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Transmission of Environmental and Conservation Knowledge in Andohahela National Park

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TITLE : Transmission of Environmental and Conservation Knowledge in Andohahela
National Park

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Rémerciements :

Je voudrais remercier à mes conseillers et guides personnels : Andréas et Sôsôny. Ils m'ont aidé non seulement pendant mon étude personnelle sinon pendant tout mon séjour ici à Madagascar. Arigato gozaimashita, Andréas, misaotra betsaka Sôsôny.

Les guides et agent qui ont participé à mon étude

Ma famille d'accueil, chez l'Epicerie Manja

La communauté de Fort Dauphin

La communauté de Libanona, un petit havre pour les mpianatra vazaha

What are we going to do tomorrow, Andréas ?

Dédicace :

Je voudrais aussi dédier ce projet aux étudiants de CEL 2005 ... et aux tous qui les suivent :
« Mazotoa ! »

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Introduction :

Andohahela National Park : Legends and Laws

The legendary forests of Andohahela National Park (N.P.) have long been respected as a source of inspiration and life for the Anosy region in the extreme southeast of Madagascar. Hundreds of years ago, according to various oral traditions, Prince Mana offered himself as a sacrifice in order to quench the drought that brought war and famine to his people, the Tahela (a clan of the Anosy tribe). Zanahary, the Malagasy creator, responded by unleashing the rains and springs in the mountains, which made the land fertile again, and stopped the wars. In gratitude, the King of the Tahelas named the rivers that flowed from the newly created springs after his son: Manantavona, Mananara, Mandrare, Manambolo, and Manampanihy. (ANGAP 1997, in Fenn 2003.)

This legend emphasizes the importance of the watershed that feeds these rivers, thereby supporting the region's economic and biological productivity (O'Connor, 1981). Andohahela N.P.'s geography and geology provide the conditions for its unique mélange of three distinct, species-rich forest ecosystems: the rainforest to the east, the dry spiny forest to the west, and the transitional forest between them. The diversity of the region can be explained by its strategic location straddled over the Anosyennes Chain, a mountain range that blocks moisture-rich trade winds from the Indian Ocean, to the southeast. The various habitats created by these factors allow for a high level of faunal diversity, even compared to other regions nationwide (Fenn, 2003). The cultural diversity is also reflected in that two distinct ethnic groups share this space: the Antanosy or Tanosy (People of the Island), and the Antandroy or Tandroy (People of the Spines).

The History of Andohahela as a Protected Area:

It was to protect colonial biodiversity resources that Andohahela was originally established as a strict nature reserve (SNR or R.N.I. - Réserve Naturelle Intégrale) by the French in 1939. It grew from a 30 000 ha parcel to three parcels totalling 76 020 ha, but the SNR status remained until 1997 (when National Park status was conferred). The S.N.R. is the most severe

and restrictive category in terms of access to and exploitation of the reserve's interior. During Madagascar's period of colonization (1896-1960), armed forest guards enforced reserve boundaries. This and other factors (low population density, fertile rice fields in the exterior) protected the reserve from much human impact originally but this is no longer the case.

The current conservation strategy of Andohahela N.P. attempts to integrate the needs of local communities through the Integrated Conservation and Development Project (ICDP). The ICDP concept was inaugurated as part of the 1980 World Conservation Strategy, which emphasized local economic development alongside the management of protected areas (Marcus, 2001). In 1988 it was incorporated into Madagascar's National Environmental Action Plan (NEAP), which outlines a gradual transfer of protected-area management and ownership from international organizations and donors to Malagasy state and local counterparts over the course of 15 years. (Marcus, 2001).

Once the transfer process is complete, most if not all of the burden of financing the park will fall on park revenues. Therefore, there is a major effort to encourage tourism, especially ecotourism, in order to increase profits from entry fees. Ecotourism has been defined by ANGAP as "tourisme engagée et responsable, liée à l'idée de conservation. » (Baorondro, 11 fev 2005). In 1999, Andohahela NP won the Silver Otter Award for "Best Overseas Tourism Project" from the British Guild of Travel Writers.

Conservation and Development: the Context

Not only at Andohahela NP, but all over the country, protected areas are trying to attract visitors. Moreover, in 2003, President Marc Ravalomanana promised the international community that Madagascar would add 4.3 million ha of protected areas to the 1.7 million ha in existence. If successfully achieved by the target year of 2008, it will increase the National Protected Area System from 3% to 10% of the country's surface area, as part of the third and terminal phase of the NEAP. In addition to encouraging ecotourism, ANGAP and partners are devising strategies similar to the ICDP to ensure a smooth transition for the communities living in areas slated to join the protected areas network.(Ramarokoto, 2003.)

The Andohahela ICDP began in 1990, and as of 1996 it was still under the management of the World Wide Fund for Nature (WWF), and received 75% of its funds from the U.S. Agency

for International Development (USAID). The ICDP sought to encourage environmental conservation ethics and appropriate behaviors in local communities. Despite ICDP activities to increase environmental awareness and literacy, to confer more and more management responsibilities to locals, and to ensure their livelihood and economic development, the same environmental pressures that threatened the park in 1981 were still present in 1996, due to the subsistence activities of the locals (Simsik, 1996). That is to say that slash-and-burn agriculture (*tavy*), cattle-grazing, and wood-product exploitation continued.

In the same year an SIT Independent Study Project (ISP) studied traditional honey harvesting techniques, wild honey collection, and the modified niche technique proposed by WWF as an alternative to the potentially destructive traditional techniques practiced in the villages surrounding the then-S.N.R. Andohahela. While the distinctions between each technique were unclear from the report, wild honey collection risks the introduction of forest fires through the use of a “burning cloth” (Jaeger, 1996). The modified niche apiculture technique and other sustainable livelihood alternatives have met with varying degrees of success.

A study conducted in 2001 found that locals at Andohahela NP, Ranomafana NP, and Masoala NP perceived the parks and related conservation efforts as a foreign concept. Especially those who could see few direct benefits from the creation of the park had problems internalising the conservation messages promoted by the ICDPs conducted there (Marcus, 2001). Since then, efforts have been made to take indigenous culture and oral traditions into account in “sensibilisation” campaigns (Fenn, 2003). “Sensibilisation” refers to the process of educating local communities in environmental awareness for the purpose of conservation and management of resources.

Thus, in spite of consensus on all levels (international, state, local) that Madagascar’s biodiversity is a valuable inheritance, there remains a lack of harmony on conceptualising the appropriate management of this heritage for the future. The source of this discrepancy appears to derive from the foreign nature of conservation strategies, and above all, foreign communication strategies for “sensibilizing” and thereby empowering local communities.

The Flows of Knowledge through the Park System:

One key aspect in the empowerment process is the exchange of information and knowledge. In fact one of the main premises of “sensibilisation” efforts is to empower local populations to overcome poverty in a way that is environmentally sustainable. Some types of knowledge are inaccessible to villages with low literacy rates, a weak transportation and communication infrastructure, and limited access to formal education. On the other hand, local communities are rich in other types of knowledge, that is, environmental and cultural knowledge. Thus, there are different types of knowledge, concentrated in certain key actors, within a knowledge-exchange network. The actors in this network, are

- the local community (ie: villagers who used to exploit the park, and still do)
- ANGAP and other NGOs (and the guides, agents, etc. representing them)
- Visitors to the Park (*vazaha*; students)
- Researchers
- The general public

Of these actors, it would seem that there are certain gate-keepers, who have more power to direct the flow of knowledge. For the purposes of this study, I have identified ANGAP and the local community as two gate-keepers.

Researchers are certainly the gate-keepers of a highly specialised form of academic, or formal environmental knowledge, but since they come infrequently to the park, I was unable to include them in the study.

Furthermore, I identified park guides and **agents** in particular, as a major information conduit between ANGAP and the community. I wanted to learn more about how they receive and convey environmental knowledge, how they conceive the environment of the park, and how they conceive their role in relation to the other key actors in the knowledge-exchange network.

ANGAP agents live and work based out of four villages which serve as park entrances. Tsimelahy, located 56km outside of Fort Dauphin, is the entrance to the transitional forest section of the park, and is associated with a 2-hour circuit, graded “easy”. Mangatsiaka is 62 km away from Fort Dauphin and serves as one of the entrances to the dry forest. Its associated circuit is also “easy” and takes 3 hours to complete. The other entrance to the dry forest is at

Ihazofotsy village, 110 km from Fort Dauphin, and offers three circuits with various durations and levels of difficulty. Finally, Malio village serves as the entrance to the rainforest, 36 km from Fort Dauphin. The hike is graded “athletic” and takes 4-5 hours. (ANGAP office bulletin board, 12 avril 2005).

Methodology :

I identified the individuals that participated in the exchange of environmental knowledge through the medium of the P.N. Andohahela.

I spoke with as many representatives of each group as possible, and for this purpose it was necessary to spend a minimum of 4 to 6 days at each of the following sites: Fort Dauphin, Tsimelahy, Mangatsiaka, and Malio.

At each site, I collected information on how each actor contributed to the exchange of environmental and conservation knowledge through the park, through formal and informal interviews. For all formal interviews, a questionnaire was used as the foundation for a more flexible conversation. (See Appendix A.) From each focus group I targeted the most knowledgeable and/or reliable representatives for the interviews, in order to save time.

- At ANGAP, I spoke with the director.
- From the agent group, I spoke with 6 agents, stationed in the villages of Tsimelahy, Mangatsiaka, and Malio. I also asked each agent to take me through the circuit associated with each site (4 of 6 were able to do so), and I recorded the information that the guide chose to convey to me during the field interview.
- From the visitor group, I was able to speak with 2 professional guides, 1 tourist couple, and 1 Peace Corp volunteer (stationed in Tsimelahy village).
- From the community, I targeted the village elders, the patriarchs and fathers of the community, and politically active members. I reasoned that elders and fathers would know a lot about the community and/or their family and would be able to speak on their behalf, having lived in the community longer than other members. Also, it is often the male heads-of-family who represent their families when making decisions or statements. (“Some Cultural Tips for Southern Madagascar”). I targeted political members of the community because I knew that they would have experience collecting statistical and/or demographic data on the community as well as community-organising experience. I asked one informant from each village to give me a tour of the village and to tell me the story behind the name of the village, in order to record the information that they chose to convey about their village environment.

Interviews were conducted in English, French, Malagasy (through a translator), or a combination of any or all languages. I tried to let the informant and translator choose the language in which he or she was most comfortable, to allow for maximum freedom of expression. Three translators helped me collect information from the field, which may have introduced variation in the responses of the informants: each translator had a different understanding of the goals of the study, and each translator had different interview styles. Furthermore, the relationship between the translator and informant varied significantly.

At Tsimelahy, the translator often did not understand my questions (he asked for me to explain them in English and French) and when he asked the informant, he would often use extraneous words that I specifically wished to avoid. For example, when I asked “What is important about the environment at Tsimelahy?” the translator almost always mentioned the acronyms “WWF” and “ANGAP”, as well as the French word “environnement” in lieu of the Malagasy word “tontolo iainana.” I asked him why he chose to do this, and he said that this was how the villagers understand the environment. I was unable to explain to him that I wanted to hear the informants’ ideas concerning their environment. The uses of foreign words like “WWF”, “ANGAP”, and “environnement” may have encouraged the informant to focus on information received from sources external to the village.

At Mangatsiaka, the translator made an effort to steer the conversation towards traditional knowledge, after the informant described “WWF” or “ANGAP” knowledge.

Whereas in Tsimelahy and Mangatsiaka, the translators had no pre-existing relationship with the informants from the village, the translator who worked with me in Malio was a member of one of the oldest families living there and was related by marriage or blood to many if not all of my informants. The informants at Malio received us very differently from informants in the previous two villages. Also, all of my informants who represented the community of Malio and Mangatsiaka had been born and raised there; whereas in Tsimelahy, half of the total number of village informants had recently moved there from elsewhere, and all key informants were not native to the village.

Findings:

ANGAP

The main goal of ANGAP is the promotion of eco-tourism for sustainable development and the conservation of Madagascar's natural heritage. Therefore, the director is interested in the transmission of environmental and conservation knowledge to the communities in the periphery of the park system, as well as to tourists from other countries. I also spoke with him about transmitting park knowledge to Malagasy students.

Formal Environmental Education:

“Classe Verte” (Green Class) was defined by the director as landscaping for the school, planting flowers, gardens, tree nurseries, and bringing a shade of green to school. He made a distinction between this definition and that of “Sortie Nature” (Nature Outings) which is bringing Malagasy students to the park for an educational outing. ANGAP conducts “Classe Verte” in 52 schools around the park. They also do lesson plans based on certain environmental cycles (like the water cycle) in 10^{ème}. ANGAP also conducts “interventions” at SIT and CEL each semester.

Eco-tourism:

The director hopes that the park will achieve “World Heritage” status from United Nations by the year 2008. In 1999 Andohahela NP won the Silver Otter Award as the Best Overseas Tourism Project, from the British Guild of Travel Writers. ANGAP has visited the guide association of Fort Dauphin in order to train them to guide tourists through the park. Once they have successfully completed the training process, the qualified guides receive a badge that allows them entrance into the park. Otherwise, they must wait outside the entrance while the park agents guide them through the park circuit. This is to ensure quality of the tour experience.

The main conduit of knowledge-transmission from ANGAP to the local villages as well as to tourists is through the park agents, who live in the gateway villages of Malio, Tsimelahy, Mangatsiaka, and Ihazofotsy. They go through a training process that instructs them in their capacity to guide tourists who come directly to the park entrance, to patrol, and to educate the community in which they live through “sensibilization.” The director defined “sensibilisation”

as the communication of the general and specific problematic of the protected area to village and urban populations.

« La Formation des Agents du Parc »

According to the director, the training that the agents receive from ANGAP (unlike the training received by professional guides based in Fort Dauphin) lasts throughout their employment. Some topics are emphasized:

- ANGAP
- Andohahela NP, and information specific to each site
- Respect for the traditions and the culture of local communities
- Providing the means for survival that are not environmentally destructive
- How to file a report on illegal activity in the forest (ANGAP does not have the ability to make arrests)
- How to welcome tourists and conduct a good guided tour.

Agents

Informal conversations, field interviews, and oral questionnaires with 6 park agents revealed a wide range of guiding strategies, experience, and level of knowledge. The guiding experience varied from 0 to 7 years, and experience in the field of conservation, usually through (WWF, Fafafi, or other ONGs) varied from about 3 months to 14 years. One agent was from Tana, another agent was from Tsiombe in the Androy region, but the others were from villages, communes, and towns in the region of Fort Dauphin. The highest level of formal education reported was the university level. The lowest degree was BEPC. Two agents speak at least 3 if not 4 languages (Malagasy, French, English, and some Italian). The rest speak a couple dialects of Malagasy and some French. All are in the process of learning English and/or improving their French.

Most agents claimed that their knowledge about the environment mainly derives from ANGAP, but participant observation indicated otherwise. The agents learned the bulk of their information about the forests from the community. More than half of the information on plants and animals in the circuit was based on local knowledge. At Mangatsiaka, the community talked about educating the agents that it was up to them to educate the agents

(Famoria, April 23). The Mangatsiaka agent also mentioned that he had felt the ANGAP training was inadequate.

Visitors

I spoke with independent guides, a tourist couple, and a Peace Corp volunteer who had been living in Tsimelahy village since April of 2004. The guides expressed the importance of giving and receiving knowledge in their profession, but it is rare that they visit the park, especially if they work exclusively for a hotel like Le Dauphin. Often, they bring knowledge to the park agents through books or previous experience. I spent some time with the tourists, but they did not stay long enough to communicate much information with me or with the community.

Informal conversations with the Peace Corps volunteer suggest that many development initiatives have been less than successful: the well built by SEECALINE was never functional (too shallow), the village toilet is insufficient for more than one person, the nursery is full of non-native plants, the fruit drier and the economic stove that she has promoted has not caught on. She has contributed to the village through English lessons at the primary school, and she plans to continue environmental education lessons through the school.

Community (Villagers)

Each village was unique in their feelings about the park, but some common themes arose from the interviews and conversations conducted with leaders of the community:

- Nearly every informant recognized the importance of conserving the forest. On the Anosy side of the mountains (ie: Malio and Mangatsiaka), members of the community readily recited the received knowledge that “the forests brought the rains” or that if they cut the trees, the rain would stop. Every village felt that it was important to conserve the environment for the livelihoods of their descendants.
- Every village noted the perceived high volume of *vazaha* visitors, but reported a minimal amount of interaction with them.
- I spoke with chefs-du-cartier where they were available (Malio and Tsimelahy). In all villages, there was a negligible amount of net immigration and emigration; however, the average family has 6-8 children in each village. Lower and upper limits were set at about 3 and 9-10 children per household.

Village 1: TSIMELAHY

The Antantsimo, like most Antanosy, customarily bury family members in the father's cemetery. One man from the village later known as Tsimelahy married a woman from another village across the river Tarantsa. According to custom, the woman moved to join her husband's village. One day, they took their family to visit the woman's ancestral village on the other side of the Tarantsa. A child of the family fell ill and died during the visit. They were unable to bring the child's body to the father's cemetery on the other side of the river because the rains had caused the river to flood. The woman's village said "Tsy omena lahy," Do not give to the man. Afterwards, this phrase became shortened to Tsimelahy.

The population is estimated to be around 800, in at least 2-3 *tanana*, but only 233 have identification documents. (Milson, April 16). Each family has between 3 and 10 children, with 8 on average (Philibert, chef-du-cartier, April 17). Their primary school opened 3 years ago and has a student body of 126, of which 66 are male and 60 are female, according to the village teacher. Formal environmental education is conducted at every grade level, through a government-issued text-book called Voary (Nature). The students have not been given a tour of the park, despite a high level of interest, due to entrance fees. (MONJA, Gervais. April 18.)

Non-Governmental Organisations – Promoting conservation for the environment

The village of Tsimelahy was named "Cleanest Village" in 2004 by SEECALINE, an NGO based in Tuléar. Other prominent ONGs in the village include ANGAP, Fafafi, WWF, ASOS. These NGOs were the main source of environmental knowledge according to the informants. Fafafi and ANGAP have been promoting tree nurseries for a long time according to the villagers. ASOS has recently been promoting various methods of alternative food cultivation: they introduced a chicken that lays eggs more frequently, called *manantody lava*, and have promised to start a pisciculture project in the near future. WWF inspired the politically active members of the village (according to the chef-du-cartier) to elect a committee to patrol the forest. SEECALINE promotes nutrition and cleanliness for village health. Promotion occurs through agents trained in Fort Dauphin or other urban centers, who either live in the village or visit frequently. Currently there are only the ANGAP agents and the CAN (Agent

Communauté Nutritionnel) for SEECALINE as permanent village residents – the other NGOs visit or have visited in the past.

I spoke with the ACN for SEECALINE, Mme RAMAHAFELY Clarisse, as well as the village association of which she is president. The group is called Milamina (“tidiness”) and started when Mme Clarisse organised a group of mostly women to create a rice storage space in 2002. Originally there were 110 members but after a disagreement over the appropriate use of funds received by the village from a political candidate during the deputy elections, the membership dwindled to 25. The ones who left the group (according to current members) thought that Mme Clarisse would get a lot of benefits from her involvement with the NGOs in town but that there was little benefit for the village itself. The ones who stayed did so because they saw the correlation between increased cleanliness and decreased incidence of disease, and they also saw direct benefits from the rice storage space (Milamina, April 18). These were also among the informants who believed that the ANGAP promoters were right when they said that the “trees brought the rain.”

What is important about the environment here?

The informants at Tsimelahy identified the forest and its many benefits, the most oft-repeated one being that it was directly linked to the availability of water (from rain or river). Other benefits include: wood for construction, wood for making charcoal to sell to urban markets (MONJA Philibert, April 17), to pump oxygen into the atmosphere (MONJA Gervais, April 18), as a home for the animals (Milamina, April 18).

How did you learn about the environment?

Every informant except Mme Tia and M. Gervais attributed their knowledge to the promoters from the various NGOs, as well as radio promotions. Mme Tia has avoided any contact with outsiders, and M. Gervais attributed some of his knowledge to formal education received at school.

Knowledge of conservation measures – tree nurseries, *aroafo* – were completely attributed to outside agencies.

Some informants alluded to difficulties explaining to other villagers the importance of conserving the environment. M. Gervais gave an example from his own experience – an old man told him that the promoters were lying when they said that the trees bring rain, because

in the old man's experience, no matter how many trees he cut, there was always the same amount of rain. (April 18). Also, many informants expressed worries about the inadequacy of cultivable land without resorting to *tavy*. They expressed the desire for more help from outside sources, like NGOs.

Village 2: MANGATSIAKA:

When the ancestors came to settle this village, they found that the stream was very cold during the winter months of May, June, and July (Mosa, April 22). They therefore named it Mangatsiaka ("cold").

This village was significantly smaller and younger than the other two in this study. The population is roughly 30-40, including children, and comprised of maybe 5-6 patriarchs. (IJO, Fiadana April 23). Two *tananas* make up the village of Mangatsiaka, and there is no school, but some children attend school in Ankirikirike. (Mosa, April 22).

Ankirikirike is the ancestral village of the family I spoke with in Mangatsiaka. The father of my principal and oldest informant brought his family to Mangatsiaka because at Ankirikirike, there was land enough for rice but not enough to raise zebu. They maintain their ancestral rice fields in Ankirikirike. The informants identified themselves foremost as a "zebu-herding village." (informal group conversation at Mangatsiaka, April 26.)

Their original settlement (the original Mangatsiaka) is where the park camp-site is currently located. Since 1939, the forest has been *alafaly* (the DEF designated the forest as a RNI). The DEF had been trying to convince them to move out of the forest, but it was not until the arrival of Sheila O'Connor that they decided to relocate. Sheila O'Connor stayed with them, asked them questions about the forest, and helped them to find the place that they have now. (M. Famera, April 23).

What is the importance of the environment here?

They used to make their houses out of *vendragne*, but this wood rots easily. Now they use *Alluaudia* wood, and it lasts at least 7 years. They want their children to conserve the forest to ensure that there will be enough *Alluaudia* to build houses.

How did they gain environmental knowledge?

They learned about the importance of conservation from Sheila O'Connor, and about the environment, about cultivation, and about zebu-herding from their parents. They have received no formal education, although at least one informant thinks that it is important for his children's future that they have access to formal education; therefore, this informant sent 3 of his 6 children to the ancestral village to go to school. (Mosa April 22). He indicated that he will show the rest of the children how to live in a "good way" because this is the responsibility of the head of the family.

The informants had had significant experience working with researchers other than Sheila O'Connor, and they realise that they have to help the ANGAP agents to conserve the forest. They do this by encouraging other villagers in the area to conserve the forest, to "tell people not to cut trees even if there is a hive" of bees in the trunk (and therefore, harvestable honey). They also realise that they know more than the ANGAP agents about the forest, and that they must teach the agents about the forest.

The lands that they cultivate have been approved by the DEF, and are strictly limited in size. This and the fact that the river dries up completely during the summer, forcing villagers to drink out of a stinking pool, has deterred immigration and population growth here.

Village 3: MALIO:

Malio was formed after survivors of an epidemic abandoned their ancestral villages. Members of various clans – the Ebrousse, the Emia, the Esakamisoly, the Esaha, and the Nakôgny – who used to live in the mountains moved here to Malio to start anew. The sickness, with flu-like symptoms, was called *fanompa*, and it killed so many of them that the old village was called Antananolomaintsy (which roughly translates to "village of the people that smell bad"). Bedobaka, a later extension of the original Malio, was so called because people going there would always say "I'm going to see the man who smokes a lot." (*Dobaka* means "tobacco" and *Be* means "big" or "a lot" according to context.) At the time, it was uncommon to smoke, and there was a man living there who smoked constantly. This man was the grand-father of the informant who told me this story (M. Tsangamana, May 1).

About 800 people live in the two *tananas* of “Malio” and “Bedobaka”, which together comprise the village of Malio. Bedobaka is about half the size of the *tanana* Malio. Families have between 3 and 9 children, but 6-7 was the average number. 161 children go to school and 130 do not as of October 2004. (Mahefa, Chef-du-cartier adjoint, April 30). They have one “instituteur suppléant”, a village teacher who is not paid by the state, due to conflicts with the previous two state-salaried village teachers.

The suppléant, M. Davis, said that the current number of students is at 139, in 3 sections: 11ème (CP1), 10ème (CP2), and 9ème (CE). The age of the children is between 6 and 14. The school opened in the late 80’s, but experienced multiple closings; in 2003 it closed down for 2 years. During the first two years of instruction (CP1, CP2) there is no formal lesson structure, but M. Davis teaches the students about deforestation through stories like that of “Besorongola”, a boy who burns the forest instead of going to school, which causes the rains to stop and a subsequent famine. For the CE students he conducts an environmental education lesson plan based on the geography curriculum. He has made a request to ANGAP through the local agent to take the children on an educational excursion to the forest.

In general, he feels that the education he conducts concerning the environment and conservation are not effective because “la réserve empêche leur développement dans la vie.” (ZAFINITSAPEY, Davis May 2). He explained that they already know that their families are struggling due to the limited amount of land, so they do not listen to the messages behind the lesson.

I spoke with the president of FRAM, the association of parents of students, and he explained that although roughly half of the children attend school, almost all parents in the village are members of the association, which started in 1986. They are frustrated with the lack of reliable school and transportation infrastructure development.

What is the importance of the environment here?

The importance of the environment at Malio lies in its life-sustaining qualities. The adjunct chef-du-cartier made the distinction between surface environment and sub-surface environment – underground resources are unimportant here because they have not found any precious or exploitable resources. (Mahefa, April 30). Other informants specified the importance of the environment for agricultural purposes or the importance of water for agriculture.

How did they gain environmental knowledge?

The informants said that they had learned how to cultivate, how to use medicinal plants, and about the environment of the village from their parents. Only M. Mahefa said that his parents never taught him anything about the environment but that he had learned from experience. He would teach his children through “oral apprenticeship” and through family discussions. Many other informants identified nightly family discussions as a mode of transmission within the family, through stories, proverbs, etc. However, M. Tsangamana pointed out that it was the responsibility of the agents to transmit environmental and conservation knowledge to the community as a whole, because each individual is too busy to educate the entire community.

There is a disciplinary committee, appointed by the village elders, to collect sanctions from villagers who exploit the forest illegally. It is called KASTI, and sanctions (usually monetary) go to development projects in the village. Other members of the community say that the ANGAP agents have taken on the function of KASTI in the two years since their arrival. The adjunct chef-du-cartier has requested family planning promoters (a doctor or nurse) to come to the village but there has been no response.

Discussion :

Although most agents considered ANGAP the main source of their knowledge, I observed that their knowledge about the forest mainly came from the village community, and that they relied on the villagers to provide information. Our host in Malio (named Tsiratsy) accompanied the agent, the interpreter, and myself on the circuit tour. My interpreter and I both noticed that the agent was constantly confirming his information with Tsiratsy. Through the course of the circuit, he and the agent together functioned as our tour guide.

At each site, there seems to be an agent who has significant experience working in conservation and development projects, but less language capacity, and another agent with significant guiding experience, and a fluency in multiple languages. Although I was unable to speak with the second agent at Mangatsiaka, the trend was apparent at both Tsimelahy and Malio. In both villages, the agent with greater language and guide experience reported much more intense, frequent involvement with researchers.

Respect is a key ingredient in the knowledge-exchange relationship between the community and ANGAP. Informants often used stories and examples to explain to me the importance of listening to elders. (MAKA, Guistave, May 1). Many agents recognized this and expressed a conscious effort to nurture respectful relationships. An agent who no longer works at Malio destroyed someone's manioc field when he found it in an inappropriate zone of the park. This caused outrage not only in Malio but in other nearby communities.. A couple of villagers also expressed the perception of the agents as "sitting around like kings" (MARA, Gaston. April 29), not doing their work to sensitize the community.

The Malio community interviews revealed more open, first-hand negativity towards the agents and towards ANGAP than the other two villages. Population pressures, the disrespectful behavior of the former agent, and the lack of proposed alternatives contributed to this conflict. Also, my interpreter was much more of an insider to the Malio community than in previous villages, which may have encouraged them to divulge more information.

Being a part of the community was also very important in communicating knowledge, especially in terms of exercising authority. In Tsimelahy, one of the agents, Loma (originally from Tsiombe), had a rice field and other crops that he cultivated alongside the villagers.

This and the fact that he has lived in the community for so long has diminished the sense that he is an outsider (personal communication, Lindsey Clark, April 20). On the other hand, as a two-year Peace Corps volunteer, Lindsey Clark expressed the feeling that the villagers take her presence and influence less seriously than a permanent resident. *Vazaha* that come to stay in the village are often seen as entertainment rather than sources of knowledge, especially given the communication barrier. Although guides and agents can never escape the distinction of a monthly salary and village of origin, they can begin to overcome this by integrating into the community. This is made more difficult however because of their work with *vazaha*, which emphasizes the differences between them and the other villagers, sometimes to the point that agents and guides are often seen as *vazaha*, themselves (MIHA Andréas, personal communication, April 10).

There was a significant lack of constructive conservation knowledge in Mangatsiaka and Malio. All conservation knowledge from the informants was based on negative messages: do not conduct *tavy*, do not cut down trees for construction, do not go into the forest without permission. Without a positive, and/or constructive alternative, these messages disempower local communities, which is contrary to the mission of sustainable development. On the other hand, at Tsimelahy, development and alternatives are coming fast but are being accepted and incorporated slowly. For example, SEECALINE had taken up the responsibility of providing free contraception to villagers, with the verbal support of the ANGAP agent – there was a significant lack of access to contraception in Malio and Mangatsiaka. The agents in both villages expressed the knowledge-capacity and the desire to work with the community on sustainable development / livelihoods projects but either money or “mentality” problems have hampered these efforts.

The issue of a “village mentality” occurs frequently when discussing knowledge exchange or knowledge sharing. It seems that this “mentality” is focused on agricultural activity, raising livestock, and following the ancestral traditions and advice, sometimes to the exclusion of new or introduced methods. This results in the under-prioritisation of formal education for some village families, as well as a reluctance to relinquish the ways of the ancestors in order to incorporate unprecedented livelihood techniques.

The foreign nature and origin of the conservation paradigm, while easily understood, can be sabotaged by misrepresenting information. For example, the old man in Tsimelahy correctly

pointed out that trees do not bring rain, but the village teacher was unable to explain that it is actually the root systems of trees that prevents erosion and retains moisture in the soil, and that water retention is arguably more important than the volume of rain. (Bos, lecture 9 feb, 2005). There is a danger in using simplified, inflexible messages in communicating environmental knowledge. This is illustrated by the “received wisdom” concept – that an environmental message can be repeated to and by officials so many times that it becomes a truism and thus restricts dialog on the subject. (Kull, 2002).

There is also a danger in the uni-directional flow of information between ANGAP and the villagers. Many interviews in Tsimelahy ended with an appeal for more help from outside sources. (Milamina, MONJA Gervais, Mahatsanga, etc.) This suggests that instead of feeling empowered to improve standards of living in the village, these informants felt the need to appeal to outsiders for help in solving problems managing their own environment.

Recommendations:

The transmission of environmental knowledge to future generations could be enhanced by incorporating the “sortie nature” into formal environmental education curricula. The village teachers I spoke with felt that there was a lot of enthusiasm on the part of the students to visit the parcel for a guided tour. Most plants and animals that were brought to my attention were used locally (see Appendix B). Therefore the older students might already have significant experience with the plants and their uses, but a lot of the ecological/scientific knowledge available through the guides might elucidate the value of protecting the forest through the park system. Also, the students would have access to valuable cultural information regarding the environment.

The uniqueness of the ecosystems in this park could be explored by more researchers, to expand the current available knowledge about the environment. Especially given the high number of medicinal plants (and especially in the rainforest), this knowledge could be extremely beneficial to the world, as well as to local communities.

In informal conversations about this project in Fort-Dauphin many people expressed the desire to learn more about the unique ecosystems that are a part of their natural heritage.

Using the ethnobotanical, scientific, and cultural information gathered in this study, it might be worthwhile to conduct a follow-up study to document the knowledge accrued by the park guides and agents about each forest circuit. The ultimate goal would be to make a book for the Malagasy public, for people who cannot afford to visit the park, to become acquainted with their natural heritage. This book might also appeal to international audiences and the tourist market.

It would be very interesting to compare and contrast this study with another SIT independent study project conducted at the same time by Claire Nelson. She studied the culturally protected “sacred forest” of Angavo, by interviewing the population of Tanantsoa, a village in the Androy region. Unlike at Andohahela, the Angavo forest has been protected by an indigenous system of *fady* and custom, instead of an imposed set of regulations from sources outside of the community.

It is clear that the communities are struggling to live with the park, and that population pressures are not being addressed sufficiently. Sheila O’Connor’s observation in 1981 – that low populations densities and fertile rice fields protected the reserve – is no longer true. Even in Tsimelahy, where contraception is readily available, the growing population was identified as a problem, because the forest is being overexploited. (MONJA Gervais, April 18). In Malio, community leaders often mentioned pushing the limits back to a certain point that had been promised to them in previous negotiations with park authorities. However, this is not a sustainable solution if each community pushes the park limits back as their population increases, hoping that the park system will expand elsewhere to make up for the loss.

Also, increasing the crop yield per surface area, and developing alternative livelihood techniques would take better advantage of the current available land. Despite the conflicts between the park system and the communities, most informants agreed upon the necessity of conservation for future generations. While they expressed their frustrations about the park’s encroachment of their ancestral lands, almost no one suggested that the whole protected areas system ought to be eliminated. In other words, no one from the community invoked their ancestral right to exploit the forest – they all seemed willing to work with the authorities, if the terms were reasonable.

Conclusion:

At Andohahela National Park, ANGAP agents serve as the main channels for environmental and conservation knowledge. Visitors to the park, due to language barriers and time constraints, deal mainly with the agents, who relay information to them about the unique environment. Most of the information that visitors get is from the local community's knowledge. The agents that worked most with researchers and really gained knowledge from them were the ones who could communicate effectively with the researchers. However, the main role of the agent is to serve as a conduit of conservation messages from ANGAP and other NGOs. Of the originally identified categories of participants in the knowledge-exchange scheme of the national park, the most intense and complicated relationship existed between the community and the agents living with them.

Respect and trust are key ingredients in the transmission of environmental and conservation messages between ANGAP and the community. The process of becoming a respected member of the community is difficult, due to all the factors that set the agent apart from the other villagers: the monthly salary, the power and responsibility to enforce park regulations, the ability to communicate with other sources or sinks of knowledge, the mere fact that he or she comes from outside the village. Living in the village allows the relationship to develop between the agent and the community. The agent has a responsibility to share information with the community, given his or her experience in conservation and sustainable development, his or her access to training and education, and the fact that they sell information earned from the local community to tourists.

The park could promote research and try to attract researchers, to take advantage of the uniqueness of the ecosystems caused by the Foehn effect of the Anosyenne Mountains. Also, educational excursions are an important method of transmitting environmental knowledge to future generations of Malagasy students. Not only do excursions allow students to experience the ecosystem and their heritage first-hand, but guided tours of the forest are closer to the traditional method of orally transmitting knowledge.

Finally, there is a fine balance between the promotion of sustainable alternative livelihood skills that empower local communities and the encouragement of dependence on outside aid

to achieve these *alternatives*. The importance of traditional and cultural environmental knowledge is not to be undervalued. In fact, the conservation of environmental knowledge relies upon tradition and culture in the villages, since it is through oral traditions that knowledge is transmitted from parents to their children, from the village to the guides, and from the guides to the world.

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Formal Interview Schedule :

Name	Profession	Date	Location	Interview Type
M. RAISONISOA, Berthien, dit FARA	ANGAP agent	April 11	Epicerie Manja, Fort Dauphin	Semi-structured
M. RAZAKANJOELINA, Rejela	Chef de l'ANGAP	April 12	ANGAP office, Fort Dauphin	Semi-structured
M. RAVELOSON, Patrick	Professional guide	April 13	his house, Fort Dauphin	Semi-structured
M. Milson	Unclear (porter, carpenter)	April 16, 17	Tsimelahy village	Structured, field interview
M. Loma	ANGAP agent	April 17	Tsimelahy circuit	Semi-structured field interview
Mme. RAMAHAFELY, Clarisse	ACN for SEECALINE, President of Milamina	April 17, April 18	Tsimelahy village	Semi-structured
M. MONJA, Philibert	Chef du cartier	April 17	Tsimelahy village	Semi-structured
Mme. Fidisoa	Member of Milamina	April 18	Tsimelahy village	Structured, group
Mme. SAFARY, Perline	Member of Milamina	April 18	Tsimelahy village	Structured, group
Mme. Soa-nirina	Member of Milamina	April 18	Tsimelahy village	Structured, group
M. MAKA, Tsaramana	Member of Milamina	April 18	Tsimelahy village	Structured, group
M. MONJA, Gervais	Village teacher	April 18	Tsimelahy village	Semi-structured
Mme. Tia	Cultivator	April 18	Tsimelahy village	Semi-structured
M. Mahatsanga	Cultivator	April 19	Tsimelahy village	Semi-structured
Lindsey Clark	Peace Corp volunteer	April 19	Tsimelahy village	Informal
M. RAMBOLAMANANA, Christophe	ANGAP agent	April 20	Tsimelahy circuit	Field interview
Mlle. RASOAZANANIRINA, Patricia	ANGAP agent	April 21	Tsimelahy village	Structured
M. Mosa	Cultivator	April 22, 26	Mangatsiaka village	Semi-structured, informal
M. Famoria	Cultivator, Patriarch of the village	April 23, 26	Mangatsiaka village	Semi-structured, informal
M. IJO, Fiadana	ANGAP agent	April 23	Mangatsiaka	Semi-

			circuit	structured, field interview
M. RAHARY, dit Dauphin	ANGAP agent	April 29 ; May 1	Malio village, Malio circuit	Semi-structured, field interview
M. Mahefa	Chef du cartier, adjoint, Family patriarch	April 30	Malio village	Semi-structured
M. DAMY, Mahalingy	President of FRAM, Family patriarch	May 1	Malio village	Semi-structured
M. Tsangamana	Cultivator, Family patriarch	May 1	Malio village	Semi-structured
M. MIHA, Roger	President of KASTI, Family patriarch	May 1	Malio village	Semi-structured
M. MAKA, Guistave, dit Remena	Treasurer of KASTI, Family patriarch	May 1	Malio village	Semi-structured
M. ZAFINITSAPY, Davis	Village teacher	May 2	Malio village	Semi-structured
M. LAHA, Tsiratsy	Cultivator, grandson of famous ombiasy	May 1, 2	Malio village	Field interview, Semi-structured

NB : Structured – oral questionnaire ; Semi-structured – some questions pre-established ; Field interview – walking in the field collecting notes; Group – multiple informants at one interview

Appendix A: Questionnaires

La Questionnaire pour les Agents du PN Andohahela.

1. Depuis quand est-ce que vous travaillez comme agent ?
2. D'où est-ce que vous venez ? Où est-ce que vous avez fait vos études ? Jusqu'à quel niveau ?
3. Combien de langues est-ce que vous parlez ?
4. D'où viennent vos connaissances? (une conversation tout au long du circuit.)
5. Quel est votre expérience avec:/ Comment est-ce que vous décririez votre rapport avec :
 - la communauté
 - les chercheurs/étudiants (est-ce qu'il y en a beaucoup ?)
 - ANGAP/ autres guides
 - L' environnement
6. Qu'est-ce que vous suggérez afin d'améliorer la profession de guide ?
7. Comment est-ce que vous comprenez votre profession? (Qu'est-ce que vous pensez à propos la philosophie de guide?)

*Questionnaire for the Local Community (Villagers):**

1. What is the "environment"? Describe the environment of the village. What is important to you about this environment?
2. Who taught you what you know about the environment?
3. What do you think about conservation? How do you try to conserve the environment?
4. Who taught you to conserve? How did you learn?
5. Describe your relationship with *vazaha*, ANGAP.
6. How can the exchange of knowledge be facilitated?

*Revised Questionnaire : ***

1. What is important for you about the environment (in this village), and what do you want your descendants to know about the environment?
2. How did you learn about these important things?
3. What environmental knowledge did you gain from your ancestors and how?
4. How will you transmit important environmental knowledge about the environment to your descendants?
5. How will you contribute to the conservation of the environment and/or environmental knowledge?
6. Is there anything I forgot to ask?

* Used only at Tsimelahy

** Used at Mangatsiaka and Malio.

Appendix B: Field Notes.

B-1: Information Gathered from Circuit Tour

TSIMELAHY:

Date: le 17 avril

Language: Français

Guide: M. Loma

- Chaîne Anosyenne : Nous sommes maintenant dans la forêt de transition. C'est la période de pluie.
- Il y a 9 espèces de baobab dans le monde entier : 1 en Afrique, 1 en Australie, 7 à Madagascar.
- Il y a 4 espèces de Didieraceae dans le parc de Tsimelaha.
- La fleuve s'appelle Tarantsy
- « Piscine des Amoureux »
- « Piscine Sacrée » - les guérisseurs soignent les maladies avec l'eau de cette piscine.

Nom / Name Sci. = scientifique ; Ver. = vernaculaire	Intérêt / Interest	Détail / Detail	Mode d'utilisation / Use
Sci. – <i>Uncarina stulilefera</i> Ver. – farehetra	Ethnobotanical	Spéciale pour shampooing; graines utilisés pour piéger les rats	
Sci. – <i>Adansonia</i> Ver. – Commun: baobab	Ethnobotanical	La population du sud utilise le baobab pour faire réservoir d'eau comme citerne	Faire un escalier, monter, faire un troue au dessus, creuser l'intérieur, attendre un ans pour que l'intérieur se cicatrise, verser l'eau
Sci. – <i>Operculicarya decaryi</i> Ver. – zabihiy	Ethnobotanical	1)Pour conserver le cadavre (en Androy) 2)cicatrisant après l'accouchement	1)piler l'écorce intérieur, embaumer le cadavre 2)se baigner dans le tisane
Sci. – <i>Kalanchoe beharensis</i> Ver. – mongy	Ethnobotanical	Plante médicinale contre la constipation	
Sci. – <i>Alluaudia humberti</i> Ver. - sonombarika	Ecological	1 des 4 espèces de Didieraceae dans le parc de Tsimelaha	
Sci. – <i>Euphorbia plageanta</i> Ver. – fiha	Ethnobotanical	1)Pour faire la toiture de la maison. Imperméable. 2)écorce intérieur	1)bois de construction

Commun – « arbre vazaha »		médicinale contre la dysenterie	
Sci. – <i>Dypsis decaryi</i> Ver. - lafa	Ecological	Endémique au PN Andohahela	
Sci. – <i>Pachypodium rosylatum</i> Ver. - vontatsitry			
Sci. – <i>Alluaudia dimosa</i> Ver. – rohondroho Commun – « arbre saucisse »	Ecological, Ethnobotanical	Pas de feuille, 2 ^{ème} espèce de Didieraceae; médicinale contre la diarrhée	
Sci. – <i>Pachypodium lamerae</i> Ver. -	Ecological	Épines sont pour la défense et pour éviter l'évapotranspiration	
Sci. – <i>Tetradenia</i> Ver. - boro	Ethnobotanical	Hallucinogenic	
Cactus	Ecological	Introduite de Mexique	
Sci. – <i>Alluaudia procera</i> Ver. - fantsiolotra	Ethnobotanical	Pour faire la planche, 3 ^{ème} espèce de Didieraceae	Bois de construction
Sci. – <i>Alluaudia ascendens</i> Ver. – tsongo	Ecological	4 ^{ème} espèce de Didieraceae ; domicile des lémuriens	
Sci. – <i>Cifostema laza</i> Ver. – laza	Botanical; ethnobotanical	Arbre qui se termine en liane ; pour devenir fameux	Planter au coin en dehors de la maison
Sci. – <i>Cedrolopsis greveyi</i> Ver. - Katrafay	Ethnobotanical	Cicatrisant	Bois de chauffe, charbon
Sci. – <i>Diospirus</i> Ver.- maintyfo, hazomainty Commun - ébène			Bois précieux
Vanilla <i>madagascariensis</i>	Ethnobotanical, ecological	Natif au sud, plante aphrodisiaque	

Date: le 20 avril

Language: English.

Guide: M. RAMBOLAMANANA, Christophe (usually works at Information Center)

- Tsimelahy is located 56km from Fort Dauphin.
- Andohahela is divided into 3 different forests, different ecosystems: the rainforest, the dry/spiny, the transitional. This is the transitional forest.
- The circuit is a 3km loop, with 2 river-crossings.
- If you want to see birds, Mangatsiaka is a better place to go.
- Now is a good time to see chameleons.

- The park was a Strict Nature Reserve in 1939 – 1997. In 1997 it achieved National Park status. In 1999 it won 1st Prize from Silver Otter Award for Best Ecotourism Project. The park was inaugurated on 18 June 2000. The important difference between a National Park and a Reserve is that a park is natural, but you can introduce species to a reserve.
- The Anosy Chain plays a big role in blocking the humidity from the east, this is called the FOEHN effect.
- There are iguanas in Latin America and in Madagascar but not in Africa, which can be explained by the Gondwanaland theory.
- 50% of the entrance fee goes to the community, through the Tana office because Andohahela NP is not self-sufficient at this point.
- There are 129 species of birds in Andohahela.
- The bird story: During a bird presidential election, all 256 Malagasy species elected the Crested Drongo because of its crown-like crest and ability to imitate the call of any other species of bird. The owl was the only one absent because he was attending his wife giving birth at home. Now, all the birds attack the owl if they see it, and so the owl only comes out at night.
- The swimming pool is taboo and sacred. The healer of the village asks people who come to him to bring water from the pool to make tea of the medicinal plants. Most people in Tsimelaha are possessed, so they consider pigs and goats fady.

Name	Interest	Detail	Use
Spiny tailed lizard	Ecological	Male – black throat; female – not black. Eat flies, eaten by snakes. Bob head to communicate and for defence, have “third eye” (pineal eye). Cold-blooded, prefer rocks for heat	
Shampoo tree Ver. - Farehetra (<i>Uncarina stulilefera</i>)	Ethnobotanical	Used to make Farehetra, a popular shampoo in Tana	Local women use before plaiting hair to remove dandruff, seeds used as pesticide (trap)
Guinea fowl (<i>Numida meleagris</i>)	Scientific	Terrestrial, lives in groups, introduced to Madagascar	Eaten by locals
Baobab	Scientific	*	
Weaver bird (<i>Ploceus sakalava</i>)	Ecological, cultural	Nest is upside down to avoid predators, most build nests in the villages, granivorous	Lucky for the villagers, <i>fady</i> to kill
Triangle palm	Ecological, Ethnobotanical	Only grows in the transitional forest, used for roofing in the village	
Tonga, Madagascar	Scientific,	Contains alkaloids, to	Villagers use tea of

rosy periwinkle (<i>Catharatus roseuse</i>)	ethnobotanical	treat leukaemia and certain cancers	root for stomach ache
Aloe	Ethnobotanical	To cure the belly-button hole after birth	Tea of dead leaves after pregnancy – antibiotic
Pachypodium	Ethnobotanical	Leaves are antiseptic	
Cactus	Cultural	Introduced by the French**	
Plaited lizard, skink (<i>Phelsuma mutabilis</i>)	Cultural, ethnofaunal	The liver is toxic.	At village parties, a villager might use the powder of the dried liver to poison someone's drink.
Red-tailed Newtonia (bird)	Ecological	Very rare. Only occurs here and in Analamazaotra – Périnet	
Fody (bird) (<i>Foudia madagascariensis</i>)	Ecological	Male changes to bright red during the reproductive season, to attract females	
Didieraceae family	Ethnobotanical, ecological	For making planks, lemurs like it. They have special cushions on their palms to avoid the spines	construction
Vanilla <i>madagascariensis</i>	Ethnobotanical	Antandroy are still polygamous, use this plant “pour activer les choses”	

*9 species in the world. 7 are endemic to Madagascar, the 1 in Africa also exists in Madagascar, 2 of the 7 in Australia. The legend of the baobab: the Devil planted the baobab upside down to spite God. During the dry season, the baobab loses its leaves to avoid evapotranspiration. The Antandroy use the baobab's cells to feed their zebu, because the cells have a lot of water. The fruits are edible, and they are also used to make Malagasy yogurt. The pachycaul form is also a strategy to conserve moisture. It is deep-rooted and can survive even if it falls over. It is impossible to tell the age from the cross-section because it does not form age-rings.

**The Sampona story: *sampo* means “accident” in Malagasy. During the colonization period, the French brought some people of High-Plateau tribe to Androy to fight the Antandroy. The French hid in a patch of cactus, but the Antandroy saw them and “accidentally” set fire to the patch and killed them.

NB: All scientific names were added afterwards. During the tour, Christophe expressed the need to be familiar with scientific names, but that it was also important to know when the audience wanted to hear them.

MANGATSIAKA:

Date: April 23, 9h00 – 9h40

Language: Malagasy translated to English

Guide: M. Fiadana

- Still Parcel II but in the dry / spiny forest section
- “Allée Sifaka” – loop circuit. This is where the sifaka territory starts. They wake up in the morning, sunbathe, groom, then start their daily activities.
- 9h04: sifaka found sunbathing in menateza tree (scientific name unknown) and in Didieraceae. 5 total in the group, at least 3 female and 1 male
- wild hibiscus
- *Lepilemur leocopis* (white-footed spotted lemur) found in Didieraceae
- Feces of wild pig in the path
- Night tour available

Date: April 24

- Croix du Sud Project: replantation of *Alluaudia ascendens*.
- There is a cleared area that used to be cultivated by prisoners. Now they harvest *Alluaudia* planks to sell at the main road.
- Other villages have pisciculture, chicken (manantody lava), and apiculture projects, but there is not enough money to sustain it in Mangatsiaka yet.
- The villagers have to use the same fields each season, because DEF only allows them a certain amount. The land is flat enough that a 6 month fallow period returns nutrients to the soil.

MALIO:

Date: April 30, 8h30 – 16h00

Language: Malagasy translated into French

Guide: M. Rahary

Zone Périphérique:

- Fleuve Morondava, à 600 mètres de l’entrée du parc – La dernière inondation a causé un mort. Il rentrait de Manambaro, après avoir vendu le riz au marché. Les gens pensent qu’il était ivre ou attiré par un mauvais esprit.
- Heriky – la rouille, causé par l’eau douce (et pas la mer).
- L’infrastructure du parc (escaliers, abritant) – construit par la communauté à la suggestion du chef secteur de l’ANGAP. Payé par ANGAP.

La Flore et Faune :

Nom / Name	Intérêt / Interest	Détail / Detail	Mode d’utilisation / Use
Lengomanitsy Rubiaceae family, <i>Paederia grevei</i>	Ethnobotanical	fanafody vavogny. (médicament pour l’estomac).	
Voasary	Ethnobotanical	Citrus fruit	À manger
Vontaky,	Ethnobotanical	fruit	À manger

<i>Strychnos spinosa</i>			
Velomihanto (en vie, pendu)	Scientific, ecological	un arbre qui vit au dépend de l'autre arbre. Très rare.	
Rengetra	Fauna	bird	
Kafenala		café sauvage	
Retantely, <i>Turraea sp.</i>	Ethnobotanical	mafaitsy (très amer). Fanafody colic abdominal, Rendre tonic le muscle, comme katrafay.	Comme du thé, prendre comme serum – seulement quand on a mal au ventre.
Haronga, <i>Harongana madagascariensis</i>	Ethnobotanical, ecological	une plante qui identifie la dégradation de la forêt. La forêt vierge n'a pas de haronga, parce qu'elle ne pousse que sur le sol dégradé, dans une forêt secondaire. Fanafody tazo vogny (fièvre jaune). Le produit pharmaceutique Fanaferol est fait avec la haronga.	
Makaragna, <i>Dombeya mollis</i>	Ecological, ethnobotanical	aussi preuves d'une forêt secondaire. Bois utilisé pour construire le mandolin, et le <i>zezo lava</i> , instrument traditionnel.	Bois de construction. les feuilles se servent comme papier de toilette pour les enfants.
Andrarezy	Ecological	aussi preuves d'une forêt secondaire.	
Rehiba	Ethnobotanical	racine est fanafody pour tuer le chien. La feuille agit comme antidote pour toute sorte de poison, même le poison qui vient d'un ombiasa.	tisane
Pilopilo, <i>Capsicum frutescens</i>	Ethnobotanical	Sakay (spice)	À manger
Sijeny	Ethnobotanical	anti-moustique	
Vôpaky, <i>Vapaka litoralis</i>	ethnobotanical	l'écorce peut être utilisé contre la fatigue ; aussi bois de construction ; fruit mangé par les lémuriens.	Bois de construction
Hazino	ethnobotanical	fleur rouge, fanafody contre la brûlure.	Prendre l'écorce, gratter sur la pierre, mettre sur la blessure.
Hovao, <i>Dilobeia thouarsii</i>	ethnobotanical	« huile malgache », nut oil	Sècher le fruit frais, piler avec un mortier.

Dans le Parc :

- La différence entre la forêt humide et la forêt sèche : feuilles des arbres. Dans une forêt dense humide, les arbres sont grands, les feuilles sont grandes et vertes, et les lianes sont grands.

La Flore et Faune :

Nom/ Name	Intérêt/ Interest	Détail / Detail	Usage / Use
Vokaky	Ethnobotanical	palmier pour faire les murs de maison	Bois de construction
Hahatsy	Ecological	fougère qui pousse sur l'arbre – parasite.	
Cactus <i>madagascariensis</i>	Ecological	endémique à Andohahela	
Vakoa (<i>pandaneus</i>)	Ethnobotanical	on fait la natte avec les feuilles.	
Palisandre	Ethnobotanical	bois d'immeuble. Bois commercial, précieux	Bois de construction
Mangily, <i>Physena madagascariensis</i>	Ethnobotanical	pour protéger contre les sang-sues.	Piler l'écorce et mettre sur les jambes comme le savon.
Vaho <i>Aloe sp</i>	Ethnobotanical	aloe de la forêt humide, pousse sur la pierre.	varié
Rahotsy	Ethnobotanical, ecological	arbre dont le fruit est mangé par les lémuriens	bois de construction.
Vintsiala	Faune (Malachite Kingfisher)	martin-pêcheur de la forêt, rouge	
Akohonala	Faune (Crested Ibis)	poulet sauvage. Rare.	Chassé par les villageois.
Teso manga	Faune (<i>Coua caerulea</i>)	oiseau, coua bleue.	Les villageois le mange.
Hahabosira	ecological	plante mangé par le <i>votsira</i>	
<i>Votsira (Galidia elegans)</i>	Cultural	un animal un peu comme le chat, qui laisse la peau du queue quand il est attrapé.	On donne la peau (<i>vorombotsira</i>) aux garçons qui font leur circoncision, aux femmes qui vont s'accoucher.
Sotro	Ethnobotanical	l'arbre le plus dur, utilisé pour l'enterrement des morts, parce que le bois dure longtemps.	
Fanja	Ethnobotanical	bois pour faire le pot de fleur.	
Taolagna	Ethnobotanical, ecological	fruits mangés par les lémuriens.	Bois de construction
Voasirindry	Ethnobotanical	les ancêtres ont mangés fruits pendant la famine.	
Falinandro	Ethnobotanical	on boit le tisane en famille pour éviter que la tonnerre	Tisane

		la tue.	
Remenso	Ethnobotanical	fanafody pour les bébés : contre la froid, colic abdominal, pour pousser l'appétit.	
Fengalala	Ethnobotanical	pour faire augmenter le lait maternel	
Hela (<i>Eliea articulata</i>)	Ethnobotanical	jus de la feuille est cicatrisant, surtout pour les blessures graves.	
Tsiokagnomby (<i>Dadonaea viseosa</i>)	Ethnobotanical	utiliser le tisane sur le peau pour guérir la fracture	Tisane, mélanger avec de l'eau tiède et la plante ahipandrotsy.
Tsilitolito, (<i>Ligodium sp</i>)	Ethnobotanical	fanfody terake. Pour améliorer la santé d'une femme après l'accouchement.	
Ambitavy, (<i>Bridelia pervilleana</i>)	Ethnobotanical	Dur, pas mangé par les insectes .	bois de construction.
Fagnota	Ethnobotanical	pour guérir la personne qui est attiré par un mauvais esprit.	
Romba be, (<i>Ocimum gratissimum</i>)	Ethnobotanical	pour les femmes après l'accouchement.	Tisane
Romba vola, (<i>Ocimum canum</i>)	Ethnobotanical	plus petit, plus parfumé. Pour les enfants avec <i>tomporaza</i> (mauvais esprit qui fait le victime avoir une attaque comme l'épilepsie.)	Mettre les feuilles au front et sous le nez.
Sangira, (<i>Phyllanthus casticum</i>)	Ethnobotanical	fanafody pour le zébu : faire sortir le placenta après l'accouchement.	

- Anindramahalio – (une vraie histoire de Malio.) Ramahalio était un homme qui avait deux femmes. Il a cherché des poissons pour ses femmes, et ils leur en a donné, une partie grande pour la *valy be* (grande femme) et une partie plus petite pour l'autre femme, la *valy masay*. La dernière n'a pas supporté ça, donc Ramahalio est revenu pour chercher plus de poissons pour elle. Après il a été amené par l'eau et il n'est pas revenu jusqu'à maintenant.
- En construisant le chemin, un des villageois a été blessé par un rocher qui est tombée sur la jambe.
- Ataykoho – endroit où les ancêtres se sont cachés pour éviter le gouverneur français pendant la colonisation.
- Cascade Andranomitily
- Tombeaux des enfants qui ont eu moins d'un ans. Pas de sacrifice de zébu.
- Tombeau abandonné.

NB : Tsiratsy, our village host at Malio, accompanied us on the circuit tour and was the source of a large proportion of the above information. Also, all scientific names in parentheses were added later.

B-2: Information Gathered from Village Tours

TSIMELAHY :

Guide : M. Milson

Language : Malagasy translated into English

Date : April 17, 14h40 – 16h15

- Everyone has their own field, *horake*.
- There is a well built by ASOS behind the rice fields.
- Manateza – tree used for constipation. Boil the leaves and drink.
- Raketa sonjo – during the fight against the French, the Antandroy used to eat this fruit.
- Mimo – treats stomach ache. Boil the leaves and drink. A project brought this tree from Fort Dauphin, it is not native to Tsimelaha.
- Tamarind tree, *kily*, *Tamarindus indica* – for an eye infection, wash eyes with cooled broth of leaves
- Chicken house
- There is another hamlet to the northeast
- Pumpkin patch
- *Lafa* seeds are pound into resin using the big mortars. The taste is *matavy* – like the taste of coconut or peanut
- *Leo* – mortar in Antanosy dialect
- *Vahombe* – big leaf aloe, the resin can be used to treat cancer. Mix 0.5 L of resin, 0.5L honey, and 1 spoon of strong alcohol (*taoka gasy*, rum, or whiskey). Women take the tisane of dried vahombe leaf to get rid of the afterbirth.
- *Vahontsoy* – small leaf aloe. (*Aloe divaricatha*)
- Savô - If you get the resin of the *Alluaudia* in eyes, take resin of savô to cure or counteract the poison. Children use the branch as a toy. (*Jatropha curcas*).
- Laza – plant this tree in any corner of the house to bring fame and good fortune.
- Fihamy – make tisane of leaves to treat low blood pressure
- Pumpkin flowers – tisane given to babies to clean out their organs
- Ebognebo - tisane given to babies to clean out their organs
- Flamboyant – decoration, (*Delonix regia*)
- Voangy (orange) tree – steam vapor treatment for fever
- Kinagna – ombiasy use the oil of this plant for ceremonies. A bath in the broth of the leaves treats fatigue.
- Romba madiniky – tisane of leaves to treat dizziness in children
- Tamatesy (tomato) – the plant keeps mosquitos away
- Fary (sugarcane) – used to make *taoka gasy*
- Sagnira – fruit eaten by children; the Antandroy use the branch as a toothbrush
- Tambarikôsy = chameleon
- A baobab tree full of weaver bird nests is good luck. *Fady* to kill the weaver birds.
- *Lafa* fronds are used to make the roofs of houses.

- Traditional beehive: a hollowed-out tree-trunk. Smoke out the bees with a burning cloth. Wild honey collection is still practiced.
- Vinda – used to make straw mats
- Zebu skin drying in the sun – drums, purses, hats, belts made from this material. The skins are often sent to Tana for processing.
- Vero magnitsy = lemongrass
- Goats, pigs fady

MANGATSIKA :

Guide : M. MOSA

Language: Malagasy translated into English

Date : April 22

- They offered us corn with zebu milk, because I said I liked it.
- Heragne – sisal-type plant with spines along the sides
- Laloasy – sisal-type plant with no spines on the sides
- Pigs are fady here. They can eat wild pigs, but it is taboo to raise them with zebu and goats in the village.
- It is fady as well to eat sokaky, sifaky, maky (ie: all lemurs).
- Za, zagne = baobab
- Zanaka omby = baby zebu; tarabao = newborn zebu; sarake (bush term for tarabao)
- Zoloke = enclosure for zebu, goats
- Romba – basil, medicinal. If you throw up or have a fever, inhale the steam.
- Feka – medicinal, treats fever
- Somangipaka – Salvadoraceae family, berries edible in September and October
- In the summer, the river dries up and they have to get water from a stinking pool. They can drink it cooked or uncooked and they do not get sick; they have no choice.
- Dagoa – fruits edible. The dry-forest version of *Dagoa strichinosis* of the wet forest.
- Kapoke – a poisonous tree
- Rohondroho (*Alluaudia dimosa*) – for diarrhoea, or when they eat too much meat
- Rotse – a big tree with edible fruits
- The park camp site used to be the site of the old village of Mangatsiaka. This is where Sheila O'Connor stayed when she came to persuade them to leave the forest.
- Eoke = giant coua, aliotse = red-capped coua, akanga = guinea fowl, vazagne = parrot. All are eaten by the villagers.
- They offer us *habobo* (Malagasy yogurt) as well.

MALIO :

Guidé par : M. LAHA, Tsiratsy ; Sosony

Date : le 1er mai, 11h18 à 12h00

- Quelques maisons sont élevées pour éviter les parasites et l'humidité.
- Ceux qui ont assez de l'argent essaient d'avoir un toit de tôle ; c'est aussi pour conserver le *ravinala*.
- Les trois types de toit naturel sont : *raty* (arbre voyageur), *tegny* (gazon), *hindy* (tige de riz)

- *Fary*- canne à sucre
- Avocat, cœur de bœuf, orange, jackfruit, papaye, banane, tamarinier (*vazaha* et *gasy*), ananas *gasy*, grapefruit, mandarin, *pilopilo*
- Eglise – toit de tôle, murs de *vakaky*
- Maisons – murs de *falafa*
- Malio est divisé en deux *tanana* : Malio et Bedobaka. Le *tanana* de Malio est presque deux fois plus grand que Bedobaka.
- De l'école, on peut voir le champ de manioc que Tsiratsy a planté. L'agent de l'ANGAP lui a dit que c'était une problème, même si le champ se situe en dehors des limites du parc.
- Tsilavira – chasseur qui vivait tout seul au savanne juste en face de l'entrée du parc. Il était bûcheron et il a coupé tous les arbres aux alentours.
- Zoloky – enclosure for zebu
- Many pigs, goats are fady

Glossary / Glossaire :

Antanosy – The ethnic group living in the Southeast of Madagascar, to the east of the Anosyenne Mountain Chain. The region they inhabit is called Anosy, and their language is Antanosy or Tanosy.

Antandroy – The ethnic group living in the South of Madagascar, to the west of the Anosyenne Mountain Chain. The region they inhabit is called Androy, and their language is Antandroy or Tandroy.

aroafo – firebreak. A buffer zone between the forest and a field cleared by tavy.

BEPC – diplôme du Brevet d'Etudes du Premier Cycle, received for successfully completing secondary school, necessary to enter high school level.

bush, brousse – the Malagasy countryside, or any rural area, especially in the Deep South of Madagascar

commune – a political unit of multiple *fokotany*

fady – taboo, forbidden, or impolite

fokotany – a political unit of between 1 – 3 village(s) or “cartier(s)”

Fort-Dauphin = Taolagnaro

horake – rice field

manantody lava – a type of chicken that is promoted by NGOs in villages, because they lay more eggs than most Malagasy chickens

ombiasy – traditional healer

Tana = Antananarivo, the capital of Madagascar

tanana – village, cluster of houses

taoka gasy – Malagasy traditional alcoholic beverage, often made with sugar cane.

tavy – slash-and-burn agriculture, a source of rural environmental destruction in Madagascar that has received much attention from national and international conservationists.

Tuléar = Toliara

vazaha – This is a Malagasy word to describe any person that is foreign to the native community. Includes international visitors to Madagascar, can include Malagasy from a foreign tribe or village.

Acronyms, English and French versions:

- ACN – Agent Communauté Nutritionnel (Community Nutrition Agent)
- Andohahela P.N. – Andohahela National Park; P.N. Andohahela – Parc National Andohahela
- CEL – Centre Ecologique de Libanona (Libanona Ecology Center, a two-year post-Baccalauréat environmental studies program in Fort Dauphin)
- CP1, CP2, CE – Cours préparatoire 1, 2, Cours Elementaire.
- DEF – Département des Eaux et Forêts ; the Ministry of Water and Forests
- Fafafi – Malagasy ONG for improving rural agriculture techniques
- FRAM – Fikambanana Ray Amandreny ny Mpianatra (association of parents of students, association des parents des élèves)
- ICDP – Integrated Conservation and Development Project; PCDI – Projet de Conservation et de Développement Intégré
- KASTI – Komity Ala Sy Tontolo Iainana (Forest and Environment Committee, Comité de la Forêt et de l'Environnement)
- NEAP – National Environmental Action Plan ; PAE – Plan d'Aménagement de l'Environnement
- ONG – Organisation non-gouvernemental ; NGO – Non-governmental organisation
- P.A. – Protected Area ; A.P. – Aire Protégée
- WWF - World Wide Fund for Nature
- USAID - U.S. Agency for International Development
- SEECALINE – Surveillance et Education des Ecoles et des Communautés en matière d'Alimentation et de Nutrition Elargie
- S.N.R. - Strict Nature Reserve; R.N.I. – Réserve Naturelle Intégrée
- SIT – School for International Training
- ISP – Independent Study Project