second on the right and a third one on the left. These transects were parallel to each other, separated by 100m between them. Points in transects were visited three times each. Sampling points every 100m along each transect were used to record birds seen and heard. Opportunistic recording of species was made along all transect.

3. Methods

To study birds of Buhanga, two methods, point counts and opportunistic sampling were used.

3.1. Point counts

Points were established in three transects surveyed. The points were established at an interval of 100m along the selected transect. A point is a single station from which a count is made and each point in this study was visited three times. Habitat types at the point counts were defined by identifying a plant species in which the bird species was seen. At each point observers waited for 2 minutes to allow birds settle down and then recorded all sightings and calls of birds for a period of 10 minutes (Sutherland, W. 2000). We then moved on to the next point and repeated the same process. The data were used to produce a bird checklist and to document migratory and Albertine Rift Endemic species. No attempt was made to measure relative encounter rates and estimate bird density because of the few sightings for majority of the species recorded.

3.2. Opportunistic sampling

Opportunistic recording were used to maximize the number of species encountered in each transect. All bird species seen or heard at different times of the day were recorded. These data were used to complete the total record list of birds in Buhanga Relict Forest.

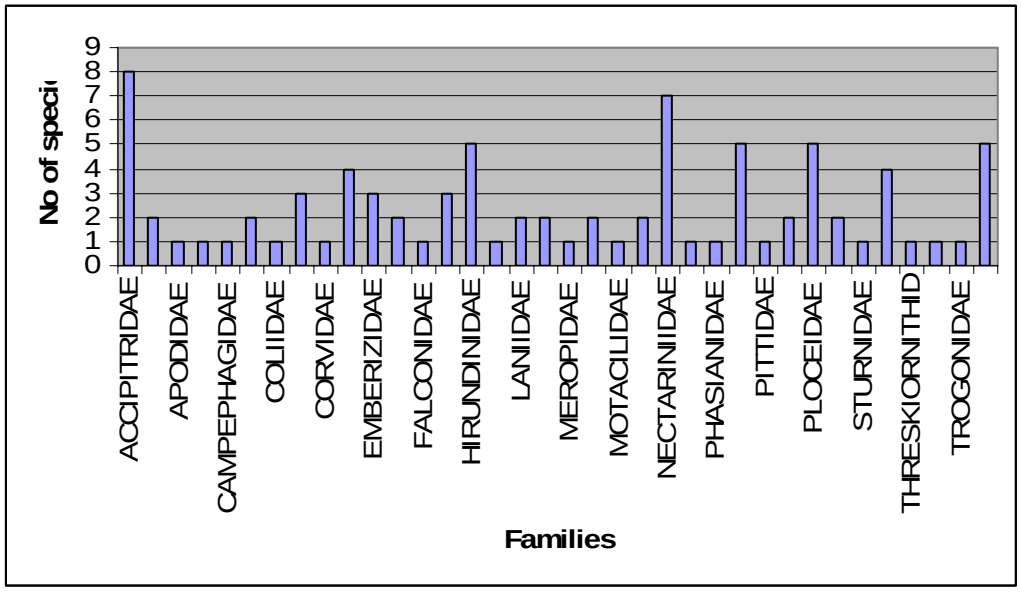
4. Results

4.1. Bird checklist

A total of 65 bird species, were recorded by sights and/or sounds during the point counts. If a species was not known by the team, field guides were consulted (to identify it). An additional 18 species were recorded opportunistically, bringing the total to 83 species gathered in 36 families, heard or seen during this survey. However some of these birds were not forest species but species that were flying over the forest or moving to or from cultivation land closer to the forest. A total list of species found in Buhanga is provided in Appendix of this report.

Bird species of ACCIPITRIDAE (8), NECTARINIIDAE (7), HIRUNDIDAE (5), PICIDAE (5), PLOCEIDEA and TURDIDAE (5) families are more abundant in Buhanga Relict Forest. Of all 34 families recorded in Buhanga during this survey, 13 families are represented by only one species (Figure 1)

Figure 3: A bar chart showing bird family richness in Buhanga Relict Forest



Birds were assigned on the categories in the appendix to look at patterns of forest specialists. (Wilson, 1995; Bennun, Dranzoa & Pomeroy 1996 in Owiunji et al 2005):

A Afrotropical migrant – a species migrating within Africa
P Palearctic migrant – a species that breeds in Europe or Asia
p A species with at least some palearctic populations
FF Forest specialist – species typical of forest interiors
F Forest generalist – less specialized but occured in small patches of forest
f Forest visitor
W Waterbird specialist – normally restricted to wetlands or open waters

w Waterbird non-specialist – often found near water

4.2. Migratory and Albertine Rift Endemic bird species

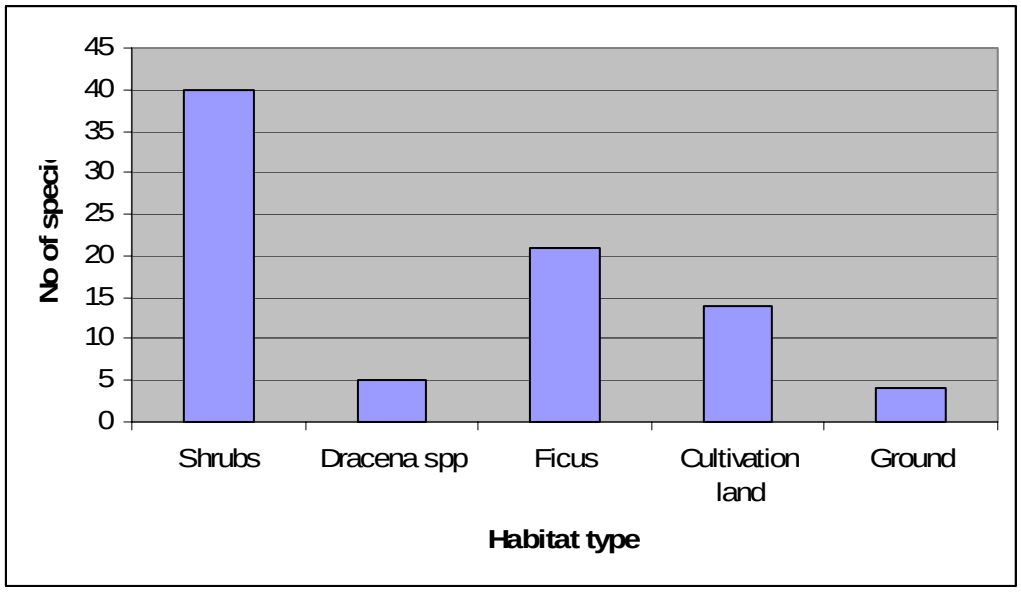
The table of checklist gives also the status of migratory and Albertine Rift Endemic bird species seen/heard. No threatened species were recorded in Buhanga relict Forest. Two migratory species, African Pitta (M) and Wahlberg's Eagle (MB) and four species endemic to the AlbertineRift, three of them species of NECTARINIIDAE Family, were recorded.

4.3. Bird species and habitat types

The main habitat of birds Buhanga is constituted by big and long trees, shrubs and undergrounds. Big and long trees include species of *Ficus*, *Erythrina* and alien species like Eucalyptus, Cypressus and Grevelia robusta mainly found around the forest in cultivation land.

A big number of species was recorded in shrubs where birds were hidden (40), followed by *Ficus spp* (21), 14 bird species were recorded in cultivation lands, five bird species were mainly recorded on *Dracaena spp* while four species were observed foraging for food on the ground (Figure 2).

Figure 4: Bird species and habitat types in Buhanga Relict Forest



4.4. Breeding records

During our bird survey in Buhanga relict Forest, we observed an immature Augur Buzzard, Tawny Eagle, Red-rumped Swallow, Rufous-necked Wryneck and Green-backed Woodpecker. A Baglafecht Weaver was making a nest with leaves of *Pennicetum purpeum*. Chicks of Black-headed Heron were recorded in Eucalyptus while chicks of White-winged Tit were observed in *Ficus spp*.

4.5. Special observations

On 21st May at 15:50 PM, in five meters from the Forest, a Martial Eagle killed a hyrax (Photo 1). The bird hovered on the mammals and caught it using the long toes inserted on the neck. The Eagle flew when we approached and continued perching waiting for our departure.

Figure 5: Hyrax killed by a Martial Eagle

5. Discussion

Buhanga is a secondary forest found in Albertine Rift region which is believed to be the richest region in bird species than other regions in Africa (Mittermeier et *al.* 2004 in ARECO, 2006). Buhanga is rich in birds with 83 species and three of them are Albertine Rift Endemics which makes 3.48% of the birds of Buhanga.

In Buhanga, A big number of species was recorded in shrub because they were hidden and were recorded by calls or seen flying for insect catching and coming back to their hideouts. Other 21 bird species were recorded in *Ficus spp.* These bird species feed on *Ficus spp* fruits. Birds of prey seat on *Ficus'* branches waiting for preys. The prey, to be hunted, includes either small bird species or small,ground mammals like Hyrax. The Bird species recorded getting out and coming to the forest feed on maize or use plants in cultivation lands or fly around. Birds seen flying out include swifts, swallow and saw-wings. Many birds of prey were seen soaring in the sky and hovering on the prey.These included Falcons, and Vultures, Kites, Bateleur, etc.

Buhanga Relict Forest is separated from the Volcanoes National Park by about 5km as the crow flies and they are both located in the Virunga and Albertine Rift region. They are both mountain forests and they are both closer to cultivation lands, birds come out for feeding on crops like maize and using plants like eucalyptus in cultivated lands.

46 (56.2%) bird species in Buhanga are also found in Volcanoes National Park in which a total number is currently estimated at 146 species (Nsabagasani, unpublished). The

difference in number may be caused not only by the difference in size but also by the altitude and habitat types of these forests. The area of Buhanga is 33.3 ha of surface (MUJAWAYEZU, 2006) whereas VNP is 16,000 ha (ORTPN, 2004) meaning 480.5 times of the remnant Buhanga forest. The altitude of Buhanga varies between 1621 and 1647meters while the altitude of VNP varies between 2400 and 4500m (ORTPN, 2004).

The bird habitat in VNP is constituted by vegetation which varies with altitude (Weber, 1987) and other kind of habitat like swamps and lakes. There is eight vegetation types in VNP related to the variation of altitude while in Buhanga there is no significance in altitude variation and there are no swamps and lake.
Buhanga Relict Forest was identified as stopover for a migratory bird species "**African Pitta**" since 2006 (Nsabagasani, C. 2008).

At the same period, the species was found in Musanze Town but in 2007 was not recorded either in Buhanga nor in Musanze. This year (2008) it has not been observed in the town (Marcell, pers.). All the time the the species was followed in the rock path but it flew into the shrub when approached only to come back after the invesitgating team left. In 2006, the species found in the town, was wounded by a Pied Crown (Classeen, M. 2006) this may be due to a lack of hideout from predators and hence the species preferred the forest like Buhanga.

6. Conclusion and recommendations

Buhanga Relict Forest located in the Albertine Rift and volcanic region, is a home range of 83 bird species with a size of 33.3 ha. The habitat of Birds is mainly composed of shrubs, *Ficus spp*., and some of them come out in land cultivation. This survey recorded breeding patterns, migratory habbits and bird species endemic to the Albertine Rift. Unfortunately, this survey was carried out only in the morning (7:00 – 11:00 AM and in the afternoon (4:00 to 6:00 PM) and the results do not contain any night bird species. But, this is the basic study to provide basic information on birds of Buhanga More research which may cover the night and different seasons is necessary in order to get data on night species and on migratory species.
This study showed how much Buhanga is rich in terms of bird species and is the only site currently known as a stopover of the African Pitta in Rwanda. If we want to conserve the restricted range species or endemic species to the Albertine Rift and migratory species, it is crucial to protect the remnant forest.

At the end of this survey we recommend that
1. The conservation of Buhanga Relict Forest be strengthen and the proposition of the government to annex the forest on VNP be implemented
2. The monitoring of birds in this forest be regular. This will reveal not only how much the forest is rich in biodiversity but also more information on bird migratory species.
3. The cultural values, beliefs and practices of the local community members be recognized, appreciated and integrated in the conservation strategy for the forest.

CHAPTER THREE: PLANTS SURVEY

1. Introduction

A botanical survey was carried in Buhanga relict forest to provide information on the diversity of plant species found in the area. The survey also served as a training exercise for students from the National University of Rwanda, Biology Department and for the staff of ACNR to help them undertake research and monitoring in botany in future (**see the pictures below).**

Figure 6: Capacity building of ACNR staff and NUR students

2. Methods

The vegetation growth and the species diversity in Buhanga are related to the topography and the geology of the site. The existing trails were used for accessibility during the survey. One transect lay out in direction north-south. The sampling points were every 100 m along each trail. Transects were used to record plants in plots. The species found for the first time along the trail or transect were recorded too.
The preferred sampling period was the rainy season which is when there is much growth of the deciduous vegetation.

2.1. Circular plots

Data on herbaceous plants, lianas, shrubs and trees were collected along the existing trails or transect. Circular plots of 20 meters in radius measured by a calibrated string were established at every 100 m interval along trails or transect. All trees and shrubs were recorded, while lianas and herbs were recorded respectively in 10 and 5 meters radius.

3.2. Identification

In addition to the flowering plant species, the Pteridophytes were also surveyed while the Bryophytes and Thallophytes couldn't due to the lack of prior literature on these groups and limited time.
The species identification was done with a magnifying glass and observations by microscope and using prior work; Owiunji (2004),Troupin Vol.I, II, III, IV for the flowering plant species and Agnew et al. (1994), Johns (1991), Taton (1946), Roux (2003), Schelpe (1986), for the Pteridophytes.

3.3. Voucher specimens

Voucher specimens of the majority of plants of interest in this survey were collected and duplicate to allow for further identification of those plants that could not be positively identified and to confirm the identification of those that were identified in the field.

3.4. Plant photos

Photos were taken to illustrate some aspects of the vegetation surveyed and the species in the forest including common and dominant species. However some species were not referenced in the existing literature and will have to be described and/or identified or as new species. These will be presented only as photos in this report.

4. Results and Discussion.

In total 189 plant species were recorded. Among these 165 are the flowering plant species and 18 are non-flowering species (Pteridophytes).
With the references on life forms: 37 are trees while 37 are lianas and 115 are herbs.

Buhanga is a relict forest dominated by *Ficus* trees associated with *Dracaena steudneri* the heavy climbers and poor undergrowth.
The presence of non indigenous and crop trees like: *Eucalyptus maidenii, Cupressus sp., Persea americana, Grevillea robusta, Musa acuminata, Pennissetum purpureum* are indicators of human activity in Buhanga for many years.
Some plant species and trees (*Ficus divsp, Dracaena steudneri, Rhus vulgaris and Rhus natalensi*s, etc) provide fruits such that Buhanga has became a souhaitable habitat of insects and birds.

The management of Buhanga for ecotourism purposes has led to the introduction of other plants, like bamboo, *Scadoxus multiflorus, Zebrina* and young *Dracaena*.. The introduction of the species must have positive or negative impact on Buhanga biodiversity. For better management and conservation of Buhanga, the impact of the species introduced needs to be assessed.

According to Owiunji (2004), the following plants are recorded as albertine rift endemic species: *Elatostema monticola* HOOK. F., *Impatiens burtonii* HOOK. *var.burtonii, Leucas deflexa* HOOK.F., *Parietera debilis* FORST. F, *Pilea bambuseti* ENGL.,

Ranunculus bequaertii DE WILD. , *Rumex bequartii* DE WILD., *Pentas lanceolata* (FORSSKAL) DEFLERS, *Pentas zanzibarica var. rubra* VERDC., *Smithia elliotii* BAKER f. *var. elliotii*, *Arisaema mildbraedii* ENGL..

Some plant species found have not been referenced or are unknown in our available literature. Those are excluded and recognized only by their genus name.

Figure 7: Buhanga plant species

Bohmeria sp **(Urticaceae)**

***Tunbergia sp*. (Acanthaceae)**

Acanthaceae species unknown

***Ficus* trees (Moraceae) and *Dracaena steudneri(* Agavaceae)**

Fabaceae unknown

Dorstenia sp. **(Moraceae)**

The traditional use of plant species for the household items in rwandan culture in addition to the growth of urbanization have led to their removal in the great part of the country. Buhanga will be a genetic bank of species such us: *Ficus divsp, Dracaena steudneri, Erythrina abyssinica, etc.*

4. Conclusions and recommendations

As highlighted above Buhanga is very important for conservation as a germplasm bank of threatened plant species, its history, for ecotourism and recreation purposes.

Therefore the following rehabilitative and conservation measures must be taken:

To set up a resource use/ management plan for the protection of Buhanga
To continue scientific research in this specific ecosystem and describe species and their conservation status.
Sensitize local communities around Buhanga about its importance and conservation.
Organize and regulate ecotourism, tourism and recreation in Buhanga.

CHAPTER FOUR: MAMMALS SURVEY

1. Introduction

The Buhanga relict forest, located Northern Province, used to be a cultural and spiritual site for the former Rwandan kingdom. This has been reason for the protection of this forest.

Nowadays, this forest is under human pressure. Illegal activities such as poaching especially for Rock Hyrax, grazing, medicinal plant collection and wood cutting for deferent uses especially for firewood are major threats to this forest.

Recently, a large interest has been raised at national level for the ecological status of Buhanga forest because of rumors saying that this forest may be home of different species of carnivores. Therefore the government approved that the forest will be managed by the Rwanda Office of Tourism and National Parks (ORTPN).

2. Field methods

The reconnaissance survey method (recce method) was used. Different parts across Buhanga relict forest were surveyed. We used existing human or animal paths, and recorded all species of mammals seen or heard and other signs (Dung and feeding signs) (White, L. & Edwards, A. (2000). The animal tracks were not possible to be used because of the rocky soil. We also based on local people information, the species they use to see in order to complete our list.

These reconnaissance surveys enabled us to obtain basic information on mammals, necessary to determine the biological richness of the area.

3. Results

The species of mammals shown in Table below were recorded during this survey. In total, 13 species of mammals were recorded. All these species are carnivores except two species of herbivores: the Porcupine *Hystrix africae australis* and Rock Hyrax *Procavia johnstoni*.

Table 1: Mammal species recorded in Buhanga relict forest

Scientific name	**Common name**	**Kinyarwanda name**	**Observation technique**
Genetta servalina	Genet	Urutoni	D, I
Ichneumia albicauda	White-tailed Mongoose	Igiharangu	D, I
Felis serval	Serval	Imondo	D, I
Panthera pardus	Leopard	Ingwe	F, I
Nandinia binotata	Civet	Impimbi	I
Herpestes ichneumon	Egyptian Mongoose	Umutereli	I
Herpestes sanguineus	Slender Mongoose	Akayongwe	S, I
Felis sylivestris	Wildcat	Inturo	I
Canis adustus	Side-striped Jackal	Ingunzu	I
Mungos mungo	Banded Mongoose	Umuga	I
Poecilogale albinuca	African Striped Weasel	Inkoryo	I
Procavia johnstoni	Rock Hyrax	Impereryi	S, D
Hystrix africae australis	Porcupine	Ikinyogote	F

S = seen; D = Dung piles; F = Feeding signs I = Information from local guide

4. Discussion and conclusion

The most significant finding from the mammals' surveys was the recording of leopard. This species was recorded based on information provided by local people and feeding signs. On the photo below, a goat was caught and killed by a leopard when it was coming from browsing in the forest (Oral communication).

Figure 8: Feeding signs: these are the remains of a goat killed by a leopard

This species is expected to be extinct in the nearest Volcanoes National Park since 1972.

In spite of the disturbance that has taken place in Buhanga relict forest in the last decade, 10 species of carnivores and 2 species of herbivores were recorded as still inhabiting this forest. Although these species are shy except the Rock Hyrax, in a few days we saw individuals of Slender Mongoose and Rock Hyrax from a close range. Dung of Genet, White-tailed Mongoose and Serval was also seen.

Figure 9: Serval dung

It is difficult to predict at this stage if some day it will be possible to develop tourist visits to view/track mammals in Buhanga. The assets or positive factors might be: (i) the reserve is small; (ii) the slopes are not very steep as compared to other forests; (iii) there is very good security in the area. The obstacles or negative factors might be: (i) the thick vegetation, rough ground composed of huge rocks and caves; the leopard which might attack humans.

CHAPTER FIVE: ETHNO BOTANICAL SURVEY

1. Introduction

The ethnobotanical survey aimed at identifying the plants used in general by herbal medicines and using interviews and group discussion on the utilization of the relict forest. A total of 38 medicinal plants were recorded in the area both for hilling human diseases and cattle diseases, represented by 34 genera belonging to 19 vascular plant families. Only 65, 78% of medicinal plants used by traditional hillers are found in the relict forest. Leaf material forms the major of plant part collected. The majority of remedies are prepared in the form of juice from the freshly collected plant parts. Most of remedies are mainly taken orally and are harvesting in the wild. For cultural reasons and conformity to the tradition, Buhanga relict forest also called"Igihondohondo" has a spiritual value for local people to its conservation and utilization.

2. Methods and Materials

The ethnobotanical survey data was collected in June and July 2008 during a period of one week, based on semi-structured interview with selected knowledge elders. Most of the interviews and group discussions were conducted in local language (Kinyarwanda) in Nkotsi sector, Bikara cell surrounding Buhanga relict forest.

2. 1. Community utilization of Buhanga relict forest

Local knowledge may sometimes be referred to us as indigenous knowledge but not obviously the same thing. Indigenous knowledge is seen to be culture specific whereas local knowledge is viewed by contemporary sources as being dynamic and gained through observation and experience rather than just a legacy of the past (Fairhead and Leach, 1994; Richards, 1994; Thapa *et al.*, 1995; Sillitoe, 1998; Sinclair and Walker, 1999 in Francis, B. ,2006)

Participatory discussions were conducted amongst people of different age classes. The group consisted of 15 people aged between 50 and 80 with a strong knowledge of Buhanga relict forest history. All participants in this group were residents of Nkotsi, Bikara village and were native, local people.

During the group discussion, every member of the group was interviewed for about 10 minutes on the importance of the culture for the conservation of Buhanga relict forest and the use of the relict forest products by local community.

Figure 10: Group discussion with local communities

2. 2. Survey on medicinal plants use

Information regarding the use of medicinal plants of Buhanga relict forest was provided by traditional healers, members of "Abadahemuka" cooperative in *Nkotsi na Bikara* sector.
At the end of each interview, specimens of plants with property for medicinal uses, difficult to identify at species level at the time were collected for later determination in the herbarium of Karisoke Research center (DFGFI).

During this ethnobotanical study, 8 traditional healers (5 men and 3 women) between the ages of 41 and 80, were involved in the study area. These herbalists were chosen from the different sites surrounding Buhanga relict forest with the assistance of local authorities and community elders (Nyumba kumi).
In order to verify the reliability of data obtained from herbalists during the survey, each plant were visited in the forest. If the species observed in the traditional hiealers' garden were not found in the forest, the species was collected for later identification in the herbarium. Species recognised only through vernacular names without identification was considered unreliable and was rejected.

For each species, the proportion of informants independently reported its use against a particular disease/disease category was also assessed using approaches employed by Gerique, A. (2006).

2. 3. Data analysis

Processing

According to Martin (1995), ethnobotanical data are organized in a way that facilitates statistical analysis. A matrix with different fields should be defined. Potential fields are: Collection number, local plant name, scientific plant name, habit, plant parts used, uses, preparation, habitat, locality, name of the informant, etc. The data collected on each separate item (a plant species, for instance) constitute a record. The values are the specific data that correspond to each field and record (adapted from Martin, 1995).

3. Results

3.1. Community utilization of Buhanga relict forest

The people who live adjacent to Buhanga relict forest have a variety of interests regarding their use and management. Within the communities are specialist user groups with interests such as beekeeping, traditional medicines and other traditional practices for cultural purposes. The table1 summarize the multipurpose species use by local community

Table 2: List of plant species used by local community around Buhanga relict forest

Scientific name	**Family**	**Vernacular name**	**Part used**	**Utilization**
1.Stephania abissinica	Menispermaceae	Umuhanda	Stem	Traditional plate (inkoko)
2. Triumphetta rhomboidea	Malvaceae	Umusarenda	Stem	Ceiling (Idari)
3. Pennissetum purpureum	Poaceae	Urubingo	Stem	Ceiling (Idari)
4. Stephania cyananta	Menispermaceae	Umwifuzo (liana)	Stem	Vans (ibigega)
5. Guania longispicata	Rhamnaceae	Umusando	Stem Leaves	Basket (Ibitebo)
6. Urera hypselondendron	Urticaceae	Umuse	Stem	Traditional mats (ibirago)
7. Clerondendrum rotundifolium	Verbenaceae	Umuziranyenzi	Stem	Stick pressure for drinking traditional beer (Umiheha, imikenke)
8. Ficus sp.	Moraceae	Umuvumu	Stem	Vat for fermentation of banana wine

Although Buhanga relict forest is known for collection of medicinal plants by local community, it is also important as a source of wood resource. Local people use the buffer zones to collect old branch of trees for firewood.

Figure 11: Local community collecting old branch of trees

For cultural reasons and conformity to the tradition, Buhanga relict forest also named ”Igihondohondo” has a spiritual value for local people for its utilization and management. The table 2 shows different sites and species of great spiritual importance for people of Nkotsi and Bikara.

Table 3: List of sites and species of spiritual importance for people of Nkotsi and Bikara

Sites or species	Importance	Brief history
1. Caves	Place for spiritual rituals	Caves of Buhanga relict forest are spiritual sacred places for local people. For example always former Kings of Rwanda spent a night in caves before their investiture.
2. Mysterious water-spring	Water-spring for the villager	In 1983, the government authorities tried to improve the water-spring to modern catchments, immediately the water-spring dried and after renouncing the project the water started flowing again. Also, water collected from the site was taken as a first bath for the former kings of Rwanda before their investiture. Currently, people come from everywhere in the region to visit and collect water for cultural purposes.
3. Igishanga cya Gihanga (marshland)	Place for spiritual rituals outside the relict forest	Sacred place for spiritual rituals for local people and according to them, he is said to harbour giant snake protecting the forest.
3. *Dracenae steudneri*	Social symbol	The species was used to entomb single people
4. *Ficus sp.*	Cultural Symbol (respectful tree)	The species is planted in the entry of the parcel: -as a symbol of keeping valuables (heritage) to remain in the family -as a symbol for showing the personality (respect) of the family.
5. *Erithrina abyssinica*	Spiritual protection	The species is planted as spiritual protection against evil spirit in the parcel

3.2. Medicinal plant survey

During the present ethnobotanical survey, 38 plant species were reported by traditional medicinemen for their medicinal uses both for healing human and cattle ailments, represented by 34 genera and 19 families (Table 4 and Table 5). Four species belong to the family of Asteraceae and three in the family of Fabaceae. The family of Chenopodiacece, Rutaceae, Rhamnaceae, Ranunculaceae, Polygonaceae, Solanaceae, Urticacaea and Cucurbitaceae were represented by two species each, while 9 families were represented by a single species.
Analysis of data shows that 23 species are herbs, 7 species are trees, 6 species lianas or climbers and 2 species are shrubs.

Of the 38 reported medicinal plants, 29 species were used to cure 9 human diseases, 6 were used to treat cattle diseases and 3 species (*Zanthoxylum sp. Engl, Rumex abyssinicus Jacq. and Cassia floribunda CAV*) were used for both human and cattle diseases.

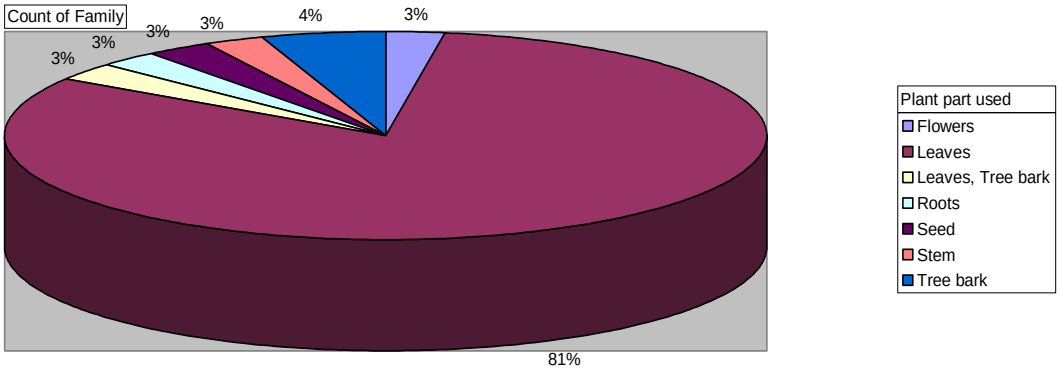
For human use- Six species are used as remedies against poison vomiting, five species against mental disorder and four species against KILONDATUMBU (alimentary tract/canal disorder) One to two species each were reported as being used for a number of different diseases such as mumps, stomach disorders, muscle disease and mental trouble (se table 4)

For veterinary use- Nine species are used as remedies against seven of cattle diseases, of which four species are used to treat bovine skin diseases against ticks (East Coast Fever, anaplasmosis and babesiosis) and two species treats Sexual dysfunction of cows, goats and sheep (Se table 5).

3.2.1. Plant parts used and the method of preparation

Leaves are the most widely plant part used around Buhanga relict forest, accounting for 81% of the reported medicinal plants, followed by 4% of tree bark. Other plant parts used represent 3% (see figure 3).

Figure 12: Proportion of plants part used per family



A majority of remedies are prepared in the part of juice from freshly collected plant parts. The juice is prepared by pounding or crushing plants part in the wooden or stone motor and pester. Water is mostly used to dilute the juice. Few remedies are prepared from dried, and subsequently ground plant parts. Usually, herbalists around Buhanga relict forest do not store the medicine for a long period of time. When the need comes, they go out and collect the plant, prepare the remedies and treat the sick animal or people. Most of the remedies were reportedly a concoction of two or more plant species.

3.2.2. Mode of administration

Most remedies are taken orally, accounting 84% of medicinal plants use, followed by external application (applied typically on skin 8 % and 5 % on ear application). One species (*Eucalyptus maideni.*) used as smoke is given anally to treat hemorrhoids.
To improve the acceptability of certain oral remedies additives are frequently used. The juice prepared from the crushed leaves from *Prunus africana* to treat dysentery, for instant, is usually taken with *Aloes vera*. The remedies are prepared also with banana to sweeten them and reduce bitterness so that the preparation can be swallowed without much difficulty.

Some of the informants reported that restriction were imposed when certain type of remedies are taken by patients. For most of the remedies, a full dose is taken at once. The dose given for most patients depend on age, physical and health conditions.

3.2.3. Informant consensus and value of medicinal plants

Investigation during the study shows that some of medicine plants are more popular than others. Accordingly *Brillantaisia cicotricosa* is the most popular, cited by five informants for its medicinal value, followed by *Cassia floribunda* and *Solanum terminale* mentioned by four informants. *Zanthoxylum sp.*, *Ranuculus multifidus* and *Ajuga alba* were cited by three informants. Each one of the others reported medicinal plant was mentioned by two informants.

Similarly, some remedies are more familiar to the herbal medicine than others for use against health problems. Informant consensus for those remedies that were mentioned by two or more herbal medicine (informants) as being used for the same purpose is given in table 3 bellow:

Table 4: List of medicinal plants mentioned by two or more herbal medicine (Informants) as being used for a particular ailment

Scientific name	**Ailments**	**N^{o} of informants**
1. Brillantesia cicotricosa	Poison vomiting Stomach trouble Mental trouble	5
2. Cassia floribunda	intestinal worm Diarrhea**	4
3. Solanum terminale	Placenta retention	4
4. Zanthoxylum sp.	Gonorrhea Babesiosis*	3
5. Ranunculus multifidus	Poison vomiting Fracture	3
6. Ajuga alba	Stomach trouble Fracture Poison vomiting	3
7. Chenopodium apulifolium	Muscle disease Kilondatumbu	2
8. Senecio manii	Poison vomiting	2

** Both human and cattle diseases
* Cattle diseases

3.2.4. Original and current status of medicinal plants

Results from origin of medicinal plants of Buhanga relict forest shows that there is a little cultivation of medicinal plants in the area. Most of the medicinal plants (65, 78%) are harvested from Buhanga relict forest. During our survey, only thirteen medicinal plants representing 34, 21% (*Chenopodium procerum, Chenopodium apulifolium, Barleria grandicalyx, Lobelia gibberoa, Prinus Africana, Zanthoxylum sp, Rhamnus prinoides, Aloes vera, Lobelia gibberoa, Senecio manii, Agrostis sp., Ranculus multifudu, Solanum acquileastrum*) are under cultivation in the area, either in home garden or farming plots.

Some of Buhanga medicinal plants species which formerly were forest-inhabiting species are now rarely encountered in the area as remnant on farm plots. For example according to some of informants *Prunus africana* disappear completely in the relict forest. Other species are commonly or occasionally found in Buhanga relict forest.

Table 5: List of medicinal plants used in traditional veterinary medicine

Scientific name	**Vernacular name**	**Family**	**Life form**	**Substance**	**Application**	**Plant part used**	**Route of administration**
Zanthoxylum sp.(Engl.)	Intare y'irungu	Rutaceae	Tree	Juice, powder	Babesiosis (Umushitwe)	Roots, Tree bark	Oral
Basela alba L.	Urunyanja, Ururarama	Baselaceae	Liana	Juice	Anaplasmosis (gasheshe)	Leaves	Oral
Cyatula schimperiana (Hochst. ex. Moq.)	Igifashi	Amaranthaceae	Herb	Juice	Sexual dysfunction	Flowers	Sex
Agrostis sp.	Urwiri	Poaceae	Herb	Leaves	Injury	Leaves	Skin
Cassia floribunda CAV.	Umukubanzoka	Ceasalpiniaceae	Shrub	Juice	Diarrhea	Leaves	Oral
Rumex abyssinicus Jacq.	Umufumbageshi	Polygonaceae	Herb	Juice	Desexualize cattle	Leaves	Sex
Rumex usambarensis (ENG) DAMMER	Umufumba	Polygonaceae	Herb	Juice	Sexual dysfunction	Leaves	Sex
Solanum acquileastrum Dunal.	Intobokarema	Solanaceae	Herb	Juice	East Coast fever (ikibagarira)	Leaves	Oral
Lobelia gibberoa HERSLEY	Intomvu	Lobeliaceae	Herb	Juice	East Coast fever (ikibagarira)	Leaves	Oral

4. Discussion

4.1. Community utilization of Buhanga relict forest

Result of interview conducted from a group discussion on different age classes show that older people are more knowledgeable on the utilization of Buhanga relict forest than young ones. The species selected play some important role in the lives of local people in Buhanga relict forest. Some species are used for weaving baskets, traditional mats and others furniture. For example baskets are important as a container for carrying beans. Rwandan's farmers carry farm produce in baskets from farms to the home/market (Mbarubukeye, S. et Niang A.I., 1996).

Buhanga relict forest is also used as an important site for local people for cultural purpose. Water springs are used as source of water for local people and both caves and some plant species (*Dracenae steudneri*, *Erithrina abyssinica* and *Ficus* sp) are used for spiritual ritual in the area (see figure 4).

Figure 13: Some important sites and species of Buhanga relict forest

Water spring *Cave* *Dracenae steudneri (Igihondohondo)*

The levels of usage of the plants named above and different site located in the relict forest for community utilization are protected under ORTPN (Rwanda office of Tourism and National Park). Since 2005, Buhanga relict forest was added as part of National Volcanoes Park. Although in the caves and sacred places in Buhanga, important spiritual ceremonies of native people continue to take place accessibility is still restricted. Neither visitors nor villagers are allowed to enter in the relict forest without permission.

4.2. Medicinal plants use

The reported number of medicinal plants (38 species) being used by traditional medicines is not small, considering the Buhanga relict forest size. Species of the family of Asteraceae are the most utilized for traditional medicine. Most of the diseases which are treated by herbal medicine in the area are poison vomiting, diarrhea and stomach problems.
According to Weber (1987), in 2005 there was an epidemic of dysentery in Musanze district because of the loss of water cleaning ability of the volcanic region.

The most widely sought after plant parts for the preparation of herbal medicine in the area is the leaf. Collecting leaves does not pose a great danger to existence of individual plant as compared to the collection of an underground part, stem, or whole plant. Studies have shown that removal of up to 50% of tree leaves does not significantly affect the growth of the species, (Poffenberger et al., 1992). However, the popularity of roots including bulbs and rhizomes, bark and stem has grave consequences from both ecological and species' survival point of view (Dawit Abebe and Ahadu Ayehu, 1993 in Giday, M., 2001).

Traditional veterinary medicines practiced around Buhanga relict forest treat some cattle ailments like bovine skin disorders (East Coast Fever, babesiosis and anaplasmosis). Merker, (1987) in Njangwe B. *et al*., (2000) said bovine skin diseases are significant in Rusizi plain. Anaplasmosis and babesiosis, present enormous cost in term of times and money in Rwanda (Van Puyvelde *et al*., 1985 in Njangwe B. *et al*., 2000).

All informants agreed that more medicinal plants were in use in the past than reported now. This has happened as a result of over harvesting in the area. This situation gave rise to the local loss of some medicinal plants and the associated knowledge.

5. Conclusion

The ethnobotanical study of useful medicinal plants surrounding Buhanga relict forest aim to help local people to take care of their health problems. Through the ethnobotanical survey a total of 38 medicinal plants were recorded in the area both for healing human diseases and cattle diseases, represented by 34 genera belonging to 19 vascular plant families. Only 65, 78% of medicinal plants used by traditional healers are found in the relict forest. There is no real threat to medicinal plants in the area as result of over-harvesting for their medicinal purpose. They are used locally and therefore harvested in small quantity. Some plant species of Buhanga relict forest are also widely used elsewhere in the country for their medicinal value (some of them even for the same medicinal use). The wide use of these medicinal plants could be attributed to their effective medicinal properties.

CONCLUSIONS AND RECOMMANDATIONS

Buhanga relict forest is an area with diverse associated habitats, flora and fauna along with manifestations of unique or traditional land-use patterns and social organisations as evidenced in human settlements and local customs, livelihoods, and beliefs. Buhanga forest should provide opportunities for public enjoyment through recreation and tourism within its normal lifestyle and economic activities.

Referring to the Six IUCN Protected Area Categories, Buhanga relict forest can be classified in Category V: **Protected Landscape/Seascape: Protected Areas managed mainly for landscape/seascape conservation and recreation**. This category is defined as an area of land, with coast and sea as appropriate, where the interaction of people and nature over time has produced an area of distinct character with significant aesthetic, ecological and/or cultural value, and often with high biological diversity.

Therefore, the Objectives of Management could follow the IUCN guidelines for Protected Area Management Categories and are the following:

· to maintain the harmonious interaction of nature and culture through the protection of landscape and/or
seascape and the continuation of traditional land uses, building practices and social and cultural
manifestations;
· to support lifestyles and economic activities which are in harmony with nature and the preservation of the
social and cultural fabric of the communities concerned;
· to maintain the diversity of landscape and habitat, and of associated species and ecosystems;
· to eliminate where necessary, and thereafter prevent, land uses and activities which are inappropriate in
scale and/or character;
· to provide opportunities for public enjoyment through recreation and tourism appropriate in type and scale
to the essential qualities of the areas;
· to encourage scientific and educational activities which will contribute to the long term well-being of
resident populations and to the development of public support for the environmental protection of such
areas; and
· to bring benefits to, and to contribute to the welfare of, the local community through the provision of
natural products (such as forest and fisheries products) and services (such as clean water or income
derived from sustainable forms of tourism).

As it is also stipulated in IUCN Guidelines Protected Area Management Categories, Buhanga relict forest may be managed by the Rwanda Office for Tourism and National

Parks (ORTPN), a public authority, but is is more likely to comprise a mosaic of private and public ownerships operating a variety of management regimes. These regimes should be subject to a degree of planning or other control and supported, where appropriate, by public funding and other incentives, to ensure that the quality of the landscape/seascape and the relevant local customs and beliefs are maintained in the long term.

REFERENCES

A.D.Q.Agnew and Shirley Agnew, 1994. Upland Kenya Wild Flowers, a Flora of ferns and herbaceous flowering plants of Upland Kenya, East Africa Natural History Society.

Alan & Meg Kemp (1998). SASOL Birds of Prey of Africa and its Islands, New Holland Publishers (UK) Ltd, London, Cape Town, Sydney

ARECO (2006). Biodiversity Survey of Mukura Forest. Report, Kibuye Privince, Rwanda: pp11

A.Taton, 1946. Révision des Hymenophyllacées au Congo belge, Imprimerie J.Duculot, Editeur Gemboux

Classeen Marcell (August/September 2006). African Pitta in Rwanda in Africa Birds & Birding newslwtter, Vol. 11, No. 4, P 19.

Dessouter, S. (1991). Pharmacopée humaine et vétérinaire du Rwanda. INRS-Butare

E.A.C.L.E. Schelpe and Nicola C.Anthony, 1986. Flora of Southern Africa, University of Cape Town

Francis, B. (2006). Assessment methods for non-timber forest products in off-reserve forests, Case study of Goaso district, Ghana. IPP, PhD-thesis, University of Freiburg.

Gerique, A., (2006). An introduction to ethnoecology and ethnobotany Theory and Methods. Department of Geography, University of Giessen, Senckenbergstr, Germany

Giday, M., (2001). An ethnobotanical study of medicinal plants used by the Zay people in Ethiopia. MSC-thesis, national herbarium. Addis-Ababa University.

Haltenolth, T & Diller, H. (1988). Mammals of Africa including Madagascar. London
I.Owiunji, D. Nkuutu, D. Kujirakwinja, I. Liengola, A. Plumptre, A.Nsanzurwimo, K. Fawcett, M. Gray & A. McNeilage (2005). The biodiversity of Virunga volcanoes. Report.

I.Owiunji, D. Nkuutu, D. Kujirakwinja, I. Liengola, A. Plumptre, A. Nsanzurwimo, K. Fawcett, M.Gray & Mcneilage, 2004. The Biodiversity of the Virunga Volcanoes, Iraguha, 2004. Rapport de stage.

Martin, G.J. (1995). Ethnobotany. *People and Plants Conservation Manuals*. Chapman and Hall, London

Mbarubukeye, S. et al (1992) La médecine vétérinaire traditionnelle au

Rwanda; Résultats préliminaires de l'enquête nationale réalisée chez les guérisseurs traditionnels du bétail en 1991, ISAR/LVNR-IRST/CURPHAMETRA-MINAGRI, Rubilizi

Mbarubukeye, S. et Niang A.I., (1996). Les usages particuliers des plantes ligneusesagroforestières autochtones du Rwanda ; Utilisation en médecine traditionnelle humaine et vétérinaire, en alimentation humaine, en apiculture et en artisanat, Rubilizi

Monfort Nicole, 1985. Les Mammiferes du Rwanda. Rotary club de Kigali, Rwanda.

Mujawayezu (2006). Contribution à l'étude de la végétation du site de Buhanga

Nicolas Blondel, 2004. Biodiversity Survey of Gishwati Forest. Ministry of Environment /WCS, Kigali. Report

Njangwe B. *et al*., 2000). Phytothérapie traditionnelle des bovins dans les élevages de la plaine de la Ruzizi. Laboratoire d'Écologie et de phytogéographie. Département de Géographie. Université de Lubumbashi. République Démocratique du Congo.

Nsabagasani, C. (June 2008). An African Pitta *Pitta angolensis* pays a visit to Buhanga relict forest, Rwanda. Article in BirdLife International Africa Partnership e-bulletin.

Office Rwandais du Tourisme et des Parcs Nationaux (2004). Plan d'amenagement et de Géstion 2005-2009, Kigali, Report: pp20

ORTPN/CGIS (2004). Parc National des Volcans, plan de zonage, report

Poffenberger M., McGean B., Ravindranath N.H. and Gadgil M., (1992). Field methods manual, Volume II. Community Forest Economy and Use Pattern: Participatory Rural Appraisal (PRA) Methods in South Gujarat, India-society for promotion of Wasteland Development in, New Delhi.

Sutherland, W.J. (2000). The Conservation Handbook: Research, Management and Policy. Oxford: Blakwell Science Ltd, pp 56.

TROUPIN. G., (1966). Etude phytocénotique du Parc National de l'Akagera et du Rwanda oriental, INRS.

TROUPIN, G., (1978). Flore du Rwanda, Spermatophytes, volume 1, Musée Royal de l'Afrique centrale, 1980 Tervuren. Belgique

TROUPIN, G., (1982). Flore des plantes ligneuses du Rwanda, Musée Royal de l'Afrique centrale, Tevuren. Belgique

TROUPIN, G., (1983). Flore du Rwanda, Spermatophytes, vol. II, Musée Royal de l'Afrique centrale, 1980 Tervuren. Belgique

TROUPIN, G., (1985). Flore du Rwanda, Spermatophytes, vol. III, Musée Royal de l'Afrique centrale, 1980 Tervuren. Belgique

Weber. W., (1987). Ruhengeri and its resources, An Environmental profile of Ruhengeri prefecture, Rwanda, Kigali.

Webber, W. (1987). Ruhengeri and its resources, Kigali Rwanda, P58-59.

White, L. & Edwards, A. (2000). Conservation research in the African rain forest. Wildlife Conservation

APPENDICES

Appendix 1. *The bird species recorded in Buhanga by this study*

The bird's checklist of Buhanga Relict Forest, showing the Families, IUCN conservation status, Common and Scientific names and category of species.
Taxonomy and nomenclature follow the standard 2007 list produced by Birdlife International and the common names of some of the birds listed may differ in the field guides of birds of East Africa.

FAMILY AND COMMON NAME	**SC NAME**	**Conservation Status**	**Category**
ACCIPITRIDAE			
African Harrier-hawk	*Polyboroides typus*	LC	
Augur Buzzard	*Buteo augur*	LC	FF
Bateleur	*Terathopius ecaudatus*	LC	
Black Kite	*Milvus migrans*	LC	pA
Martial Eagle	*Polemaetus bellicosus*	LC	
Mountain Buzzard	*Buteo oreophilus*	LC	FF
Wahlberg's Eagle	*Aquila wahlbergi*	LC	**Af**
Tawny Eagle	*Aquila rapax*	LC	FF
ALCEDINIDAE			
African Pygmy-kingfisher	*Ceyx pictus*	LC	
Grey-headed Kingfisher	*Halcon leucocephala*	LC	
APODIDAE			
Little Swift	*Apus affinis*	LC	
ARDEIDAE			
Black-headed Heron	*Ardea melanocephala*	LC	w
CAMPEPHAGIDAE			
Black Cuckoo-shrike	*Campephaga flava*	LC	
CAPITONIDAE			
Double-toothed Barbet	*Lybius bidentotus*	LC	F
Spot-flanked Barbet	*Tricholaema lacrymosa*	LC	F
COLIIDAE			
Speckled Mousebird	*Colius striatus*	LC	
COLUMBIDAE			
Emerald-spotted Wood-dove	*Turtur chalcopsilos*	LC	f
Red-eyed Dove	*Streptopelia semitorquata*	LC	f
Tambourine Dove	*Turtur tympanistria*	LC	F
CORVIDAE			
Pied Crow	*Corvus albus*	LC	
CUCULIDAE			
African Cuckoo	*Cuculius gularis*	LC	
Blue-headed Coucal	*Centropus monachus*	LC	w
Klass's Cuckoo	*Chrysoccoccyx klass*	LC	f
Red-chested Cuckoo	*Cuculus solitarius*	LC	

EMBERIZIDAE			
African Firefinch	*Lagonosticta rubricata*	LC	
Bronze Mannikin	*Lonchura cucullata*	LC	
Red-billed Firefinch	*Lagonosticta senegalensis*	LC	
ESTRILDIDAE			
Black-crowed Waxbill	*Estrilda nonnula*	LC	f
Common Waxbill	*Estrilda astrild*	LC	
FALCONIDAE			
Pergrine's Falcon	*Falco peregrinus*	LC	
FRINGILLIDAE			
Streaky Seedeater	*Serinus striolatus*	LC	f
Thick-billed Seedeater	*Serinus burtoni*	LC	FF
Yellow-fronted Canary	*Serinus mozambicus*	LC	
HIRUNDINIDAE			
Blue Saw-wing	*Psaldoprocne pristoptera*	LC	
Lesser Striped-swallow	*Hirundo abyssinica*	LC	
Red-rumped Swallow	*Hirundo daurica*	LC	
Rock Martin	*Hirundo fuligula*	LC	
White-headed Saw-wing	*Psaldoprocne albiceps*	LC	
INDICATORIDAE			
Scaly-throated Honeyguide	*Indicator variegatus*	LC	
LANIIDAE			
Grey-backed Fiscal	*Lnius excubitoroides*	LC	
Mackinnon's Shrike	*Lanius mackinnoni*	LC	
MALACONOTIDAE			
Brown-crowned Tchagra	*Tchagra australis*	LC	
Tropical Boubou	*Laniarius aethiopicus*	LC	
MEROPIDAE			
Cinnamon-chested Bee-eater	*Merops oreobates*	LC	F
MONARCHIDAE			
African Paradise-flycatcher	*Terpsiphone viridis*	LC	f
White-tailed Blue Flycatcher	*Elminia albicauda*	LC	F
MOTACILIDAE			
Cape Wagtail	*Motacilla capensis*	LC	w
MUSCICAPIDAE			
Dusky Alseonax	*Muscicapa adusta*	LC	F
White-eyed Slaty Flycatcher	*Dioptrornis fischeri*	LC	F
NECTARINIIDAE			
Blue-headed Sunbird	*Nectariniae alinae*	LC	**FF/AR**
Bronze Sunbird	*Nectarinia kilimensis*	LC	f
Green-headed Sunbird	*Cyanomitra verticalis*	LC	
Regal Sunbird	*Nectarinia regia*	LC	**F/AR**
Rwenzori Double Collared Sunbird	*Cinnyris stuhlmanni*	LC	**F/AR**
Scarlet-chested Sunbird	*Nectarinia senegalensis*	LC	f
Variable Sunbird	*Nectarinia venusta*	LC	f
PARIDAE			
White-winged Tit	*Parus leucomelas*	LC	f

PHASIANIDAE			
Scaly Francolin	*Francolinus squamatus*	LC	F
PICIDAE			
Green-backed Woodpecker	*Campethera cailliautii*	LC	F
Nubian Woodpecker	*Campethera nubica*	LC	F
Olive Woodpeeker	*Mesopicos griseocephalus*	LC	F
Rufous-necked Wryneck	*Jynx ruficollis*	LC	F
Specled-breasted Woodpecker	*Dendropicos poecilolaemus*	LC	F
PITTIDAE			
African Pitta	*Pitta angolensis*	LC	**M**
PLATYSTEIRIDAE			
Brown-throated Wattle-eye	*Platysteria cyanea*	LC	
Chinspot Batis	*Batis militor*	LC	f
PLOCEIDAE			
Holub's Golden-weaver	*Ploceus xanthops*	LC	
Baglafecht Weaver	*Ploceus baglafecht*	LC	f
Black-headed Weaver	*Ploceus melanocephalus*	LC	
Spectacled Weaver	*Ploceus ocularis*	LC	
Yellow Bishop	*Euplectes capensis*	LC	
PYCNONOTIDAE			
Common Bulbul	*Pycnonotus barbatus*	LC	f
Yellow-throated Greenbul	*Chlorocichla flavicollis*	LC	
STURNIDAE			
Ruppell's Glossy Starling	*Lamprotornis purproptera*	LC	
SYLVIIDAE			
Cinnamon Bracken-warbler	*Bradypterus cinnamomeus*	LC	F
Chubb's Cisticola	*Cisticola chubbi*	LC	F
Grey-backed Camaroptera	*Camarptera brachyura*	LC	f
Grey-capped Warbler	*Eminia lepida*	LC	
THRESKIORNITHIDAE			
Hadada Ibis	*Bostrychia hagedash*	LC	w
TIMALIIDAE			
Arrow-marked Babbler	*Turdoides jardineii*	LC	
TROGONIDAE			
Narina Trogon	*Apaloderma narina*	LC	
TURDIDAE			
Brown-backed Scrub-robin	*Erythropygia hartlaubi*	LC	
Common Stonechat	*Saxicola torquatus*	LC	
Olive Thrush	*Turdus oliveceus*	LC	F
Red-capped Robin-chat	*Cossypha natalensis*	LC	F
White-browed Robin-chat	*Cossypha heuglini*	LC	f

Appendix 2. *The list of plant species recorded in Buhanga relict forest .*

1. TREES

	Famille	Species	Local names
1	MORACEAE	*Ficus asperifolia MIQ.*	UMUSENE, UMUSENA
2	DRACAENACEAE	*Dracaena afromontana MILDRAED*	UMUHATE, UMUHATI
3	DRACAENACEAE	*Dracaena steudneri* ENGL.	IGIHONDOHONDO, UMUHATI
4	MORACEAE	*Ficus sp.*	UMUVUMU
5	MELIANTHACEAE	*Bersama abyssinica* FRESEN	UMUKAKA/UMUTURA MUGINA
6	TILIACEAE	*Grewia forbesii* HARVEY ex MASTERS	
7	SAPINDACEAE	*Allophyllus africanus* P. BEAUV.	UMUTETE
8	VERBENACEAE	*Clerodendrum Sp.*	IKIZIRANYEZI
9	ACANTHACEAE	*Hypoestes triflora* (FORSSKAL) ROEMER et SCHULTES	MAGARU
10	ASTERACEAE	*Vernonia amygdalina* DELLE	UMUBIRIZI,UMUGARAGARA
11	VERBENACEAE	*Clerodendrum jonstonii* OLIVER	UMUKONDOGORO
12	VERBENACEAE	*Clerodendrum buchholzii* GUERKE	UMUKUNGUMBURU, URUHESHYI, UMUHENE
13	CUCURBITACEAE	*Lagenaria* (SONDER) NAUDIN	UMUTANGA
14	BIGNONIACEAE	*Markhamia lutea* (BENTH.) SCHUM.	UMUSAVE
15	MALVACEAE	*Hibiscus ludwigii* ECKLON & ZEYHER	UMUNYABUTUTU, UMUSHOSHWE
16	ACANTHACEAE	*Acanthus pubescens* (THOMSON ex OLIVER) ENGL.	IGITOVU, UMUTOVU
17	RUBIACEAE	*Canthium oligocarpum* HIERN	UMUSHABARARA, UMUSHUBU,
18	LAURACEAE	*Persea americana* MILL.	AVOKA
19	MALVACEAE	*Abutilon Mauritianum* (JACQ.) MEDICUS	UMUKUNGERI
20	EUPHORBIACEAE	*Euphorbia candelabrum* WELW.	UMUDUHA
21	RUTACEAE	*Clausena anisata (WILLD.) HOOK f. ex. BENTH.*	UMUNO
22	SAPINDACEAE	*Lepidotrichilia volkensii LEROY*	UMUGENDAJORO, UMUGIRIGWA, UMUNYWAMAZI
23	FLACOURTIACEAE	*Dovyalis macrocalyx (OLIVER) WARB.*	UMUSHUBI, UMUTEGENGERI, UMUTUKUZA
24	FLACOURTIACEAE	*Dovyalis sp.*	UMUSHUBI, UMUTEGENGERI, UMUTUKUZA
25	ASTERACEAE	*Vernonia lasiopus O. HOFFM.*	IGIRIHERI, IKAMAMBOGO, IVUMAVUMA, IVUMO
26	RUBIACEAE	*Rytigynia bugoyensis* (K. KRAUSE) VERDC	UMUSHABARARA, UMUSHUBU,
27	CAESALPINIACEAE	*Albizia adianthifolia (SCHUM.) W.F. WIGHT*	UMUSEBEYA
28	FABACEAE	*Erythrina abyssinica* LAM ex. A. RICH	UMUKO, IGIKO, UMURINZI

29	PITTOSPORACEAE	*Pittosporum sp.*	
30	EUPHORBIACEAE	*Ricinus communis L.*	
31	ANACARDIACEAE	*Rhus vulgaris MEIKLE*	UMUSAGARA, UMUSAGARA-NYAMABUMBA
32	ANACARDIACEAE	*Rhus natalensis BERNHAM ex KRAUSE*	UMUSAGARA
33	CAESALPINIACEAE	*Cassia floribunda*	UMUKUBANZOKA
34	MYRITACEAE	*Eucalyptus maideni.*	INTURUSU
35	CUPRESSACEAE	*Cupressus sp.*	SIPURE
36	PROTEACEAE	*Grevillea robusta A. CUNN.*	IGEREVERIYA
37	MYRITACEAE	*Psidium guajava L.*	IGITI CY'IPERA

2. LIANAS

	Famille	**Species**	**Local names**
1	RUTACEAE	*Toddalia asiatica (L.) LAM*	
2	RHAMNACEAE	*Gouania Longispicata ENGL.*	UMUBIMBAFURO
3	URTICACEAE	*Bohmeria sp. JACQ.*	
4	EUPHORBIACEAE	*Tragia brevipes PAX*	*ISUSA*
5	ASTERACEAE	*Helichrysum schimperii* (SCHULTES-BIP) MOESER	
6	LILIACEAE	*Gloriosa superba* L.	INTERAMARUNGU/NYAMUKO/UMUKONORO
7	ASCLEPIADACEAE	*Gongronema angolense (N.E. BR.) BULLOCK*	UMURONDORONDO
8	SMILACACEAE	*Smilax anceps* Willd.	
9	MENISPERMACEAE	*Cissampelos mucronota A. RICH.*	UMUHANDA
10	CACTACEAE	*Rhipsalis baccifera (J.MILL.) STEARN*	
11	ASCLEPIADACEAE	*Periploca linearifolia DILLON et A. RICH*	BAMBURAGAR
12	CUCURBITACEAE	*Oreosyce africana HOOK.f.*	UMUCYURO/UMWISHYA
13	CUCURBITACEAE	*Zehneria scabra (L.f.) SONDER*	UMWISHWA/UMUSHISHIRO
14	MORACEAE	*Ficus ottoniifolia* (MIQ.) MIQ	
15	CONVOLVULACEAE	*Thunbergia sp.*	
16	URTICACEAE	*Urera hypselodendron (HOCHST. ex A. RICH.) WEDD.*	UMUSE
17	ASTERACEAE	*Gynura scandens O. HOFFM.*	IGIFURANINDA, IKIZIMYAMURIRO
18	MENISPERMACEAE	*Stephania abyssina (DILL. et RICH.) WALP.*	UMUHANDA
19	VITACEAE	*Cyphostema cyphopetalum* (FRESEN.) DESCOINS	IKIBOMBWE
20	VITACEAE	*Cyphostema bambusetii* (GILG et BRANDT) DESCOINS	IKIBOMBWE
21	CUCURBITACEAE	*Momordica pterocarpa A. RICH.*	INKUNDABURIMA

22	FABACEAE	*Desmodium intortum (MILLER) URBAN*	ITUZA
23	FABACEAE	*Desmodium sp.*	ITUZA
24	PHYOTOLACACEAE	*Phytolacca dodecandra L'HERIT*	UMUHOKO, UMUHOKORO
25	SOLANACEAE	*Solanum terminale FORSSKAL*	UMUHANURANKUBA
26	CONVOLVULACEAE	*Ipomea wightii (WALLICH) CHOISY*	UMUHURURA, UMURYANYONI, UMUTARANUKA
27	DIOSCOREACEAE	*Dioscorea sp*	ITUGU
28	RUBIACEAE	*Rubia cordifolia AUCT.*	URUKARARAMBWE RUNINI
29	BASELLACEAE	*Basella alba L.*	URURARAMA, INDARAMA
30	ROSACEAE	*Rubus sp.*	INKERI
31	MENISPERMACEAE	*Stephania cyanantha WELW. ex HIERN*	
32	ASCLEPIADACEAE	*Secamone sp.*	
33	CONVOLVULACEAE	*Ipomea sp.*	
34	TILIACEAE	*Triumfetta rhomboidea JACQ.*	UMUCUNDURA, UMUSHYIGURA
35	VITACEAE	*Rhoicissus tridentata* (L.f.) WILD et DRUMOND	UMUMARA
36	CUCURBITACEAE	*Momordica foetida* SCHUM.	UMWISHWA, UMUCYURO
37	ASCLEPIADACEAE	*Ceropegia meyeri-johanis* ENGL.	

3. HERBS

	Famille	**Species**	**Local names**
1	MORACEAE	*Dorstenia sp*	
2	ORCHIDACEAE	*Eulophia streptopetala* LINDLEY	
3	APIACEAE	*Torillis arvensis* (HUDSON) LINK.	
4	ACANTHACEAE	*Hpoestes triflora* (FORSSKAL) ROEMER ET SCHULTES	MAGARU
5	AMARANTHACEAE	*Celosia schweinfurthiana SCHINS*	
6	MALVACEAE	*Pavonia urens var. urens (*DE WILD.) HAUMAN	IBIYUYU, IKINYAGAPYIZI, UMUTUTU
7	PRIMULACEAE	*Lysimachia ruehmeriana* VATKE	AKAYOBORA, UMUYOBORA
8	POLYPODIACEAE	*Loxogramme abyissinica* (BAK.) M.G. PRICE	
9	ASPLENIACEAE	*Asplenium adianthum-nigrum* L.	
10	ASPLENIACEAE	*Asplenium protensum* Schrad.	
11	ADIANTACEAE	*Cheilanthes kirkii* (Hook) Alston	
12	ASPLENIACEAE	*Asplenium sandersonii* Hook	
13	POLYPODIACEAE	*Drynaria volkensii* Hieron	

14	ASPLENIACEAE	*Asplenium gemmiferum Schadr.*	
15	OLEANDRACEAE	*Nephrolepis undulata* (Sw.) J.Sm	
16	ASPLENIACEAE	*Asplenium lobatum* Pappe & Rawson	
17	OLEANDRACEAE	*Arthropteris orientalis* (Gmel.) Posth	
18	POACEAE	*Penissetum purpureum* SCHUM.	URUBINGO
19	ARALIACEAE	*Polyscias fulva* (HIERN) HARMS	UMWUNGO, UMWUNGU
20	URTICACEAE	*Boehmeria sp.* JACQ.	
21	AMARANTHACEAE	*Cyathula schimperana* HOCHST. ex. MOQ	IGIFASHI
22	SOLANACEAE	*Physalis perviana L.*	IMBUHU, IPERI, UMUHUHU.
23	CYPERACEAE	*Mariscus sumatrensis* (RETZ) RAYNAL	INDAGARAGO, INTARATARE
24	ACANTHACEAE	*Hypoestes triflora* (FORSSKAL) ROEMER et SCHULTES	MAGARU
25	ACANTHACEAE	*Hypoestes forskalei* (VAHL) SOL. ex ROEMER et SCHULTES	IJOGWE, ISOGO, NYIRABUTI
26	BALSAMINACEAE	*Impatiens burtonii* HOOK	INDONDORI
27	BALSAMINACEAE	*impatiens hochstetteri WARB.*	INDONDORI
28	ASTERACEAE	*Bidens pilosa L.*	IGISHOKORO, INYABARASANYA
29	ASTERACEAE	*BIdens grantii* (OLIVER) SHERFF	IHONGWE, ISHIKASHIKE
30	URTICACEAE	*Pilea bambusetii* ENGL	UMURYABARENDA
31	URTICACEAE	*Pilea chevalieri* SCHELL	
32	COMMELINACEAE	*Commelina diffusa* BURM.	URUTEJA
33	AMARANTHACEAE	*Achyranthes aspera* L.	
34	BRASSICACEAE	*Cardamine africana* L	SOGA
35	AMARYLLIDACEAE	*Scadoxus multiflorus* (T. MARTYN) RAF.	
36	ADIANTACEAE	*Peallea adianthoides* (WILLD.) J.SM.	
37	OXALIDACEAE	*Oxalis cornuculata* AUCT.non L.	
38	ASTERACEAE	*Ageratum conyzoides L.*	INKURURA, KAZIRARUGUMA AKARYAMIRABAKOBWA,
39	POACEAE	*Panicum calvum* STAPF.	IKIRUMBI
40	URTICACEAE	*Girardinia heterophylla* (VAHL) DECAISNE	
41	CRASSULACEAE	*Karankoe integra* (MED.) O. KUNTZE	
42	ACANTHACEAE	*Brillantaisia cicatricosa* LINDAU	ICYUNGA, IKIRAPU, IKINYAMUGERE
43	ACANTHACEAE	*Brillantaisia patula* T. ANDERSON	URUSOGO
44	LAMIACEAE	*Ipoza riparia ouTetradenia riparia* (HOCHST.) CODD	UMURAVUMBA
45	URTICACEAE	*Parietaria debilis* FORST. F.	
46	ASTERACEAE	*Crassocephalum montuosum (S. MOORE) MILNE-REGH.*	IGIFURANINDI, ICYUNAMYI
47	ASTERACEAE	*Conyza sumatrensis (RETZ.) E.K. WALKER*	BAMBUBA, RUKABUKIRA

48	LAMIACEAE	*Plectranthus ferrugineus (ROBYNS) TROUPIN et AYOBANGIRA*	
49	MUSACEAE	*Musa acuminata* COLLA	
50	HYMENOPHYLLACEAE	*Trichomanes sp*	
51	PIPERACEAE	*Peperomia fernandopoiana* C. DC	
52	ASPLENIACEAE	*Asplenium theciferum* (Kunth) Mett.	
53	ASPLENIACEAE	*Asplenium aethiopicum* (Burm.f.) Becherer	
54	TILIACEAE	*Sida cordifolia L.*	UMUCUNDURA
55	FABACEAE	*Phaseolus sp.*	
56	POLYPODIACEAE	*Rumex usambarensis* (ENGL.) DAMMER	
57	POLYGONACEAE	*Rumex abyssinicus* JACQ	UMUFUMBA
58	ASTERACEAE	*Lactuca inermis* FORSSKAL	RURIRA
59	VERBENACEAE	*Lantana trifolia L.*	UMUSEKERA, UMUHENGERI
60	ORCHIDACEAE	*Orobanche minor SMITH*	
61	PTERIDACEAE	*Pteridium aquilinum var. africanum* (Hieron. Ex R.E. Fries)	
62	RUBIACEAE	*Pentas zanzibarica var. rubra VERDC.*	ISAGARA, KARABUTSIRWE
63	RUBIACEAE	*Pentas lanceolata (FORSSKAL) DEFLERS*	
64	FABACEAE	*Crotalaria sp.*	
65	FABACEAE	*Tephrosia vogelii* HOOK.f.	
66	SCROPHULLARIACEAE	*Berbascum benthamianum* HEPPER	GATERANYA
67	DRYOPTERIDACEAE	*Dryopteris sp.*	
68	LAMIACEAE	*Plectranthus barbatus ANDREWS*	IGICUNSHU
69	PTERIDACEAE	*Pteris prolifera*	
70	ASTERACEAE	*Tagetes minuta L.*	NYIRAMUNUKANABI
71	NYCTAGINACEAE	*Mirabilis jalapa L.*	
72	CYPERACEAE	*Kyllignga apendiculata SCHUMANN*	AGAKEREKEZI
73	CYPERACEAE	*Kyllinga elatior KUNTH*	
74	EUPHORBIACEAE	*Acalypha psilostachya HOCHST.*	
75	ASTERACEAE	*Crassocephalum vitellinum (BENTH.) S. MOORE*	IGISUNUNU, ISUNUNU, UMUSUNUNU
76	POACEAE	*Rynchelrum repens (WILLD.)HUBB., KEW BULL.*	
77	POACEAE	*Aristida adoensis HOCHST.*	GAKOKI, ISHINGE, LUBUKA
78	EUPHORBIACEAE	*Biophytum helenae* BUSCAL.et MUSCHLER	NYAMABUMBA
79	RUBIACEAE	*Spermacoce princae* (SCHUMANN) VERDC.	NGINGWITANA
80	POACEAE	*Agrostis sp.*	
81	SCROPHULLARIACEAE	*Alectra sessilflora* (VAHL) KUNTZE	
82	ACANTHACEAE	*Asystasia sp.*	AKANYAMAPFUNDO

83	ASTERACEAE	*Crassocephalum bumbense* S. MOORE	IGIFURANINDI, ICYUNAMYI
84	ASCLEPIADACEAE	*Secamone sp.*	
85	POACEAE	*Setaria sp.*	
86	ASTERACEAE	*Lactuca sp.*	
87	ASTERACEAE	*Helichrysum schimperi* (SCHULTZ-BIP.) MOESER	
88	LAMIACEAE	*Ocimum suave WILLD.*	UMWENYA
89	MALVACEAE	*Hibiscus fuscus* GARCKE	UMUTOZO
90	POACEAE	*Paspalum sp.*	
91	ASTERACEAE	*Galinsoga parvifolia CAV.*	KIMALI
92	ASTERACEAE	*Galinsoga ciliata* (RAF.) S.F. BLAKE	KIMALI
93	ASPLENIACEAE	*Asplenium varians Wall.ex Hook.& Grev*	
94	ASPLENIACEAE	*Asplenium lividum* Melt ex. Kuhn	
95	PTERIDACEAE	*Pteris friesii* Hieron	
96	THELYPTERIDACEAE	*Christella hispidula* (Decne.) Holttum	
97	HYMENOPHYLLACEAE	*Vandenboschia melanotricha* (Scleschtend) Pichi Serm.	
98	ASPARAGACEAE	*Asparagus recemosus* WILLD.	
99	ASTERACEAE	*Microglossa sp.*	
100	RANUNCULACEAE	*Thalictrum rhynchocarpum* DILLON ex A.RICH	AKANYARUHIMA, UBUGOMBORO
101	FABACEAE	*Vigna macrorhyncha* (HARMS) MILNE-REDH	
102	ASTERACEAE	*Bothriocline longipes* OLIVER et HIERN	IGIHEHE, URUHEHE
103	ASTERACEAE	*Sonchus aspe*r (L.) HILL	KIKEMBEKEMBE, RURIRA
104	COMMELINACEAE	*Zebrina pendula* SCHNIZ.	URUTEJA
105	CARYOPHYLLACEAE	*Drymaria cordata* (L.) WILLD. ex ROEM et SHULTES	MVURIDAHITA
106	URTICACEAE	*Elatostema monticola* HOOK. F.	
107	BORAGINACEAE	*Cynoglossum amplifolium* HOCHST.ex A. DC	
108	RUBIACEAE	*Rubia cordifolia* auct. non L	URUKARARAMBWE
109	SCROPHULLARIACEAE	*Veronica abyssinica* Fresen	NYIRAGAHUZA
110	POLYGONACEAE	*Polygonum nepalense* Meissn	
111	FABACEAE	*Indigofera arrecta* Hochst. ex A. Rich.	UMUSORORO
112	ASTERACEAE	*Dichrocephala integrifolia (L.F.) Kuntze*	
113	RUBIACEAE	*Galium chloroionanthum SCHUMANN*	URUKARARAMBWE
114	TILIACEAE	*Sida rhombifolia L*	UMUCUNDURA
115	POLYGONACEAE	*Rumex bequaertii* DE WILD	UMUFUMBA
116	ARACEAE	*Arisaema mildbraedii* ENGL.	

Appendix 3. List of medicinal plants used against human ailments

Scientific name	Vernacular name	Family	Life form	Substance	Medicinal indication	Plant part used	Route of administration
Ranunculus miltifidus Forskk.	Kazingashya	Ranunculaceae	Herb	Powder, Juice	Fracture, poison vomiting	Leaves	Broken part, Oral
Ajuga alba (GUERKE) ROBYNS	Igitingwa	Lamiaceae	Herb	Juice	Poison vomiting	Leaves	Oral
Clerodendrum fuscus GUERKE	Umumara	Verbenaceae	Liana	Juice			
Rhamnus prinoides L'HER.	Umunanira, umusasa	Rhamnaceae	Tree	Juice	Poison vomiting	Leaves	Oral
Lysimachia ruhmerians VALTKE.	Umuyobora	Primulaceae	Herb	Juice	Stomach trouble	Leaves	Oral
Clausena anisata (Willd) Hook. F ex. Benth	Umuzo	Rutaceae	Shrub	Juice	Varicela, scabies	Leaves	Skin lesions
Gouania longispicata Engl.	Umusando	Rhamnaceae	Liana	Juice	Foetal trouble	Leaves	Oral
Chenopodium apulifolium Auct. Non schrad.	Umugombe	Chenopodiacece	Herb	Juice	Muscle disease, Kilondatumbo*	Leaves	Oral
Chenopodium procerum Hoschst. Ex Moq.	Umwisheke	Chenopodiaceae	Herb	Juice	Muscle disease	Leaves	Oral
Desmodium repandum (VAHL) DC.	Ituza	Fabaceae	Herb	Juice	Heart disease, Poison vomiting	Leaves	Oral
Barleria grandicalyx LINDAV.	Bugangabukari	Acanthaceae	Herb	Juice	Child Bellybutton	Leaves	Oral
Bidens pilosa L.	Inyabarasanya	Asteraceae	Herb	Juice	Mental trouble	Leaves	Oral
Asystasia sp.	Akanyamapfundo	Asteraceae	Herb	Juice	Mental trouble	Leaves	Oral
Brillantaisia	Kirogora,	Acanthaceae	Herb	Juice	Mental trouble,	Leaves	Oral

Trichocarpum LIANDEV.	Ikinyamugere				Poison Vomiting, Stomach trouble,		
Prunus Africana (Hook.f.) KALKMAN	Ubugomboro	Ranunculaceae	Herb	Juice	Snakebites	Leaves, Tree bark	Oral
Thalictrum rhynchocarpum DILLON & A. RICH	Igikwamba	Amygdalaceae	Tree	Juice	Dysentery	Leaves	Oral
Erithrina abyssinica Lam.	Umuko	Fabaceae	Tree	Powder	Mental disease. Kilondatumbo*	Tree bark	Oral
Dracenae steudneri AUCT. Non. ENGLER	Igihondohondo	Agavaceae	Tree		Mental disease		Oral
Zanthoxylum sp. (Engl.)	Intare y'irungu	Rutaceae	Tree	Powder, Juice	Gonorrhea	Tree bark	Oral
Senecio manii Hook. F.	Umutagara	Asteraceae	Herb	Juice	Poison vomiting	Leaves	Oral
Solanum terminale Forsskal.	Umuhanurankuba	Solanaceae	Herb	Juice	Placenta retention	Leaves	Oral
Urtica massaica MI. IDBR.	Igisura	Urticacaea	Herb	Juice	Gonorrhea	Roots	Oral
Persea Americana MILIER.	Ivoca	Lauraceae	Tree	Juice	Stomach trouble		
Cassia floribunda CAV.	Umukubanzoka	Ceasalpiniaceae	Shrub	Juice	Intestinal worm	Leaves	Oral
Eucalyptus maideni	Inturusu	Myrtaceae	Tree	Smoke	Hemorrhoids	Stem	Anal
Cajanus cajan (L.) MILLSP.	Umukunde	Fabaceae	Herb	Juice	Mumps	Leaves	Ear
Zehneria scabra (L. SONDER	Umushishiro	Cucurbitaceae	Liana	Juice	Mumps	Leaves	Ear
Rumex abyssinicus Jacq.	Umufumbageshi	Polygonaceae	Herb	Juice	Kilondatumbo*	Leaves	Oral
Gunura scandens O. HOFFM.	Kizimyamuriro	Asteraceae	Liana	Juice	Kilondatumbo*	Leaves	Oral
Momordica foetida SCHUM.	Umwishwa	Cucurbitaceae	Liana	Juice	Poison vomiting	Leaves	Oral
Tragia brevipes PAX.	Isusa	Euphorbiaceae	Herb	Juice		Leaves	Oral