Walking Amongst the Sacred Spines

Social and Ecological Investigation

of the

Fenoaivo and Zanavo Sacred Forests in Southern Madagascar

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Abstract

This study explores the social and ecological aspects of the Fenoaivo and Zanavo sacred forests—an area located in the commune of Ifotaka and region of Anosy in the spiny forest of southern Madagascar. Through a general survey of the 2.5km by 950 meter forest, a survey of the fauna and flora, a survey of the sacred forest areas, over fifty local interviews and an expert stakeholder survey sent out to over 65 people internationally, an attempt was made to look at the areas potential for a community conserved area and the possibility of community-based tourism. Discovering that both the general forest is ecologically diverse and the sacred forest is traditionally diverse, it is necessary to look at each sacred forest around Madagascar case by case and it is imperative to remain sensitive to the traditional practices and cultural beliefs of the locals. Therefore more studies of the biological significance and cultural history of these forests will aid in compiling information to illustrate to not only the nation, but local communities, the potential contribution these sites have on the conservation of biodiversity

Introduction:

Staring at the tomb covered in stones in the midst of dense spiny trees, I couldn't help but admire the beauty of my current surroundings and the strong Anosy traditions that had allowed this sacred area in Madagascar to flourish. As the fourth largest island in the world, Madagascar sits off the eastern coast of Africa, containing wide diversity of endemic species due to its isolation from the continent of Africa 65 to 100 million years ago (Ifotaka Final Report 2002). However, 2,000 years of human disturbances have caused an 80 percent loss of Madagascar's original forest cover. Since 1960, the island's population has doubled while its forest area has shrunk in half. Every year, 200,000 hectares of forest are being destroyed due to exploitation for firewood, charcoal production, selective logging for building materials and agriculture (Soutter, Smith, Ntambia, Rana).

In the southern region of Madagascar, the spiny thicket forest, an area known for its slow regeneration, has, without exception, been affected by these disturbances. Northern Madagascar has been on the top of the conservation agenda in Madagascar, protecting a total of six areas under the status of national parks in 2007, but considering that the southern spiny forest contains the highest plant endemism in the country with 48 percent of the genera and 95 percent of the species, and has been named one of the 200 most important ecological regions in the world, it is also essential to concentrate on this area (Elmqvist). According to Stolton and Dudley in 2005, the spiny forest covers about 4,430,000 hectares, but only 1,400,000 and 1,700,000 hectares are intact habitats. Since the 1970s , the spiny forest has been declining due to clearing for cultivation, cattle herding, timber harvest and charcoal production (Elmqvist). Protection for these fading areas covers no more than three percent of the region. (Stolton and Dudley).

Even with these harsh living conditions, colonization and globalization, the Anosy

people have successfully continued their traditions. These traditions can easily be viewed driving down the road and observing the tall spiny trees that jut out from the spiny thicket below—these sacred areas seem essentially 'untouched.' Forests have traditionally been central in the social and cultural life of communities in the south, "inspiring respect through a great number of taboos and norms" (Stolton and Dudley). Taboos are "social prohibition or something regarded as holy or unclean" (Lingard). Traditional taboos and other community rules have helped regulate who can enter the sites and what can be harvested from these areas and have therefore protected them from years of human disturbances such as logging and slash and burn agriculture. Historians and anthropologists are fascinated by the cultural and traditional aspects of the sacred forests whereas biologists and conservationists view these sights as a prime opportunity to preserve some of the forests that contain some of the most fascinating flora and fauna in the world.

WWF notes that there are 60,000 hectares of sacred sites within the spiny forests and more than 1,000 individual areas ranging from large forests covering mountains to just a couple of trees surrounding ancestral tombs (Ferguson, 2007). Sacred forests are places where "spiritual powers protect the forest against transgressors" (Horning). The forests contain ancestral spirits (*lolo* or *ngatsy*) and can be burial grounds for royal families, supply water or other important resources for villages, have historical significance, shelter genii (kokolampo), mythical animals, stolen cows and serve as places for healing ceremonies (Ferguson, 2007). It is important to note that community sacred forests each have their own rules concerning acceptable activities within or surrounding the area.

Fifteen to twenty percent of southern forests should be set aside as protected areas in order to preserve important niches and therefore, through the use of local and traditional knowledge, sacred forests may be a solution to reach this goal (WWF). In the article *Recognizing the Contribution of Sacred Natural Sites for Biodiversity and Conservation*, the

authors support the idea of 'traditional conservation sites' by describing them as "islands of biodiversity" that alone may not be so biologically significant, but together, at a larger scale or ecoregion can have some great value (Soutter, Smith, Ntiamboa, Rana). In 2003, President Marc Ravalomanana described the plan to increase protected land in Madagascar from 1.7 million to six million by 2008 in a plan called the Durban Vision in order to primarily address increasing forest loss. Since this time, there has been an increase of protected sites used to save the biodiversity of Madagascar.

Currently, the International Union for the Conservation of Nature (IUCN) categorize protected areas based on nature conservation, science, visitor opportunities, and local and indigenous needs (Ferguson Lecture, 2008). The categories include: strict nature reserves, wilderness areas, national parks, habitat/species management areas, protected landscape or seascape and managed resource area. Governance over these protected areas also differs depending on the protected site: governance by government, shared governance, private governance and governance by indigenous peoples and local communities. In the last decade, conservation efforts have progressively turned to more social approaches integrating local control over natural resources and utilizing 'cultural and indigenous knowledge' (World Wildlife Fund). Sacred forests, although not yet recognized formally as conservation sites, have a possibility of becoming biodiversity and conservation sectors, governed and driven by local people and traditions.

Although there is a lack of recognition of sacred forests in Madagascar and other parts of the world, there are some international efforts being made by non-governmental organizations to protect these areas. Efforts to promote Indigenous and community conserved areas have recently been discussed. ICCAs, formally known as CCAs, are "natural and/or modified ecosystems containing significant biodiversity values, ecological services and cultural values, voluntarily conserved by indigenous peoples and local communities—both

sedentary and mobile—through customary laws or other effective means" (CEESP briefing note 9, 2008). Conserving, or having the potential to conserve an enormous part of the Earth's biodiversity, these areas can connect landscapes and seascapes, aiding in migration of wildlife, livestock and genetic exchange. This paper sets out to attempt to connect the discussion that is occurring around the world to the situation that is happening in southern Madagascar, especially in the spiny forest of the Androy region.

In addition to the possibility of a community conserved area, the idea of ecotourism within community areas should also be explored. Ecotourism can be defined as when "outsiders travel to natural areas that aims to conserve the environment and sustain the well being of local people" (Ferguson, Lecture 3 October 2008). Madagascar's ecotourism, however, is sometimes confused and misused and the terms 'nature' or 'wilderness' tourism may fit better. The most important idea, however, is that any sort of tourism should be community based ecotourism--a form of ecotourism where the local community has substantial control over and involvement in the development and management of tourism and a major proportion of benefits remain in the community (Benman 2001 cited in Ferguson Lecture Series).

One example of how both community conserved areas and community based ecotourism has been effective so far is in the village of Ifotaka. Ifotaka has a forest that has largely been protected by its sacred nature and serves as the *Ala Faly* of the Antefotoka clan. The sacred forest of Ifotaka is 540 hectares of spiny forest on the northern bank of the Mandrare River, but the entire area spans 22,000 hectares. Containing five species of lemurs, vulnerable to extinction and many important plant species, this sacred site contains some biodiversity only found in the South. In February 2006 the area was given temporary protection by the government and a community based tourism program has recently begun—the proceeds go directly to management of the surrounding landscape and reforestation,

however it has not been around long enough to see the economic consequences of the arrangement (Ferguson). Although this is a new project that has only just begun its, hopefully, long lasting, existence in the Ifotaka village, it serves as a good template to work off of in different areas around the spiny dry forest.

Objectives:

During the month of November (3-24), I went to the commune of Ifotaka, in the district of Amboasary-Sud to investigate the social and ecological aspects surrounding the sacred forest of Fenoaivo and Zanavo and the potential of it becoming a legally recognized site. Although it took a lot of effort in finding a site that would allow me to study in their area (Appendix A) the decided area turned out to have more potential than the others. The area between the villages of Fenoaivo and Zanavo is quilted with sacred and non-sacred forests. Distribution, area, biological significance and history of these forests have not been studied extensively and therefore compiling this information will aid in illustrating to the nation the potential contribution these sites have on the conservation of biodiversity and culture and will help to connect the international efforts concerning ICCAs with the actual happenings of the Fenoaivo/Zanavo forests (Ferguson, 2007).

Methods:

1.Study Area (Maps 1-9)

The village of Fenoaivo sits in the commune of Ifotaka, district of Amboasary-Atsimo and region of Anosy just south of the Mandrare River. The Fokotony is named Fenoaivo and includes such villages as Fenoaivo, Matsandy, Zanavo, Androvongnomby and other smaller villages to the south. The people of the area are a mostly Antandroy, but also include Andriamanare and Antezanavo. The Fenoaivo village also contains the communities of

Ankatsakala, *Faly* Bala and TananAgnombe, all areas in close proximity to the main area. The forest between Fenoaivo and east to the village of Zanavo marked my study site. The area is characterised by drought tolerant woody species of Euphorbiaceae and Didiereceace, which can reach up to 10 meters. With the dry season starting in March and ending in October or November, the area's average rainfall is less than 500 mm a year (Elmqvist).

Even with this brutal weather pattern, the area contains diverse plant species and forest types (scrub, low thicket, high thicket, dry forest, gallery forest) that are intermingled with villages, fields, clear cut areas and sacred forests. In addition the area is known to have an abundance of lemurs, reptiles and bird species.

Fenoaivo has not always been in the present area. Previous to 1971, the village sat to the north-west, still on the southern side of the Mandrare. When visiting this site, it was clear why it was so optimal—it sat in the middle between the Mandrare River, and two other little streams that supplied water, and fertile land for cultivation. However, in 1971 a large cyclone completely destroyed the village and the fields of cultivation. In order to survive, the people of Fenoaivo moved to its current location, which was then called Tsyvaky. After more people arrived and the population grew, it was necessary to expand the village outwards to the community of Ankatsakala, which was then clear cut and settled. Again, in 1999 another cyclone hit Fenoaivo, causing massive destruction of fields once again. The president, who before had been very wealthy with many zebu and lots of land and who had lost a major portion of his wealth, wrote countless letters to the government, describing the problems and the severity of the destruction. He requested aid, and when he received no responses, it was necessary clear cut some of the forest in order to create more land available for cultivation (before this cyclone every field was next to the river).

Currently, the population of Fenoaivo is around 850 people representing over 12 ethnicities. Cattle herding and cultivation are the main livelihood activities. When the rains

come, cultivating maize, beans, squash, sweet potatoes, cassava are used for personal consumption and to sell in the weekly market of the commune held every Thursday. People come from many kilometres away in their zebu carts to sell their livestock or cultivated goods and to just enjoy the social bustle of the market place. Two trucks come as well, bringing pots, pans, batteries and clothes, along with many other items.

The road that runs to the north of the village to Ifotaka and then onto Amboasary-Sud was built during colonial times by the Malagasy people, directed by the French (treatment of the Malagasy, as expected was not optimal). Although the road is in very rough shape, with large dug out areas, it still is vital for the transportation of goods, people and livestock from village to village. The protestant church arrived in the village 30-40 years ago and was constructed by the local people. The Catholic Church arrived more than 20 years ago, built by missionaries, who have subsequently left the area. The school was built in the community just before the Catholic Church. At it was required to pay to enter school, but two years after its opening, the community requested it to become public. The village currently works with two NGOs—CARE and PSDR. CARE has been working in Fenoaivo for 8 months giving corn to the community. PSDR gives money to buy goats, livestock and other goods.

2. Survey of General Forests

The first step in studying the area of Fenoaivo, was to do a survey of the forest used by the locals that sat between the villages of Fenoaivo and Zanavo. Using images obtained from Google Earth at an eye altitude of 1.34 km, a grid system was superimposed lettered A-O horizontally over 2.5 km and 1-5 vertically over 950 meters. Each grid cell measured approximately 150 meters by 150 meters.

Everyday, starting no later than 5:30 am, Lycco (my translator/research assistant), a local guide and I would set out to the forest. Using a Global Positioning System (GPS—

making sure the accuracy was less than 10 meters) , the Google Earth Map and prominent landmarks of the area the corner of each corner of every column would be found and we would subsequently, work our way south, studying each quadrant 1-5. We used the same protocol for looking at each specific quadrant. The information collected is as follows:

Grid Number and Letter: Recorded from the grid drawn on Google Earth Map

Name of Area: Given to us by our local guide—sometimes the grids would transect different named areas, so all names were recorded.

Social History/Cultural Status of Area: Given to us by our local guide—information on permitted and forbidden activities, time of cuttings, reasons for cuttings, information on cultivation products (if fields are present)

Sacred or Non-Sacred: Given to us by our local guide—if yes, the name of the area for later analysis.

Transects: After this information was collected (could also be collected when entering the forest) we would do 4 transects if possible (Figure 1), depending on the amount of thorns, sisal and cactus we encountered. Usually we would head across the grid 150 meters, go down the grid 50 meters and so on.

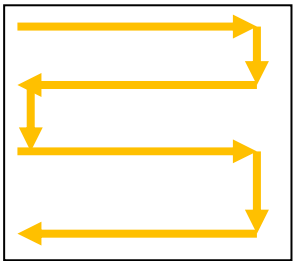

Figure 1- Optimal transect path through each quadrant.

During the walk through the forest a number of things were observed:

Shape of Grid Box: Coordinates were recorded from the GPS at the corners of ever grid box in order see the boundaries.

Summarizing Photo: Not only by looking at the Google Earth Map, but while walking through the forest, a photo was taken as a representative image of the forest species make up and quality. GPS points were recorded and then using a digital camera, a photo was taken N, E, S, W and then up at the canopy (if one is present). Each photo number was also recorded for later use. In many cases more than one photo was taken due to the heterogeneous make up of the grid cell.

Classification of Forest Type: Using a table created after taking a small tour around the area of types of areas, each grid cell was given one or many classifications:

Classification	Description
Scrub-	A scrub-like habitat, typically growing in poor or rocky soils and dominated by Pachypodium and Aloe families. Areas with lots of cactus or sisal usually classified as scrub. This category also includes low secondary scrub that grows in areas that have been slashed and burned for cultivation (*Hatsake*). (Figure 2)
Low Thicket-	A short form of spiny thicket usually under 4 meters in height and dominated by the Euphorbiacae. (Figure 3)
High Thicket-	A tall form of spiny thicket, typically over 4 meters in height and dominated by species of the Didiereaceae family (Fantiolotse-*Allaudia procera* and Songy-*Allaudia ascendans*). (Figure 4)
Dry Forest-	Forest in between high thicket and gallery—with a pronounced canopy and a more heterogeneous flora composition. (Figure 5)
Gallery Forest-	Forests dominated by tall Tamarind trees (*Tamarindus indica*) and found along the banks of major rivers. Canopy is typically around 15 meters. Heterogeneous flora composition. (Figure 6)
Village/Zebu Pens-	Two or more house or an area for keeping zebu. (Figure 7)
Cleared-	Areas that have been clear cut either for use of agriculture, villages, or grazing. (Figure 8)

Open-	Areas where there has been no clear cutting—possibly the soil is too poor in nutrients to sustain any sort of flora (sandy or rocky) or a place where water builds up during the rainy season (*Antsihanaky*). (Figure 9)

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Index of Disturbance: Using an index of disturbance created prior to the study, a number was given to each grid cell. Categories of Grazing, Paths/Roads/Fences, Logging, Invasive Species and Overall Quality of Forest Area were looked at:

Evidence of Grazing:

Index	Description
1	No evidence of grazing by sheep, goats or zebu—no droppings, foot prints, or grazing traces.
2	Minimal evidence of grazing—few traces of footprints, droppings or grazing (not significant to alter forest composition)
3	Increased to high level of grazing—definite traces of footprints, droppings or grazing, but original composition of forest not drastically damaged.
4	Extensive evidence of grazing—many traces of footprints, droppings of grazing that has altered the area in a drastic way.

Paths/Roads and Fences:

Index	Description
1	No paths/roads or fences present
2	1-2 small paths or fences, no roads
3	2-3 paths or fences and possibly a road
4	More than 3 paths, or fences and roads that obviously disturb the surrounding forests

Selective Logging/Burning:

Index	Description

1	No signs of logging or burning—no burnt trees or cut stumps
2	Several signs of logging or burning—a couple of cut or burnt stumps, but not to an extent that transformed the forest composition.
3	Lots of evidence of logging or burning—cut and burnt stumps present, and/or plank making evidence
4	Significant evidence of logging or burning—clear cut or burned areas.

Invasive Species:

Index	**Description**
1	No species of cactus or sisal plants
2	Couple of species of cactus or sisal plants, but not significant numbers
3	Increased population of sisal and cactus plants—not the dominant species, but less than half.
4	Extensive invasive species present—dominant species in the area and obviously not the original forest composition.

Quality of Forest:

Index	**Description**
1	Hardly disturbed—forest very well intact
2	Some disturbance—forest show signs of disturbance, but still mostly intact.
3	Disturbed—Lots of disturbances, but original form of forest still visible.
4	Very disturbed— So many disturbances that the forest is unrecognizable.

Homogeneous/Heterogeneous: After transects were walked, a decision was made if the plant species composition was homogenous (many of the same flora species and not much variety) or heterogeneous (many different types of flora species).

Dominant Species: Determined the most prevalent plant species and estimate percents if possible of the various species in the grid cell

Changes in the Map: Since the Google Earth Images being used were taken in 2005, there

had obviously been some changes in the composition of the forest. Therefore, it was important to note these changes and where they occurred.

Other Observations: Any other important details were noted—plant names, local names, terrain or soil type, weather etc.

3. Survey of Flora and Fauna

Opportunistically, during the survey of not only the general forest, but also the sacred forests, the local and scientific name of lemurs, birds and reptiles were recorded.

Lemurs- Every time a lemur group was spotted, the species, coordinates, location and count of individuals were recorded. Four possible types of lemurs could have been spotted-- *Sifaka* (*Propithcus verreauxi verreauxi*), *Maky* (*Lemur catta*), *Hatak* (*Microcebus murinu or griseorufus).*

Birds- After observing the bird with the binoculars to get a better view of the physical characteristics, the Malagasy name of each bird was obtained by our local guide and then using the field guide *Birds of the Indian Ocean* by Ian Sinclair and Olivier Langrand, the birds were then identified using their scientific names.

Reptiles- As reptiles were observed, their scientific names were identified by *A Field Guide to the Amphibians and Reptiles of Madagascar* by Frank Glaw and Miguel Vences.

4. Survey of Sacred Forests

After the general survey of the surrounding forests, it was very easy to not only recognize the sacred areas, but also understand their boundaries. Therefore, with the help of our local guides, we were able to use the GPS and the Google Earth Map to walk around each sacred site, taking points every 20-50 meters. After this was complete, it was necessary to

once again enter the area of the sacred site, and using the system of transects once again, do a similar survey as in Method section 2 (Index of Disturbance, Classification etc.). Although this information was already recorded during the first survey of the forest, it was easier to be more in depth after a second look. In addition, history of the sacred area was recorded—what causes the area to be sacred, who is buried in the area, where the resources for the tombs were brought from, what activities are permitted and forbidden etc. It was also interesting to look at the boundaries of the area and how each site was 'protected.' Pictures were taken and similarly recorded and observations on the area in general were taken down.

5. Locally Conducted Interviews

Over 50 informal *qualitative* interviews were conducted in the locations of Fenoaivo, Zanavo, Ankatsakala, Faly Bala and TananAgnombe. The objective for these interviews was to not only discover more about the history of the areas, but also to discuss the way the locals perceive and utilize the forest around them, including sacred forests. In addition, the interviews served to gather opinions of the locals about conservation, the possibility of a community conserved area and tourism. The interviews were semi-structured, meaning the interview questions were open-ended and could be carried out in large groups, families or individuals (Ifotaka Study). Questions (Appendix B) about history, the forest in general, sacred forests, conservation and tourism were asked, but were first discussed in order to have the interview run smoothly. There were a number of base questions that were asked to everyone, but other questions were asked depending on the informant's knowledge of the subject matter.

The questions would be translated from French to Malagasy by Lycco and he would then translate the answers back into French. At times, it was easier for him to carry on a conversation and translate the conversation at the end depending on the feeling of the situation. Interviews were held with men, women and children of all ages. Although it was important to interview those who held average position in the village, it was also necessary to interview those who held power of authority in the community—elders, the president, notables. Interviews were conducted in the afternoon, when most of the community was back from working their fields and lasted anywhere from 15 minutes to over an hour depending on how freely the informant wanted to talk about the issues presented. Lycco and I would either set up interviews in advance or would walk around the different communities following a snowball interview style.

6. Stakeholder Survey

A survey (Appendix C) of international expert stakeholders was conducted for 65 recipients. This was aimed to put in context the local survey of the sacred forest and help determine whether outsiders should indeed even be meddling with the forests or just leaving them well alone. The questions, compiled by Barry Ferguson and me, attempt to get at the opinions on conservation policy and sacred forests. These questions include such subjects as: potential recognition of these sites, reinforcement and protection for the forests (are they threatened at all), possible rewards for the cultural and ecological services the sacred forests provide for conservation (Expert Stakeholder Survey, Ferguson, Miller 2008).

Results:

1. *Survey of Forest in General*

Names of Forest Areas: Below are the names of the areas of the general forest given to us by local villagers.

Name of Area	Grid Cell
Ambatovato	A1, C3, C4,D4, I5, H5, H4, G5, K1, K2, K3, K5, J5
Fenoaivo	A1
Bazar Agnombe	A2, B3
TananAgnombe	A3, A4, A5
Kiborin-Ajaja	B5
Antsihanaky	B5, C5, D3, D4, E1
Antanamiritsa	B4
Ampisopiso	C1,C2, D1, D2, E1, E2, ,
Kiborin-Ajaja	B2
Marovato	B1, B2, B3, J4,
Zoloke	A4
Angangombe	C3
Antsakalahike	F1
Tsymangovi	F1
Ampalibe	F2, F3, F4, G1,G2,G3, G4, H1, H2, H3, I1,I2,I3,I4, J1 J2, J3
Emagnotria	F3, F4
Ampasipasy	E5, F4, F5
Tambohotsihanake	E3
Vohin-tsakasaka	E5
Ambagnemba	E5
Belavenoke	D5
Nord Ankirikirisoa	I4
Zanavo	K1, L-O

Classification:

The classification of the forest, proved to be very heterogeneous, even for each grid cell. Therefore, many grid cells had multiple classifications. Overall, 28 out of the 75 grid cells contained scrub, 28 contained Low Thicket, 54 contained High Thicket, 28 contained Dry Forest, 3 contained Gallery Forest, 7 contained villages or cow pens, 22 contained Cleared areas and 9 contained areas of Open. The most frequent classification in the Fenoaivo and Zanavo area is the High Thicket followed by Scrub, Low Thicket and Dry Forest. However close behind are Cleared Areas. The Gallery Forest only showed up in 3 grid cells in the northern part of the study area. Although the classifications within the entire forest study area were quite heterogeneous, within each grid cell, 46 of them (61% of grid cells) were homogeneous when looking at flora species diversity and 29 of them (39 % of grid cells) were considered heterogeneous when looking at flora species diversity. Although some grid cells shared classifications, if part of the cell was heterogeneous the whole cell was considered heterogeneous.

Number of Grid Cells with Specific Forest Classifications

Classification	Number of Grid Cells Classified (out of 75)	Percent of Grid Cells Containing Classification
Scrub	28	37%
Low Thicket	28	37%
High Thicket	54	72%
Dry	28	37%
Gallery	3	4%
Village/Cow Pens	7	9.3%
Cleared	22	29%
Open	9	12%

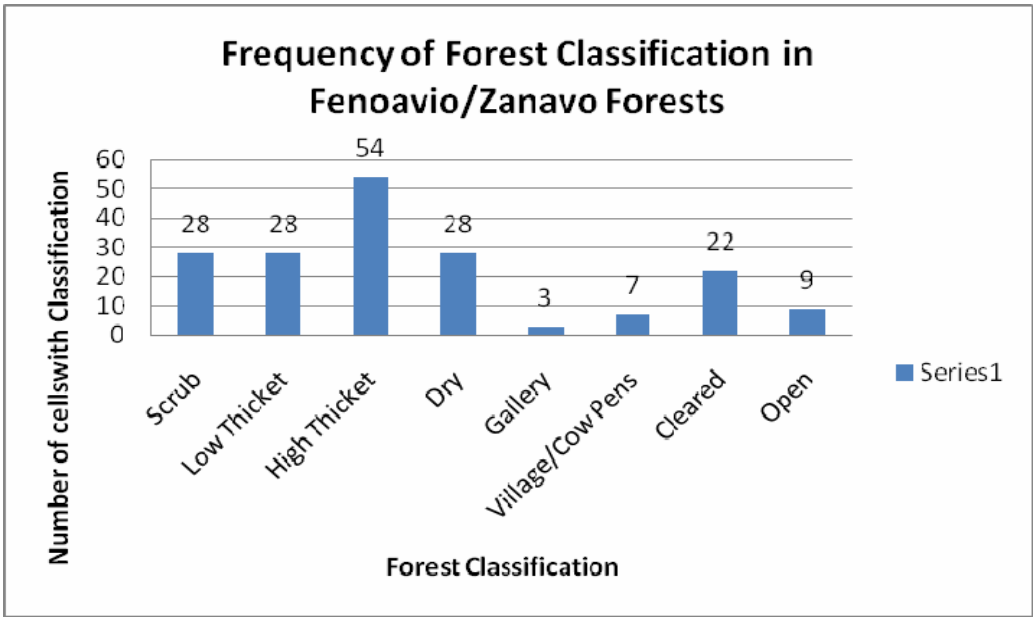

Figure 10: Frequency of Forest Classification in Fenoavio/Zanavo Forests. Graph relates the forest classification to the number of cells which it occurs.

Disturbance Index:

After looking at the disturbance index of all 75 cells (some were in between two indexes), it is clearly seen that the Zanavo/Fenoaivo forests overall fall into the 2 (131 occurrences) or 3 index (132 occurrences). However, generalizing this is hard as the forest is very diverse. There were many areas where the forest was very intact (sacred forests, especially) but there were also areas of complete degradation. When looking at grazing, the majority of grid cells had a 2 as their classification, meaning there was minimal evidence of grazing—few traces of footprints, droppings or grazing (not significant to alter forest composition). Logging also showed that the highest frequency was at 2: several signs of logging or burning—a couple of cut or burnt stumps, but not to an extent that transformed the forest composition. The highest frequency for paths was a 3: 2-3 paths or fences and possibly a road. Quality of the forest was a 3: disturbed—Lots of disturbances, but original form of forest still visible. Invasive Species was a 2: couple of species of cactus or sisal plants, but not significant numbers, or 3: increased population of sisal and cactus plants—not the dominant species, less than half.

Frequency of Index of Disturbance in Grid Cells A-O in Fenoaivo/Zanavo Forests

	1	2	3	4	Mode
Grazing	18	29	24	8	2
Logging	15	31	26	12	2
Paths	16	24	30	10	3
Quality	18	22	27	11	3
Invasive	23	25	25	9	2/3
Total	90	131	132	50	AVERAGE: 2/3

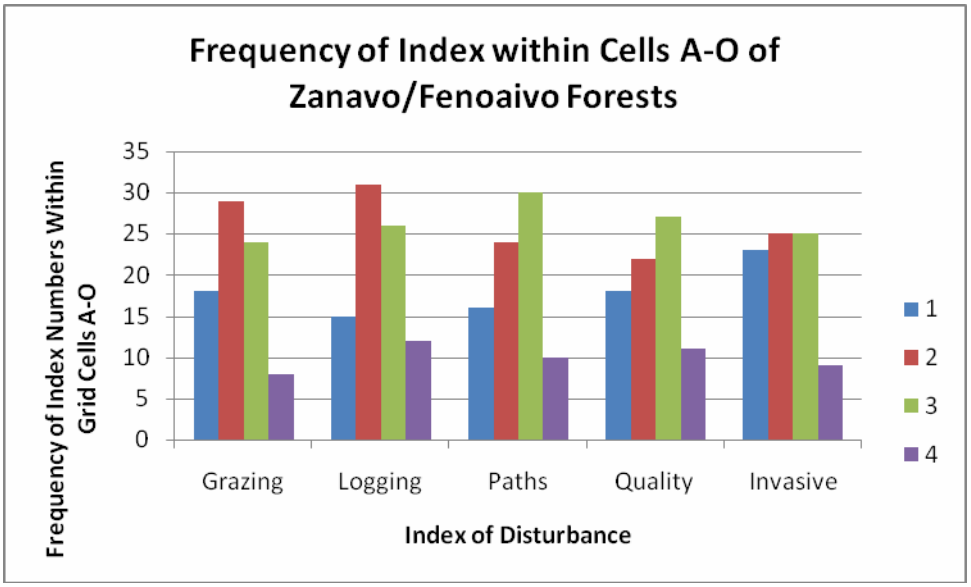

Figure 11: Frequency of Index within cells A-O of Zanavo/Fenoaivo Forests

Changes in Map:

During our survey of the forest, even though we were using a Google Earth Map and a GPS, it was still difficult to navigate around the forest. Some of this had to do with the differences between the map, created in 2007 and the present forest. Most changes were due to new cuttings or burnings or new infrastructure—houses, cow pens, paths.

Grid Number	Change in Google Earth Map
A1	Northwest and center cuttings, path added
A4	More cuttings and new cow pen
A5	New House in northeast corner
C1	More paths added
C2	Southwest corner cutting and burning (Name: Avaha). Dominated by *Raketa*,
C3	Cutting
C5	Burning
D4	Burning
E3	Burning for next year cultivation. One month ago.
E5	West burned 2/3 months ago. (PasiPasy)
F1	Center cut to be burned in future South burned one year ago
F3	West burning 6-7 months ago
F4	West cutting, and south burning 1 year ago
F5	Burning and new houses
H5	Cutting
I4	Cutting
I5	Cutting—some new shrubs
J1	Cutting
K5	Cutting

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Figure 12: Pictures of what a forest would have looked at previously (Dry forest) and what it looks like after cutting. This is a marked change from the Google Map

2. *Survey of Flora and Fauna:*

Flora:

After surveying the both the general forest and the sacred forest, a total of 57 flora species were identified by their Malagasy names. Thirty of these could be further identified by their species/genus and/or family.

Flora of Zanavo/Fenoaivo Forests

Vernacular	Scientific	
	Genus Species	**Family**
Baobab	Adansonia za	
Bemandaly	Unknown Sp 1	
Benono	*Acacia rovumae*	Fabaceae
Boradoka	*Berchemia discolour*	Rhamnaceae
Dagoa	*Strychnos decussata*	Loganiacae
Darofotsy	*Unknown Sp 2*	Burseraceae
Daronomby	*Commiphora marchanedia*	Burseraceae
Daromena	*Commiphora*	Burseraceae
Darosike	*Commiphora sp.*	Burseraceae
Falintivoke	*Unknown Sp 3*	
Famanta	*Euphorbia sp.*	Euphorbiacae
Fantiolotse	*Alluaudia humbertii*	Didiereaceae
Fihangne	*Euphorbia plagianta*	Euphorbiacae
Fiofio	*Toxocarpus sp.*	
Fomonty	*Unknown sp. 4*	
Haloboronale	*Albizzia masiko*	Mimosaceae
Hazomby	*Croton sp.*	Euphorbiacae

Hazomalagny	*Moninga drouhardi*	Euphorbiacae
Hazomena	*Securinega sp.*	Euphorbiacae
Hiligne	*Unknown Sp. 5*	
Jabihy	*Operculicarya decaryi*	Anacardiaceae
Katrafay	*Cedrelopsis grevei*	Ptaeroxylaceae
kily	*Tamarindus indica*	**Cesalpineae**
Kitopoke	*Unknown Sp. 6*	
Kobay	*Unkown Sp. 7*	
Laloa	*Unknown Sp. 8*	
Lay		Malvaceae
Lombiny	*Unknown Sp. 11*	
Mendoravigne	*Unknown Sp. 12*	
Mangy	*Unknown Sp. 13*	
Mozotse	*Unknown Sp. 14*	
Osa	*Xerophyra darylitiodes*	Velloziaceae
Pisopiso	*Pemphis madagascariensis*	Lythraceae
Raketaborivoa	*Opuntia ficus*	Cactacea
Raketamena	*Opuntia strita*	Cactacea
Ranghaotse	*Unknown Sp. 15*	
Rohondroho	*Alluaudia dimosa*	Didiereaceae
Romba	*Unknown Sp. 16*	
Roikpitike	*Mimosa sp.*	Mimosaceae
Ronhavitse	*Unknown Sp. 17*	
Roy	*Acacia farmesiana*	Mimosaceae
Sakoandalitse	*Operculicarya hyphenoides*	Anacardiaceae
Sandrany	*Unknown Sp. 18*	
Sasavy	*Salvadora sp.*	Salvadoraceae
Sirosiro	*Gyrocarpus americanus*	Hernandiaceae
Sogno	*Allaudia ascendens*	Didiereaceae
Solete	*Unknown Sp. 19*	
Somohtsoy	*Unknown Sp. 20*	
Tahintany	*Unknown Sp. 21*	
Takisakisake	*Unknown Sp. 22*	
Taolankafotse	*Grevvia sp.*	
Tamboro	*Unknown Sp. 23*	
Tongoarahamba	*Unknown Sp. 24*	
Tsyvonkon-tsifana	*Unknown Sp. 25*	
Vahognmbe	*Unknown Sp. 26*	
Vahonge	*Unknown Sp. 27*	
Vontaky	*Unknown Pachypodium sp. 28*	
Zagne	*Unknown Sp. 29*	

Fauna:

Lemurs- During our survey of the forest, five groups of Sifaka (*Propithcus verreauxi verreauxi*) were seen on multiple occasions. The locations of these lemurs were in F2, I1, I2, I4, I5, H5, the middle of G1, J5, J4, J3, a long with south of Zanavo. Within the Fenoaivo forest, it is believed that there was one group in the ranges of quadrants F and G and three groups between I and J. Each group had on average 5-7 individuals, except the group in the Zanavo forest, which had 3 individuals (male, female and baby). One baby was observed in the group of quadrants F and G. MAP Due to the very aggressive manner of the Sifakas every time we approached them, it was advised by our guides to leave them be—I complied after hearing stories of locals being attacked and getting their ears and noses chewed off.

Although locals have seen Maki (*Lemur catta)* and Hatak (*Microcebus murinus or griseorufus* , none were observed during this study.

Birds- A total of fifteen bird species were identified with the vernacular name and genus/species. Local names of the species were also recorded for all but six.

Birds of Zanavo/Fenoaivo Forests

Vernacular Name	Local Name	Genus /Species
Crested Coua	Tivoke	*Coua cristata*
Crested Drongo	Relove	*Dicrurus forficatus*
Giant Coua	Eoke	*Coua gigas*
Grey Headed Lovebird	Karyaka	*Agapornis canus*
Hamerkop	Takatse	*Scopus umbretta*
Helmeted Guinefowl	Akanga	*Numida meleagris*
Lesser Vara Parrot	Bolokikely	*Coracopsis nigra*
Madagascar Button Quail	Unknown Name 1	*Turnix nigricollis*
Madagascar Coucal	Kotrohokha	*Centropus toulou*
Madagascar Fody	Unknown Name 2	*Foudia madagascariensis*
Madagascar Lesser Cuckoo	Unknown Name 3	*Cuculus rochii*
Madagascar Paradise Fly Catcher	Unknown Name 4	*Terpsiphone mutata*

Madagascar Partridge	Unknown Name 5	*Margaroperdix madagascariensis*
Sakalava Weaver	Folin-ja	*Ploceus skalava*
Tylas	Unknown Name 6	*Tylas eduardi*

Reptiles- A total of eleven species of reptiles were observed, including, chameleons, the radiated tortoise (very endangered), and snakes.

Genus /Species
Furcifer lateralis
Trachylepis gravenhorstii
Oplurus cyclurus
Chalarodon madagascariensis
Zonosaurus trilineatus
Trachylepis madagascariensis
Mimophis mahfalensis
Dromicodryas bernieri
Astrochelys radiata
Furcifer verrucosus
Liophidium torquatum

3. *Survey of Sacred Forest*

Borders of Sacred Forests: Map 10 shows the borders of each sacred area. These areas can be very large (Ampalibe) or just one or two trees (the area where the president's father's house used to be). Initially, it was thought that borders on the sacred forests would be difficult to follow exactly. However, contrary to this belief, each border of the forest was very well identified. Not only was it obvious due to the large trees that frequently gave away the area as sacred, but there were also markers that helped determine boundaries. These include: Cactus (*Opuntia sp.*), sisal, rocks, hanging horns and aloe. After a sacred forest area is identified, many villagers cut down cactus in and place them along the edges of the area. Being a rapid growing species, it serves as a good fence, not only indicating *faly* areas, but also serving as a fence to people and livestock. Sisal was used in a similar manner, but usually was found within the sacred forests, marking tombs or other sacred features. In Ampalibe (I1) there is actually an area of sisal that is used as a transplant area. People can take the sisal and use it to mark tombs within that particular forest. Rocks and Aloe are also placed around forests every couple of meters. Rocks used usually come from outside of the area being traditionally protected. Lastly, horns are used to mark areas. This not only warns people that this area is *faly* and if cutting occurs, it is necessary to sacrifice zebu, but in the case of the Zanavo Sacred forest (Agnalan Tsakalalike), this also shows that someone did actually cut within the forest and that zebu were sacrificed.

In addition to these borders, in two forests (Ampalibe and Agnalan Tsakalalike) forest was protected by an area of forest. This area was described to us as the *vêtements(*clothing*)* to the sacred areas. This area, although not formally considered *faly*, is understood to be left alone—no cutting or grazing. Permission by the head of the specific village can be granted if there is a resource especially needed by a villager, but for the most part the area should be left alone. The clothing of these two sacred forests is contained within the borders of our mapping activity.

Amazingly and without exception, everyone interviewed in Zanavo and Fenoaivo knew the *faly* areas inside and out, including young children. There is no doubt anyone could have taken us into the forest and showed us exactly where the *faly* begins and ends. Children learn these areas from an early age. One man interviewed had his 5 year old daughter sitting in his lap, when asked this question he of course replied with a strong yes and then indicated his daughter, suggesting that she also knew all the areas. Whenever a child walks in the forest with parents or other adults, *faly* areas are certainly pointed out to their children. Faly areas of other villages in the surrounding areas are also known by most of the villagers—even as far as Ifotaka and Ambovombe!

Classification:

Each *faly* area was given a classification (ecological and social) based on the protocol given when surveying the general forest. Names and reasons for its sacredness were recorded (below). Areas went from having open areas all the way to full fledged gallery type forests. Most areas contained very large Didiereaceae species along with species in the Euphorbia family.

Table of Names, Cultural History and Classification

Of Sacred Forests of Zanavo/Fenoaivo

Name	Cultural History	Classification
Tsytrobo	Historical Remembrance	Scrub/Low Thicket
Kiborin-Ajaja 1	Tombs of Children 5 years of age and under	High Thicket
Kiborin-Ajaja 2	Tombs of Children 10-15 years of age and under (1 newborn tomb present)	High Thicket
Kiborin-Ajaja 3	Tombs of children (no age requirement)	Scrub/Low Thicket
Antsihanaky	Tombs of President's mother and nephew	Low Thicket/Cleared/Open
Ampaly Akaboagne	Tombs of President's uncle and others—very old.	Scrub/Low Thicket/Cleared
Ampisopiso	5 tombs containing those people of the village with higher status. 1 tomb contained a young girl and her father.	Scrub/High Thicket
Presidents House 1	Struck by lightning and burned to the ground.	2 Large Hazomalagny trees (*Moninga drouhardi*-Euphorbiacae*)*
Presidents House 2	President's father's old house—burned after his death.	Circle of Fantiolotse trees (*Alluaudia humbertii*-Didiereaceae)
Ampalibe	Most sacred area and oldest area containing tombs and markers to remember those who could not be buried in the	High Thicket/Dry Forest and Gallery Forest

	area. No children's tombs.	
Agnalan Tsakalalike	Tombs of Zanavo Village. 15-20 years ago.	High Thicket

After looking at all the different disturbance indexes for each sacred area (not including Tsytrobo, and both president's house, due to their small size and non-forest like qualities). As presented, index of disturbance shows that the highest frequency for grazing is 2 (minimal evidence of grazing—few traces of footprints, droppings or grazing (not significant to alter forest composition) logging 1 (No signs of logging or burning—no burnt trees or cut stumps) paths/roads 1 (No paths/roads or fences present), invasive species 1 (No species of cactus or sisal plants) and overall quality 1 (hardly disturbed—forest very well intact) or 3 (Disturbed—Lots of disturbances, but original form of forest still visible). Therefore the overall highest frequency is a 1 on the index of disturbance.

Total Numbers for Index of Disturbance for Sacred Forests in Zanavo/Fenoaivo

	1	**2**	**3**	**4**	**Mode**
Grazing	3	4	1	0	2
Logging	5	1	2	0	1
Paths/Roads	1	2	2	0	2/3
Invasive Species	5	3	0	0	1
Overall Quality	3	2	3	0	1/3
Total	22	12	9	2	

Cultural History:

It was also important to find out the history of each particular sacred area. Most of the sacred areas, with the exception of Tsytrobo, Antsihanaky, the Zanavo Sacred forest and the two areas of the house, have been considered *faly* and have contained tombs for many years (all of our guides would respond 'forever' when asked when the area became sacred). Ampalibe (before Fenoaivo moved locations in 1971) is the oldest and Antsihanaky is the most recent (five years ago). When a person dies, the body is usually placed either next to or on top of a previous tomb that has since decomposed. It is very rare that a when a person dies from an existing clan, that a new area will be created for them. With the case of the president's mother, she would have been buried with her husband across the river, but he knew that not many people could swim and the river comes up and down frequently. Therefore, the president chose an area that was naturally open, not fertile due to the rocks and not visited by people very often. In addition, the sacred forest of Zanavo was chosen because the forest bordered the field of the first person who died, and he thought that it would serve to protect his property. Otherwise, people are usually buried within the area of their ethnicity—their grandfather or father.

The diversity of what makes an area sacred in the Fenoaivo and Zanavo forests also became apparent. Sacred areas can be placed where an important historical event took place, where an important ancestral house once stood, where tombs of men, women and children have been placed or stone markers that represent an ancestor who could not get back to the area to be buried.

In addition, the tombs of the buried also vary depending on the forest you are in. In the Fenoaivo sacred forests, all adults are put inside of a large species of tree (*Kobay*, *Mendoravigne*, of *Sandrany*). If you are a high status citizen (king, notable), then your tomb will not be covered in rocks, however if you are part of the general population, the tomb will be covered with a pile of stones that have been brought in from outside the forest. Children under the age of 15 or 16 are not buried within a tree --just covered in rocks. In KibornAjaja, there was a tomb, where the body was visible under a thin layer of rocks. In addition to having the style of tombs with stones, the president's mother was not buried under stones at all—her tomb was made of cement. This is due to the fact that the president, at the time, had money to spend on cement from Ambosary and therefore constructed a tomb in this fashion: a true showing of respect. Additionally, in Fenoaivo it is *faly* to put the sacrificed zebu horns on the tomb, however 2 km down the road east at the Zanavo sacred forest, large zebu horns jewel the tombs. Plates, bowls and silverware at every site are placed over and around the tombs along with the wood used to carry the bodies.

Activities in Sacred Forests-

Although everyone is permitted to enter the forest, villagers rarely go into the areas unless searching livestock that have entered or for funeral ceremonies. All cutting, with the exception of the day of the funeral, and burning within the sacred forest is considered *faly* or taboo, along with defecation, smoking and other activities considered 'disrespectful' to the ancestors. Although livestock are not really permitted into the forest, villagers do not seem to be bothered if this does occur—they simply retrieve them as soon as possible.

The consequence for breaking these taboos is the sacrifice of zebu. It does not matter if it is one tree or the whole forest, it is necessary to complete this act. In Ampalibe, several years back, a man from a different village came in and chopped down an entire section near the road. After refusing to sacrifice zebu, his family was forced to instead. Now, the forest has once again become *faly*. In the Zanavo sacred forest, the same type of incident occurred, zebu was sacrificed and the forest, once again became faly. Now, zebu horn markers line the road in order to remind everyone of this act. When asked what happens if the perpetrator is not seen when cutting in the forest, the villagers simply responded that they are always caught—everyone knows everyone else's hatch marks and footprints.

Funeral Ceremony-

After a person dies, their body is brought to area chosen for burial. Everyone in the village attends the funeral. Once there, the body is usually placed under a specific tree (Sasavy tree in Ampalibe) and zebu are sacrificed. The number of zebu depends on wealth of the person. Usually it ranges from 1-3. If a person has no zebu, the body will wait in the village until family members are notified and bring zebu to be sacrificed. After the sacrifice, the *Tsimahavelogne*—a single member of the village—will sprinkle the blood of the zebu over the area where the body will be placed. Some *Tsimahavelogne* only sprinkle blood for 'grandes personnes' and others only for women and children. The body is then placed in a hollowed out *Kobay, Mendoravigne or Sandrany*, tree which was cut down from the surrounding area and carved out at the village. The tree with the corpse inside is then placed over the blood sprinkled area—head towards the east and feet towards the west-- and covered with rocks depending on the person's status in the village.

In Fenoaivo, all parts of the sacrificed zebu must be taken out of the forest back to the village, whereas in Zanavo, the horns of the zebu are placed on the tomb itself. Once back at the village, dancing and more sacrifice takes place. After a person dies and becomes an ancestor (*razanah*) respect for the person always increases whatever their status in village was before. If a person was not liked in the community because of some negative activities, it is necessary to forget all of this when the person passes away. One elder man used a Malagasy quote, "Mena tany, mena ovy" (the ground is red and the potatoes are red). This summarizes the Malagasy thinking philosophy about the ancestors—it is necessary to respect and honour ancestors because they are now part of the earth, the earth that is necessary for life. Although many of the villagers have converted to Christianity, most funeral ceremonies have remained the same, with the exception that Christians now sacrifice their zebu in the village instead of on sight.

Conservation:

Forest Use:

Interviewing the locals was important to not only discover how they use the forest, but also, where activities take place within the forest. The forest, for Fenoaivo and Zanavo, is an important place where people hunt, collect firewood (dry/dead trees), defecate, collect honey (*tantely*), roots (*fangitse*), fruit, collect wood for houses, zebu pens, tools, chariots (*Allaudia ascendas* or *sogni*), gather food for zebu, sheep and goats, graze livestock, use trees for ancestral burying, and collect cactus for fences and zebu. In addition, the forest provides the villagers with important medicinal plants: *Katrafay* (stomach, back, eyes), *Hazolava* (back), *Menateza* (stomach), *Manongo* (teeth), *Tamboro* (stomach). In addition, the people of the villages realize the importance of the forest for rain.

The people of Zanavo, mostly use the forest that is slightly west of the village, south and east. The people of Fenoaivo use the forest just east of the village (Ambatovato, Bazar de Boeufs), but also walk south for larger trees. Every person in the village—if they are originally from the area—tends to have their own area in the forest for cutting and logging along with their own fields for cultivation. Of course, it is, in most cases, the men who 'own' the land, not the women. If, for some reason, a person needs trees from another part of the forest, it is necessary to get permission from the head of the village (president), who will then discuss the matter with the other elders in the village. Ownership of land is passed down from father to son, but also can be obtained through buying and selling.

Since the beginning of the villages of Zanavo and Fenoaivo, the villagers have all noticed changes in the surrounding forest in general. Most informants mention that it is much harder to find firewood now and it is necessary to travel longer distances a long with large enough trees to cut down for houses and tools. In addition, hunting has become harder as there are remarkably less animals. Lemurs have become quite scarce and they have noticed a higher population of lemurs in sacred forest areas because their surrounding environment has been destroyed. The reasons for this, they say, are an increase in population, the cyclone and unnecessary cuttings. The villagers of the area know the importance of the forest for their daily use and some even for the environment (in order to keep the soil healthy), however they believe that it is necessary in many cases for survival. When the cyclone destroyed the fields, cutting down the forests in order to grow food for their families was vital. The president of Fenoaivo does not like that people are cutting down the forests, but has three kids himself, and knows they will need the trees and other resources the forest provides to live. The notable in Ankatsakala says that "people love the forest", but using its resources is required for life.

Current efforts to preserve the forest:

There have been some efforts to protect the remaining forests of Zanavo and Fenoaivo. People have begun to buy wood from place far away to build houses. However, this only alienates the villagers from the actual destruction being done in forests farther away. Additionally, mandating permission for cutting in parts of the forest aids to discourage those who cut down the forest unnecessarily. In 2004, the commune established an area north-east of town for the re-growth of Allaudia species, in order to attempt to regenerate some forest areas that have been recently degraded. Although the area is overgrown with cactus, it still serves as an area where cutting is prohibited. In addition, about six months ago, the president of Fenoaivo sent a letter to the Malagasy government requesting funding for 6 local people to survey the forest. His goal is to set up a situation much like the one that is occurring in Ifotaka. He is still waiting for a reply. Before sending the letter, the entire community was consulted, and he explains that everyone seemed content with the plan. All agreed that the surveyors must be local and must be paid to protect the forest from unnecessary degradation of the forest. The president, however realizes that sacred forests are a good place to start.

Other villagers are not convinced that protecting the forest is the best thing for the village. This should **not** just be simply bypassed as it was a minority of people interviewed. They are concerned that if the forest is going to be protected, how vital resources will be extracted. These concerns are **very** reasonable and need to be looked at before any sort of community conservation plan goes into play.

Tourism:

In addition to the idea of protection, opinions about tourism were also obtained. At the moment, tourists from the organization of Classic Camping visit a forest area south of Zanavo. I decided, even though it is off my grid map, it would be beneficial to take a tour of the area led by the guides that have been working with this organization. After a long

discussion with the two elderly guides, they finally agreed to lead us. The area of forest used belongs to the two men and therefore, they are the only ones who lead the tourists when they come. The area can be described as high thicket or dry forest and is composed of many different species including *Osa, Kobay, Katrafay, Sakoan-dalitse, Daro*, and both Euphorbia and Allaudia. It was a very intact forest, and when asked if it was sacred, they both replied at first 'no' and then went on to explains that the village had just decided not to cut in the area. The forest is composed of many sifakas, hatak and maky and various species of birds. Since it was difficult in the first place to get to the site, we were not able to penetrate the forest at all—merely walk around the outside. Apparently, 4-5 tourists come at a time in the evening, and use the paths to spot nocturnal and diurnal lemurs and birds. They come for a few hours, take some pictures and then are on their way. Each tourist pays the guides 5,000 ary ary. Although they consider it work and enjoy the money, they apparently only want to work with Ed, the director of Classic Camping.

In Fenoaivo, although there have not been tourists through the area at all, almost overwhelmingly every informant, who had knowledge on the subject, expressed an interest in having a set up like Ifotaka. Even those who admitted not knowing much about tourism and the situation in Ifotaka saw no reason not to have tourism in the area. Since most of the fauna (lemurs) are within the sacred areas, it was asked if they minded tourists through their area. No one seemed too bothered by it, on the condition that they go with a local policeman or guide and disturbance to the area does not occur. An overwhelming majority thought that tourism would only benefit the evolution of the village economically and socially. However, the majority of informants thought a tourism program should be organized by an outside organization, while others believed it would be best to be done only by locals and their traditions.

Expert Stakeholder Survey

Sixty-five surveys were sent out to international experts on sacred forests and conservation. Out of the sixty-five, fifteen responded. Although this is only about a 23 percent response rate, it is still valuable information that can be used to further the discussion of sacred forests and conservation. The survey as seen in Appendix B discusses sacred forests in general, sacred forests in terms of conservation and sacred forests and tourism.

Sacred Forests:

One important aspect of outsiders studying sacred forests is making sure that it is understood what makes a sacred forest sacred for locals. With the list given the informants answered in the following way:

Characteristic	Yes	No
Burial Grounds	10	
Ancestral declaration	9	1
Presence of genie's	8	
Presence of mythical animals	7	2
Shelter or trade stolen zebu	4	7
Use of the term 'Ala Faly' by conservation organisation or by Malagasy forest service	5	4
Site for traditional healing ceremonies	8	1
Presence of honey bee hives	3	7

Overall, all informants agreed on what characterizes a sacred forest with a couple of exceptions. One-hundred percent of those who replied to the question believe that burial

grounds characterize sacred areas. The majority believe that ancestral declaration, presence of genie's and mythical animals and sites used for traditional healing ceremonies were all characteristics of sacred forest. Roughly half considered an area sacred when conservation organizations and the Malagasy forest service uses the term *Ala faly*. Lastly, a minority of those who responded to the question believed that the presence of honey bees was an aspect of a sacred area. One informant believed that sacred "means that the forest is conserved for its values other than its use values."

Another important aspect of researching the possibility of conservation within sacred areas is deciding how important these areas actually are for overall conservation in the broader realm of Madagascar.

Total Responses of Conservation Contributions of Sacred Forests

Conservation Contribution	*Highly Significant*	*Quite Significant*	*Not Significant*
Endemic species with extremely restricted range	5	4	0
Instilling/maintaining a conservation ethic among communities	6	2	1
Providing sources for repopulation of animal/plant species	4	5	0
Pollination services	2	6	0
Landscape conservation (aesthetics)	5	2	2
Soil Conservation (erosion prevention)	5	2	2
Watershed Management and Water Conservation	2	5	2
Conservation of examples of pristine or near-pristine examples of habitats	3	5	0

The majority of informants who responded believe that Endemic species with extremely restricted ranges, Instilling/maintaining a conservation ethic among communities, landscape conservation (aesthetic), and soil conservation (erosion prevention) are highly significant conservation contributions that sacred forests provide. Additionally the majority of informants believe that sacred forests contribute quite significantly in providing sources for repopulation of animal and plant species, pollination services, watershed management and water conservation and conservation of pristine examples of pristine or near-pristine habitats. Others discussed the fact that at times the sacred areas are too small for any conservation purpose and that these contributions depend on the mentality of the local people.

With respect to threats of sacred areas, a majority believed that erosion of 'traditional cultural values' influenced by globalisation and direct threats due to the expansion of industrial and artisanal mining **highly threaten** sacred areas. Erosion of 'traditional cultural values' influenced by religious change and demographic pressure and migration were thought by the majority of respondents to **marginally threaten** sacred areas. In addition many stakeholders believe that conversationalists threaten these areas by "sticking our noses in it with a different perspective." It is believed that conservation efforts towards sacred forests could disempower the local people and therefore chip away at longstanding traditions within the community.

Although the majority of respondents believe that sacred forests should be formally recognised as community based protected areas under the Systeme des Aires Protegee de Madagascar (SAPM), many of them go at the subject in a sensitive manner. Some believe that it should be a case by case approach, making sure that the local people get back their agency. One respondent said, "the forests are not protected for biological conservation, but for tradition" and *'by applying a foreign system to their classification and integrating the status they have with conservation, is there a possibility this might wreck the only system*

people so far have to protect forests?" Another questions "What if external conservation organisations establish protected areas and define there own sets of restrictions as part of the Durban initiative? " and goes on to say that this could "undermine existing conservation logics/ethics in local communities." The overall census was yes, but agencies must recognize and respect communities' rights and customary institutions and must support these institutions to "fend off external threats...which are today inevitably upon the remaining natural resources everywhere in the world."

A majority of the respondents expressed their belief that Malagasy local people have no conservation effort, however many of them are optimistic that through education, people can learn and begin to understand the importance of preserving the natural resources around them and therefore 'traditional institutions' of sacred forests and taboo species could be used as the basis for natural resource management interventions. This education can be targeted to rural and urban people through radio programs, posters, festivals that "highlight the cultural values of wildlife and sacred forest aspects." In addition it was suggested to use positive leitmotiv like : "Use the wise of the ancestors to have a bright future"; "Be proud of our culture, our richness"; "Many people want to know/have them." It is important to show the value of the conserved sacred forests for ecosystem services, and for local and global value.

Tourism:

The majority of people voiced that sacred forests had the potential of being used for tourism after careful analysis of the positives and negatives and the full support of the community. The main reason for their optimism is that they believe it is a good way of "raising funds, providing local employment, reinforcing local values and traditions and creating local appreciation for natural and cultural heritage." However, tourism is, as one put, a "double edged sword" possibly contributing to the destruction of the forests. An example

of defection and urination was given: if tourists come through the area, it is inevitable that the 'tabooness' of that act could weaken and therefore decrease the conservation of the area by local people. In addition it is imperative to look at how the economic benefits are being distributed—it must be going to the local community, not just the guides and not just to external organization. There were two respondents that thought that tourism should not be used in sacred forests due to the fact that they can erode taboo species.

Discussion/Limitations:

Although sacred forests serve as conservation tools without, ideally, changing local traditions, the opposing forces of tradition versus globalization have inevitably begun chipping away at the long-standing traditions. People are still trying to desperately survive and burning forests in order to grow food or logging to get materials for their houses is necessary. Similarly, people need to eat and livestock need to be fed. Natural disaster like the cyclone that decimated many of the fields in 1971 and 1999 in Fenoaivo, do occur. These are times that it is inevitable that forests will be cut in order for survival. Villagers continue to encroach on these once sacred lands in order to obtain more land for cattle grazing, agriculture, burning wood for fuel, charcoal, and hunting. Luckily, with the case of the Fenoaivo and Zanavo the people have not allowed the erosion of their fady areas. Clearly from the survey of the general forest and then those areas that remain sacred, the sacred forests remain, for the most part, undisturbed whereas the general forest shows great degradation that has even increased since 2005, without the occurrence of a cyclone.

Sacred forests are bedrocks for community beliefs and therefore it is only natural for the local people to manage the areas. Many experts believe "community rules about sacred

forest are better able to steer local behavior" compared to those imposed by the state (Horning). In the area of Analovelona, the olobe acts as the local leader that influence community norms. Through interviews, Horning found that villagers were comfortable with their local leaders—much more so than state leaders. She discovered their aversion to vazaha, as they are suspicious of outside authority. Therefore, "environmental regulators that are based on traditional customs and sanctioned by local institutions are more likely to be respected than those imposed by external administrative agencies" (Lingard). Although, this community-based situation seems ideal, it is also important to note that there is always an overseer -- as our academic director says it is really "a top down policy administered at the bottom" (Jim Hansen, October 11, 2008).

Since the goals of sacred forests tend not to be related to conservation and biodiversity, it may prove difficult to actually get some of these sites recognized. Education, therefore, is necessary for local people on the importance of conserving the forests. Possibly, showing them how protecting forests can directly benefit them in their everyday lives would be beneficial and effective. For example, teaching them that erosion of soil occurs from deforestation and such ideas as that. However, when looking at sacred sites for biological conservation reasons, it is also imperative to recognize the spiritual and cultural rights and therefore better ensure that the livelihoods and cultures of indigenous and traditional people will not be severely disrupted. Respect for the rights of the people could decrease mistrust and conflict between outsiders and locals and therefore possibly broaden and open up opportunities for further development and broadening protected areas. There is a fear that if the engagement with nature becomes quantified or explained merely in scientific terms, the steadfast traditions could erode away even faster (Soutter). The culture and traditions of the local peoples in these sacred sites must be respected in order to continue the conservation efforts. For this reason and the diversity of not only the spiny dry forest (ecologically) but for

the diversity in traditions surrounding sacred forests, even across a two kilometre area, it is necessary to take each community individually to look at potential conservation efforts.

Tourism, although has been seen as an excellent way to improve funds in the surrounding area, also has been causing problems in the village of Zanavo and even during my time spent in Fenoaivo. Zanavo shows an interesting case where the benefits coming in from tourist activities are only being shared between the two elders who lead them. When inquiring about the potential of being led to the area, we had conversations with other villagers in the market area. None of them wanted anything to do with the situation and would merely say that they could not get in the middle of it and we would have to talk to them. Then, we thought maybe Monsieur Remanamby could take us there, even though it would be optimal to use the guides that had contact with the tourists. However, when suggesting this, we were looked at as if we were crazy. We never understood quite why we were not welcome to study in the region, but it soon became clear that there was tension within the community. For every five tourists who came to the forest, the two elders received 50,000 ary ary (around 30 dollars). This was 50,000 ary ary that could have been shared with the community, but instead it stayed within the hands of Soavily and Tsytindria. The president of Fenoaivo, when asked about this issue explained that money and honor were major contributors to the behaviour we encountered in Zanavo. Although quite a harsh statement, it is a good example how economics complicate issues of community based tourism greatly and efforts on education and more research must be put forth to see how to better this potential problem.

Even in Fenoaivo, there was some tension about our local guides. During the preliminary meeting before the commencement of my study, it was decided that the president was going to be the ultimate decision maker on who our daily guides would be. It was true that for two days, his eldest son was sent with us to the forest, but we also had other guides

not from his immediate family. However, apparently during a community meeting about half way through the study, there were members of the village who called him a bit of an egoist as he was only giving us guides from his family and questioned why they were not picked. The next day, we were given a guide from across the village—he was not related to the president at all. Again, although there are no formal tourist activities set up in Fenoaivo and I was not really considered a tourist, problems still occurred. This is why it is necessary to have, if tourism should be a possibility, full support and understanding of the situation and funds.

Although this study was meant to just look, preliminarily, at the sacred forests of Fenoaivo and Zanavo and its potential for a community conserved area, there were definite improvements that could have been made. First off, interviews, like always, were difficult as the Malagasy culture is so very different from American culture. Many of my questions were very '*vazaha-like.*' Luckily, I had a great guide, who helped reword my questions in order to make them more comprehensible for the informant. Of course, translation is always difficult as it was, in reality, translated from English, to French to Malagasy back to French and written down in English. Although it would be have been optimal to speak Malagasy fluently, this was just not feasible in the short time studying in Madagascar.

Another issue that could have posed a problem was that since the people of the village knew I was there to study their forest, their responses to questions of conservation could have been a bit skewed. The president of Fenoaivo talked on and on about various conservation ideas he has, but who really knows if he believes this, or just said so to the 'vazaha' doing a study on protecting the forest and he wanted to make us happy.

Additionally, due to a lack of time, the surveys sent out to the stakeholders were never piloted. This would have been a good idea in order to receive feedback on layout, questions

and overall quality of the material. Although it was never out right said, it may have been the reason for the lack of responses.

Conclusion:

The issue of sacred forests as tools for conservation and biodiversity is a very sensitive subject that risks, in fact, eroding traditional forests even more. Researchers also run the risk of sounding patronizing, with the idea of 'community knows best.' However, something undoubtedly amazing can come out of melding cultural traditions with biodiversity and conservation and with the complete understanding by the community, a village could flourish. Now more research needs to be done on what crucial legislative and policy support and recognition is required for sacred forests and specific case studies to see the potential. Then come the questions could this support actually expand the sacred sites or catalyze the development of more sites? Could there possibly be the development of green corridors connecting sacred sites to other recognized protected areas? Therefore more studies of the biological significance and cultural history of these forests will aid in compiling information to illustrate to not only the nation, but local communities, the potential contribution these sites have on the conservation of biodiversity in Madagascar. Because, although indirect, the conservation of these sacred sites does show an inspiring strong link between tradition and conservation and it really gives a positive perception of the relationship between man and nature.

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Interviews

Date	Name	Date	Name
10/11/088	**Soae**	**17/11/08**	**Brother of President Manahira**
11/11/08	Remanamby		**Moliraho**
	Fanohiza		**Soahinezahe**
	TsyTindria		**Herintsoa**
	Managnosike		**Rosetta**
14/11/08	**Sazahe**	**19/11/08**	**Tarohetie**
	Zemimy		**Manasoa**
	Kalilahe		**Liasoa**
	Valisoa		**Siza**
	Sambomanase		**Saliha**
15/11/08	**President's Wife**	**21/11/08**	**Maturmano**
	President Manahira		**Lafoshe**
	Tsimihenta		**Soafunidihe**
	Tsimihira		**Soavoatsy**

16/11/08	**Salika**		**Razafy**
	Maka		

***This list is not inclusive by any means, due to the large group interviews and due to keeping anonymity to those who did not wish for their names to be presented. Additionally, there were countless very informal conversations at the market—however, names were not given.**

*** Additionally, due tot he nature of the key stakeholder survey, all identities are also kept anonymous.**

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Appendix A

Getting There

Although not officially part of my study, it is important to note the happenings that occurred before studying at Fenoaivo/Zanavo forests and the reasons why this study area was chosen over others. My intended study was the sacred forest of Ankilihira-- an 80 hectare gallery forest on the northern bank of the Mandrare River in southern Madagascar. It was necessary for Barry Ferguson (my ISP advisor and an expert on the Ifotaka region) to ask

permission from the traditional leader of Andranogiso (Zafymoli) if entering and studying in the sacred forest would be feasible. On the weekend of the 2nd of Novermber, 2008, Barry arrived at the village with the head of the Antefotaka clan and had a discussion about the possibility. The leader first required us to give them eight zebu, then it went down to three zebu and when Barry said 1, the count went to two. One zebu was possible, but two zebu was not and therefore Barry left on amicable terms.

Earlier in the year a tourist group called Classic Camping had entered the sacred forest, but without formally discussing it with the local people. At the present, the clan would like the organization to give eight castrated zebu for their entrance. It was not clear at the time if this was the reason for the leader's persistence, but talking with others who have also tried to enter the forest (even a woman from the same clan) and encountered similar responses, it seems that this forest is truly sacred and very important to the community.

After leaving, Barry was pointed to the village of Zanavo—about 10 kilometers west of Ifotaka on the southern banks of the Mandrare. Here the village was surrounded by a patchwork of sacred and non sacred forests and also had been visited by the same Classic Camping Organization. Barry sat down with Monsieur Remanamby (the second president of Fokotony), Tanohiza, Tsytridira (two elder men in the village, the latter an *ombiasa*) and two other men from the village. During the meeting two other men joined. Throughout the conversation the elders said nothing, but it was clear that they could not make a decision. Even so, Barry left with the understanding that everything was fine to work in the area, but knew that the village would have to have a meeting to discuss its finality.

On November 4, 2008 Barry and I arrived at Zanavo around two o'clock in the afternoon. We could immediately sense that something was not quite right as no children were there to greet us with smiling faces and the women merely said *salama* and continued

on their way. Our feelings proved true as Monsieur Remenamby told us after an hour discussion, the villagers decided against having me study their forests. They questioned why there was a sudden keen interest from *vazaha* to enter their forest and, due to security, they thought it would be best if I did not study and stay in that particular area.

At this point in the afternoon, Monsieur Remenamby took us to the village of Fenoaivo, a village two kilometers west of Zanavo. He had talked to the president of Fokotony who lived in the village and it seemed that it would be possible for me to work there on the same part of forests—we were not holding our breath. However, as we drove up in our car, we were immediately greeted by a sea of smiles and laughing children. Several of the men of the village, the president, Monsieur Remenamby, Barry and I sat out side as we explained the objectives of my study and we agreed to sacrifice a sheep the next day. A bag of rice and a basket of lychees were also presented to the villagers. The president allowed us to set up our tents under a tamarind tree in his back yard, and the family presented us with a chicken—we knew everything was going be just fine.

The next morning, we awoke at 4:30 am with a gathering of men, women and children and of course a large sheep tied to a tree. A full public assembly took place including all the *fokonolo* (members of the village). The men sat in a circle under the tamarind tree and Barry and I sat on a bench on one side of it and the women and children sat behind them in the distance. The sheep was sacrificed and as the women prepared the meat and rice, Barry and the elders again discussed (in a more formal, traditional way) the objectives of my study, the dates of study and requested local guides to accompany me into the forest every day (of course prices were also negotiated). In addition, the villagers discussed what the discourse should be when *vazaha* like me want to study in the area—they appreciated Barry's approach to the situation and had heard about what had happened in the Ankilihira forest east. Rum, beer and tobacco were offered to the men of the village. Barry

was told to offer the first beer and the best pieces of cooked meat to the notable who sat to my left. After filling our bellies with hot meat, copious amounts of rice, and cups of warm beer, the crowd dispersed, and finally on, November 5th, my study could begin.

Appendix B
Questions for Interviews
General Information on Villages

The Forest in General

How is the forest useful for you?

Who goes into the forest?

How far away are the resources used?

Has there been a change in the surrounding areas?

Have organizations like WWF done projects here—zoning?

Who owns the land?

How do you partition land?

Sacred Forests

What makes the forests sacred?

Are there koklompos, mythical animals...?

Has the sacred forest changed in size or number?

What activities are allowed in the forests?

Who is allowed into the forests?

Are there guards for the forest?

What happens if a taboo is broken?

Where are the resources for tombs, boundaries obtained?

If there are medicinal plants in the forests, can they be used?

What animals are present in the forest?

Do you know sacred areas of other villages?

How are sacred forest taboos and locations taught to children?

What are burial ceremonies like?

Do they mind *vazaha* in the forest?

Potential of Conservation and Tourism

Have there been tourists through this area?

What happened with the tourists that went to Bebarimo and Zanavo—why were we turned away?

Do you think there should be a protocol before vazaha enter the forest?

Are you familiar with the happenings with community based conservation and tourism in Ifotaka?

Do you think that could be a possibility here as well?

What do you think about officially protecting areas, especially the sacred forests?

Appendix C

The Sacred Forests of Southern Madagascar

A Survey of Expert Stakeholders, November 2008

1. **Do you feel that the sacred forests of southern Madagascar are under threat (or potentially under threat) from:**

   a. Erosion of 'traditional cultural values' influenced by religious change
   HIGHLY THREATENED / MARGINALLY THREATENED / NOT THREATENED (highlight/underline as necessary)

   b. Erosion of 'traditional cultural values' influenced by globalisation
   HIGHLY THREATENED / MARGINALLY THREATENED / NOT THREATENED(highlight/underline as necessary)

   c. Direct threats due to the expansion of industrial and artisanal mining
   HIGHLY THREATENED / MARGINALLY THREATENED / NOT THREATENED (highlight/underline as necessary)

   d. Demographic Pressure/Migration
   HIGHLY THREATENED / MARGINALLY THREATENED / NOT THREATENED (highlight/underline as necessary)

Do you have any comments or information regarding the threats to sacred forests:

2. **Should the people of southern Madagascar be helped to access forest carbon finance (Post Kyoto UNFCC/Voluntary Markets/Other) in recognition of the contribution of their sacred forests to forest conservation and carbon sequestration?**

   YES / NO

3. **Could you conceive of any other forms of direct payments or incentives for conservation which could be suitable to support communities managing sacred forests?**

YES/NO if yes please describe

4. **What is a sacred forest ? do you interpret that any of the following cultural characteristics of a forest make it 'sacred'?**
   a. Burial grounds (e.g. *Ala Kibory, Ala Fasana*) YES/ NO
   b. Ancestral declaration (e.g.*dina'ndraza*) YES/ NO
   c. Presence of genie's (e.g. *coquolamps*) YES/ NO
   d. Presence of mythical animals (e.g. *kotoki/kalanoro/tratrak*) YES/ NO
   e. Use of the forest as an area to shelter or trade in stolen zebu cattle YES/ NO
   f. Use of the term 'Ala Faly' (or Ala Fady) by conservation organisations Or by the Malagasy forest service YES/ NO
   g. Site used for traditional healing ceremonies (e.g. *Sabo*) YES/NO
   h. Presence of honey bee hives YES/NO

   Do you have any suggestions of other cultural or natural features of forests which may merit their consideration as sacred ?

5. **How would the issue of land tenure rights be dealt with in any mechanism for rewarding sacred forest conservation?**

6. **Do you feel that the people of southern Madagascar have a strong conservation ethic outside sacred forests?**

7. **How significant do you feel the contribution of sacred forests is to conservation, specifically referring to :**

Conservation Contribution	***Highly Significant***	***Quite Significant***	***Not Significant***
Endemic species with extremely restricted range			
Instilling/maintaining a conservation ethic among communities			
Providing sources for repopulation of animal/plant species			
Pollination services			
Landscape conservation (aesthetics)			
Soil Conservation (erosion prevention)			
Watershed Management and Water Conservation			
Conservation of examples of pristine or near-pristine			

examples of habitats			

8. **How do you feel about the potential of using sacred forests for tourism?**

9. **In recent years a number of authors have suggested that the 'traditional institutions' of sacred forests and taboo species should be used as the basis for natural resource management interventions. Do you have any practical suggestions as to how this suggestion could be *operationalised*?**

10. **Section 4.6 of the attached report presents a framework for the assessment of Community Conserved Areas. Do you have any comments or suggested improvements for this framework or any suggestions for additional criteria to this framework?**

11. **Do you have any recommended references or key experts on this subject area which you would like to recommend?**

Extract from 'Ferguson 2007'

4.6 Draft Framework for Assessing Features of CCA's

NO	CRITERIA	CLASSIFICATION, DETAIL
1	Name of Forest	
2	Latitude, Longitude	
3	Fokontany, Commune, Region	
4	Clan and Tribe of local population	
5	Historical Context of region	E.g. Migration, bioclimatic, political, colonial impacts, disasters, conflict, environmental change
6	Ownership/Tenure (de facto)	Common Pool
		Private
7	Ownership/Tenure (de jure)	Private
		State
8	Initiation of CCA	Locally Initiated
		Externally Introduced and community driven
		Externally Introduced and driven
9	Why is this area a CCA?	Ancestral Burial Ground
		Medicinal Plant Collection Area
		Ancestral 'decree'
		Honey Grove
		Presence of Genie (Kokolampo)
		Presence of Mythical Animals
10	Controlling Authority (who imposes sanctions, and checks for adherence to rules)	Clan Leader (Mpitokohazomanga, Lonake, Notable)
		Ombiasy
		Single Family
		Whole Community

		Local Association established for the purpose (COGE, COBA)
		Local authorities/forces of order can intervene
11	Customary/Traditional Laws on forest access and use	Permissions
		Proscriptions
		Prohibitions
12	De Jure Laws on forest access and use	Permissions
		Proscriptions
		Prohibitions
13	Extent and form of internal recognition given to the CCA	Whole Local Community Respects all aspects of the CCA
		Vast Majority of Local community respect all aspect of CCA (some dissenters)
		Restricted group of local community respect CCA
14	Is there formal/informal external recognition of the CCA	Describe the situation
15	Antiquity of CCA	100 yrs + (pre colonial)
		50-100 yrs (Colonial Era)
		20-50 yrs (post independence, pre NEAP)
		Less than 20yrs (since conception f NEAP)
16	Size of CCA	<1ha
		1-10ha
		10-100ha
		100-1000ha
		1000ha+
17	Biodiversity Significance	IUCN Red List Species (per category (CR, EN, TH, LC, DD)
		Presence of flagship species (lemurs, tortoises, birds)
		Degree of endemism (national, ecoregion, subregional, point)
		Species Richness/Diversity
		Type of Habitat
		Condition of Forest, Is it an example of climax of this habitat?
		Presence of Invasive or Introduced Species
18	Ecological – Environmental Values	Role as refuge for migratory species
		Pollination/fertilisation role in wider landscape
		Amount of Carbon Stored
		Watershed protection
19	Character of Surrounding Landscape	CCA is fragment in an intensively agricultural area
		CCA is a fragment in a landscape of degraded natural habitat
		CCA is part of a wider area of natural (or nearly natural) habitat
20	Cultural Significance	Famous/revered ancesters buried
		Specific oral history/myths associated with this site
		Source of particularly rare medicinal plants
		Site for healing ceremonies (Sabu) such as sacred grove or cave.
21	Threat Assessment	Not currently under threat
		Minor threat from human activities (eg removal of dead wood, low density livestock grazing)
		Significant threat from human activities (e.g. Slash and Burn, timber extraction, intensive grazing, deliberate introduction of invasive species such as sisal/raketa, hunting).
22	Future Threat : Distance from and Connection to Urban Areas	Close to areas already supplying urban fuel and construction wood markets
		Distant from areas supplying urban fuel and construction wood markets

23	Livelihood Cost of Existence of Sacred Forest to local population	None
		Minor Cost (local displacement of forest activities)
		Major Cost (large scale displacement of forest related activities – eg purchase of wood from far away).
24	Livelihood System of Local Population	Crops (detail)
		Livestock (detail)
		Sale of Forest Products
		Salaried work on plantations
		Level of dependency on forest products
25	Organisational Architecture in Region around CCA	Local Political and Administrative System
		Government Agency Presence and Activity
		NGO Presence and Activity
		Business, Commercial Activities
26	Conservation Needs/Priorities	
27	Conservation Opportunities	
28	Potential IUCN Management Model (Categories : I-VI)	
29	Resource people concerned with the CCA to provide information, advice, and oversight	
30	Existing documentation on CCA	