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THE MIKEA HUNTER-GATHERERS OF SOUTHWEST MADAGASCAR: ECOLOGY AND SOCIOECONOMICS⁽¹⁾

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ABSTRACT This paper provides an overview of the habitat, natural resources, history, and socioeconomy of a small group of foragers called the Mikea who live in a semiarid forest environment of southwestern Madagascar. The flora and fauna of this forest are made up largely of rare, endemic species to Madagascar and the fragile environment is at risk of destruction by the process of desertification, particularly slash-and-burn agriculture and overgrazing by livestock. It is hypothesized that the Mikea persist as hunter-gatherers as an ecological and socioeconomic adaptation employing resource partitioning and mutualistic specialization with neighboring agropastoralists. Suggestions are proposed how to mitigate the detrimental affects of slash-and-burn cultivation.

Key Words: Mikea; Madagascar; Hunting-gathering; Natural resources; Socioeconomy.

INTRODUCTION

The Mikea are a little known group of between 1000 and 2000 people who live in the semiarid Mikea Forest of southwestern Madagascar (Fig. 1). The Mikea area includes the Conservation Priority Level 2 Lake Ihotry/Morombe Ecological Complex and the Level 3 Mangoky riverine protected area, as defined by the Malagasy government. Knowledge about the populace inhabiting this ecologically important but fragile area, particularly in respect to utilization of the natural resources, is critical to formulating a proficient conservation management plan.

Until recently, many researchers believed that the Mikea were a fantasy (Lombard, 1973), and today the Malagasy general public still does. This paper will review contextual evidence for their origins, history, economy, culture and why they persist as hunter-gatherers, building on previous descriptions of the Mikea way of life (Dina & Hoerner, 1976; Stiles, 1991, 1995).

ENVIRONMENT AND NATURAL RESOURCES

The Mikea live on the eastern edge and in open pockets of a dry forest between Morombe and the Mangoky River in the north and the town of Manambo in the south, an area of about 2000 km². The Route National 9 runs north-south to the east of Mikea country through a relatively well-watered (800 mm mean annual rainfall) and fertile valley occupied mainly by the agro-pastoral Masikoro people. This road, though of poor condition, is the main communication with the outside world. The

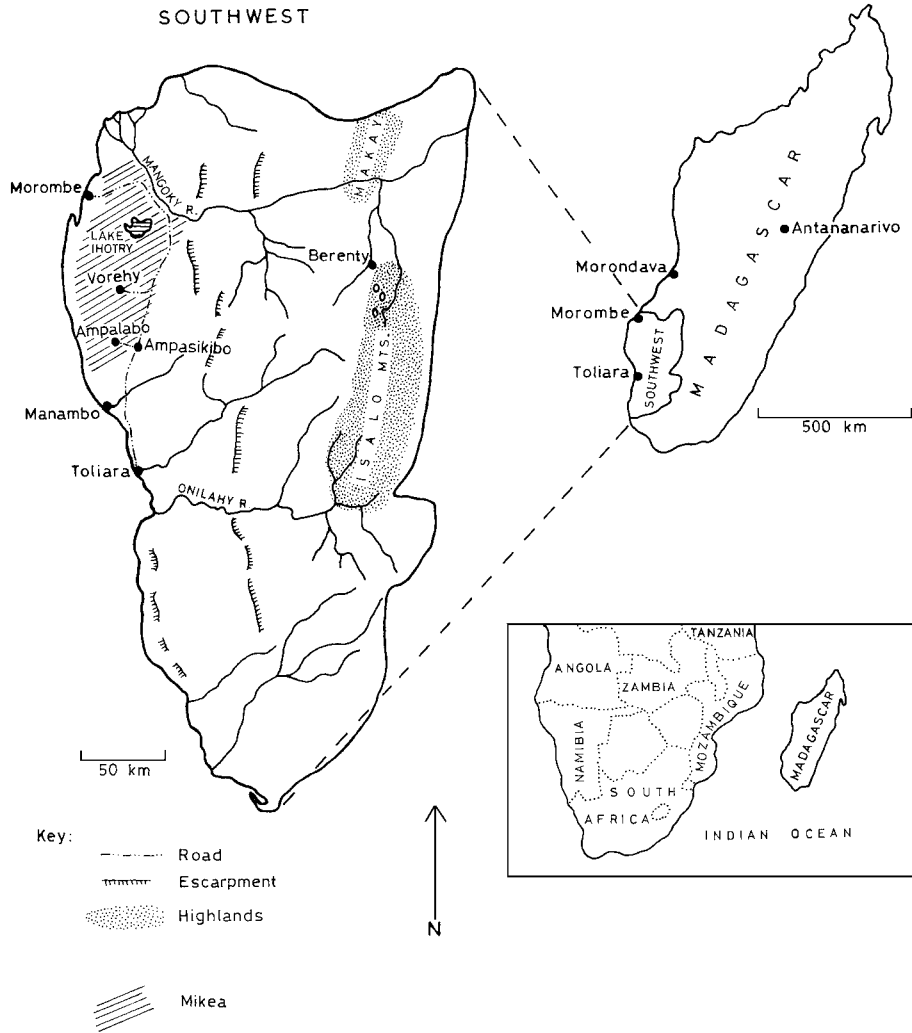


Fig. 1. The semiarid Mikea Forest of southwestern Madagascar.

main Mikea occupation area receives less than 600 mm of rainfall a year, declining to 400 mm near the coast, where the fishing Vezo people live. The rainy season is from mid-December through March, followed by a transitional period up to July when the cool, dry season begins, running through September. October to the beginning of the rains is a hot, humid season (Table 1).

The soil is mainly sand, covered by a surprisingly dense and rich tropophilic woodland in the east grading into a xerophytic spiny forest nearer the coast. Localized small basins contain richer soils and wetland reeds and grasses. The Mangoky river on the northern boundary of Mikea country is the only permanent fresh water source, though several seasonal streams and ponds are located in the Namonty area. Lake Ihotry is a perennial saline lake. Over 60% of the plant families

Table 1. The Mikea annual cycle.

Month	Season	Climate	Subsistence	Settlement
October November	Faosa	Hot, humid	Collecting tubers, pig hunting, burning fields	Kizo
December January February March	Litsake	Rain	Planting, hunting tenrec, honey, dried tubers, maize harvest	Tana (<i>Vohitse</i>)
April May June	Limberano / Fararano	Transition	Maize, tubers, tenrec	Tana (<i>Tongalibaty</i>)
July August September	Asotry	Cool, dry	Clear fields, hunt lemur, birds, dry and stockpile tubers	Kizo

in the area are endemic to Madagascar, as are 90% of the species (Hoerner, 1986). The climate is one that has many similarities with that found in the Sahel of Africa, but the vegetation is much richer, due no doubt to less population pressure from humans. Appendix 1 provides a list of what I have been able to gather concerning the indigenous and botanical plant names and their uses by the Mikea, Masikoro and/or Vezo.

Animals consist of a number of species of lemur, small hedgehog-like creatures generically termed tenrec, viverrid carnivores (similar to civets), the African bush pig, bats, snakes and other reptiles, and turtles. Most of these animals are found nowhere else but Madagascar. There are a great number of birds, many species endemic, along with the African Guinea fowl. Appendix 2 presents a list of fauna and its uses. As recognition of this important area of biodiversity the northern part of the forest, including the saline Lake Ihotry, has been designated a protected ecological complex by the government. The area is under threat from the spread of a type of degraded secondary bush, called *hatsake-moka*,⁽²⁾ which is due to slash-and-burn agriculture.

The sandy soil and lack of perennial streams results in most of Mikea country being totally devoid of water during the latter half of the dry season, from about July to late November. During and immediately after the rains, December-April, Mikea find water in pools (*vovo*) and in tree hollows. The poor soils and lack of water offer the Mikea some protection from invasion by neighbors, though cattle grazing by Masikoro and Antandroy is increasing in the area, putting more pressure on the fragile ecosystem.

ORIGINS AND HISTORY

The Mikea are considered by the other people of the area, and by most historians, as *tompontany*, original inhabitants of the land preceding all the others. This does not win them respect, however, as their agricultural neighbors look down on them because they live in the forest and live off of the land. This is not considered civi-

lized behavior, and the attitude is common to forager-farmer relations in many parts of the world. But where did the Mikea come from and how long have they been there?

I. Archaeology

The earliest evidence of human occupation of Madagascar comes from Mikea country. Humanly worked hippopotamus bones from Ambolisatra and Lamboharana, on or near the coast, have been dated to approximately 2000 years ago (MacPhee & Burney, 1991). The hippo bone was worked by iron tools, indicating an Iron Age initial occupation, and explains the dearth of stone tools in Madagascar. The earliest dated occupation sites are located in the north of the country at Lakaton'i Anja (4th and 8th centuries AD) and at Nosy Mangabe (8th century AD). The pottery at these sites is undiagnostic of cultural origins (Dewar & Wright, 1993). The site of Sarodrano 3 in the southwest on the coast was dated by C-14 on charcoal to the 5th century AD, but destruction of the site by a cyclone before it could be properly excavated renders the date inconclusive of human occupation (Battistini & Vérin, 1971). Sarodrano 1, dated to the 15th century, suggests that the Vezo were practicing their current marine exploitation way of life by this time. From the 10th century on, Madagascar along with the Comoros Islands nearby, became integrated into the Indian Ocean trading network involving Swahili, Arabs, Persians, and Indians (Vérin, 1986).

Evidence of the earliest human arrival by 2000 B.P. is bolstered by a dramatic decrease in tree pollens and increase in tiny pieces of charcoal in old soil sediments, indicating fires and deforestation, at exactly the same time, that suggests clearing for agriculture (Burney, 1993). A few centuries later several species of large animals on the island became extinct, such as the dwarf hippo (*Hippopotamus lemerlei*), the elephant bird (*Aepyornis*), giant turtle (*Testudo grandidieri*), and several species of giant lemurs (Battistini & Vérin, 1967; Dewar, 1984). It is thought that a combination of human hunting, habitat destruction, and climate drying led to their demise (Dewar, 1984; Burney, 1993). It is possible that the ancestors of the Mikea were involved in all of this.

II. Ethnographic and Linguistic Evidence

Today everyone on Madagascar, including the Mikea, speak a Malayo-Polynesian language most closely related to a language cluster spoken in southern Borneo called Southeastern Barito (Dahl, 1951), though there is extensive influence on the vocabulary and phonetics of Malagasy from Bantu (Dahl, 1953), indicating an early and long-lasting contact between the Asian and African populations. All glottochronological studies conclude that Malagasy split from its related Southeast Asian languages between the 4th and 7th centuries AD (Dahl, 1951, 1991; Vérin, *et al.*, 1969; Adelaar, 1991), and the Indonesian migration to Madagascar probably did not begin until the 7th or 8th century (Adelaar, 1991; Dahl, 1991). Al-Idrisi confirmed that by the 12th century Indonesians were well established in Madagascar and on the Mozambique coast (Chittick & Rotberg, 1975). Because of the relatively

late arrival of Indonesians I think it reasonable to hypothesize that the people who landed in southwestern Madagascar 2000 years ago were Bantu Africans.

The tribes of all areas of Madagascar have oral traditions concerning an ancient people called Vazimba. These Vazimba were in the rich central highlands and were pushed out by immigrating Indonesians centuries ago. They moved west and today there are several pockets of people still called Vazimba living south of Majunga and north of Morandava. They are mainly fresh water fishermen, though some today also cultivate and raise livestock. They used to speak a non-Malagasy language (Drury, 1729, 1969; Birkeli, 1936), which I and others think was of Bantu origin (Kent, 1970; Vérin, 1986). Birkeli (1936) collected non-Malagasy vocabulary and clan names from Vazimba and the related Beosy hunter-gatherers who live north of the Mikea. I found some of these words and clans present with the Mikea, and they are not found in Masikoro, the Malagasy dialect most Mikea speak. From this I conclude, as Birkeli did, that there is a distant historical connection between the Mikea and other Vazimba. These words have not yet been definitely identified as Bantu, though Birkeli tried to demonstrate that some were.

Some have proposed that the Mikea are people who fled to the bush to escape domination and exploitation by the late 17th and 18th century Sakalava dynasties and the 20th century French colonialists (Dina & Hoerner, 1976), and that there were no people living in the Mikea forest prior to the 17th century. We have already seen that people were there 2000 years ago, but were they there in between?

In 1528, prior to any of the dynastic wars in western Madagascar, a Portuguese named Nuño da Cunha landed at the mouth of the Mangoky river in present-day Mikea country. He found that the interior immediately behind the coast was inhabited by “blacks with fuzzy hair like those of Mozambique.” He noted that they lived in small communities and had no chiefs, the latter being very un-Malagasy. He traded with them for two days (Kent, 1970: 183). Robert Drury, a shipwrecked Englishman taken as a slave from 1701 to 1718, encountered Vazimba and hunter-gatherers in southern and western Madagascar (in fact, he lived himself as one for a while). They seemed well established at the time, and there was no indication that they were recent. He noted that they were people who just wanted to be left alone and did not want to become part of the incessant wars that plagued the region. He lived with a group of Vazimba near Morandava for six months. He spoke fluent Malagasy, but the Vazimba language was completely different. They did not keep cattle or have riches that others would want to plunder, and if slave raiders came they simply disappeared into the forest.

Furthermore, Kent (1970: 135) states that the Masikoro did not originate until the mid 17th century when a group from the Bara migrated north from around the Isalo escarpment. They mixed with the Mikea and other Vazimba to become the Masikoro, which means “inland people.” If the people seen by da Cunha were Mikea, the Masikoro obviously could not be their ancestors.

Several cultural features distinguish Mikea from the Masikoro, whom many say the Mikea originate from. The most important difference is in religion. Almost all Malagasy have some sort of wooden post called a *hazomanga*, which represents the ancestors and is kept by a senior clansmen for each clan. The Mikea and other Vazimba do not have them, but rather the Mikea have sacred trees called *hazofaly* in

which ancestral spirits (*koko*) live. The true Mikea also do not have *tromba* and *bilo*, involving spirit possession and curing, nor do they have circumcision ceremonies (*savatse*) like the surrounding peoples. They are the only people on the island to have the leg xylophone (*kilangaa*), made up of seven pieces of wood played on the legs of a girl. There are several Mikea clans which do not seem to be found in the Masikoro (e.g. Marofoty and Ndrabala), and one that is found elsewhere only in the Vazimba of the north (Mangedrano). There are other differences as well. Because of proximity and interrelations the Mikea speak like the Masikoro and have taken on some of their clan names. This is very common with hunter-gatherers who interact with neighbors (Stiles, 1981).

Aside from Bantu loan words found in other Malagasy dialects, I have not uncovered any definite Bantu words unique to the Mikea, though I have found several words not found in neighboring dialects, except in Beosy. Examples are *dzahamoke* (man), *boenga* (big rat-like creature), *bokahoko* (dog) and *angavo* (bat). Since 'man' and 'dog' are pretty basic vocabulary this finding is significant. A trained linguist would no doubt find out much more.

Because of the normal way in which people move around and mix with one another I think it unlikely that the Mikea are direct descendants of the people who worked the dwarf hippo bones 2000 years ago. I do think, however, that some ancestors of the Mikea have been living in that area since well before the 17th century, and that the Masikoro have little to do with Mikea origins as an ethnic identity. It is more likely that the Vezo fishing people share in Mikea history.

SUBSISTENCE AND SETTLEMENT PATTERNS

The Mikea are usually described by outsiders as primitive nomads, wandering the bush in search of tubers and tenrec. I have found, however, that they have a quite well-developed system of living in the forest, with a structured annual cycle. Locals distinguish three different kinds of Mikea, and in general, they display different ways of living and types of settlements. There are the Mikea-Masikoro, the Mikea-Vezo and the 'true' Mikea. Because of trade and intermarriage, there is a certain amount of mixing, however, but I will present an idealized version.

There are five types of house in which a Mikea could be found; the *trano*, or semi-permanent, rectangular wattle-and-daub thatched structure common to the Masikoro (though it can sometimes be made of wooden planks) found in agricultural villages; the *tsano* (Vezo dialect pronunciation of *trano*), a flimsy hut made from reeds, palm leaves and/or mats always located on the beach or coastal dunes; the *tongalibaty*, a 1.5 meter high, small rectangular hut made of bark, usually of the baobab tree; the *vohitse*, a small rectangular hut made entirely of *ahidambo* grass (*Heteropogon contortus*); and finally, the *tsangatsanga*, a lean-to open at either end usually made of bark, though it could be of grass. At a certain time of year the forest Mikea sleep outdoors, simply digging into the sand or making a hollow in a termite mound. These house types are related to settlement type and subsistence pursuit.

I. Seasonal Cycle (see Table 1)

The Mikea year begins in about October, when thunder sounds the approach of the rainy season. This month and the next is called *faosa*, and it is hot and relatively humid, with occasional scattered rain showers near the end. The forest Mikea are living in the deep forest now, sleeping outdoors, doing what they call *kizo*. They are living entirely from hunting and gathering, and the main purpose is to collect as many edible tubers as possible, which they stockpile. The main tubers are wild yams of the *Dioscorea* genus which they call *ovy*, *sosa*, *babo*, etc., the *ba*, *moky* and *lalanda*, all three *Ipomoea* sp., *saonjo* (*Colocasia* sp.), *tavolo* (*Tacca pinnatifida*) and others. They dry the tubers they don't eat and in November make several trips to transport them to the band semi-permanent village (*tana*). Tubers are carried in bark cordage net bags called *koko*. Wild pig and lemurs are the main animals hunted during this period, as the tenrec species are hibernating in holes in the ground and in tree hollows. The pig hunts, with spears and usually dogs, are called *mangoro lambo*. Sometimes pits are dug with wooden stakes in the bottom (*pongy*) to spear them. Lemurs and birds are usually killed with a blowpipe (*porotsy/fintsiriky*), sometimes a sling, and birds sometimes trapped in a *fitseboke*. The Mikea no longer use bows and arrows for hunting, though children play with them shooting insects and birds.

The rainy season, December to late March or early April, is called *litsake*. The *tana* are located in a clearing in the forest, and the fields to be cultivated are usually in the vicinity. The forest was cleared before going into *kizo* and now the dry matter is burned off. In December with the first rains maize and sometimes other crops such as cassava are planted. The slash-and-burn system is called *hatsake*. The fields are small and not really looked after; there will be from one to two weeding during the whole growing period. The people hunt mainly tenrec during this period as they come out of their holes and eat the dried tubers from *kizo*, as ones in the ground are growing and are not good to eat until near the end of the rains in late March. When Mikea dig out tubers, they usually leave a piece in the ground (*amparahaly*) to regenerate. Tenrec, slow-moving creatures, are usually killed with a throwing stick or club. *Litsake* is also a main honey collecting period. In April, the maize is harvested. The best ears are kept to eat and as seed, and the rest is sold. The *tana* marks the central area of a band's territory, and the village itself shifts around within it in response to availability of tubers. During the rainy season most Mikea live in *vohitse*, the grass houses.

Now comes a transitional period from late April to June, called *limberano* by the Mikea-Masikoro and *fararano* by the Mikea-Vezo. People eat the maize harvest in these months, and continue to forage. Many bands move away from the fields closer to the forest and tuber sources (tubers have climbing vines which like trees), and build or reuse the bark houses (*tongalibaty*). In June water starts to be a problem as the water holes and tree hollows begin to dry up. From July to November the sole source of water for many Mikea is the *babo*, a tuber. Other tubers are even cooked in its water. I've taken its liquid on several occasions, and it is quite refreshing, and surprisingly copious in the tuber, large ones giving a liter or more. The period December through June in the camps is called *antaniney*, from *tana*.

The size of these camps can vary widely. The true forest Mikea, who have little to do with the villages, live in settlements of from two to six houses and 10-25 people, including children. Andranohazo-Betampy, one of the bands I studied, is such a type. These are very simple settlements with bark huts and lean-tos, with virtually no furniture. Another I worked with, which was Mikea-Masikoro, called Benofy, was larger. It had eight huts and perhaps 40 people. They had left the forest a few years previously to move to Vorehy, a village with a European missionary, health clinic, permanent well and market. But they survived poorly trying to cultivate, so they had returned to the forest and hunting-gathering, which provides a more reliable and varied food supply, and in addition, forest trade products. But they had brought metal water drums, an ox cart, two oxen and four goats with them. They had also set up an iron-working forge, and made their own digging spades, knives, etc. from scrap metal. Other Mikea-Masikoro camps, such as Bedo, were even larger.

Late June through September is called *asotry*, the cool, dry season. In June and early July many bands spend time cutting the forest in preparation for the rains. Others wait until October-November. The determining factor is the time they plan to spend in *kizo*. Most bands leave *tana* and go into *kizo* in late June or July to go for *manetseky* ('the hunt'). The tenrec go into hibernation now, but life is similar to that of *faosa*. The tenrec holes are cleverly dug, with many twists and changes of direction so that they cannot be found, though every once in a while a Mikea can spot the breathing hole and will dig the poor creature out.

Each band has a distinct, named *kizo* territory that is unoccupied the rest of the year. It has to contain a good quantity of *babo*, as this is the only source of water, except in the Namonty area where there are more permanent ponds from phreatic waters. Fishing is even done in this area was told that the Mikea had never known famine, even when people in the agricultural villages were suffering from drought. The forest provided all the food, and more, that they ever needed.

The Mikea-Vezo on the coast and Mikea-Masikoro living in larger mixed villages such as Vorehy and Ampalabo do not normally go on *kizo* for long periods. They might only go into the forest for a few days at a time, for a specific purpose to find a tree for making a boat, to collect honey, medicinal herbs, or a few tubers to fill a shortage. The Mikea-Vezo do not make forest camps, and spend the majority of their time fishing and collecting sea produce. They, along with the Vezo proper, carry out a type of hunting-gathering on the reefs at low tide, called *mihake*. The *asotry* season is particularly important for this, and the people move camps often along the beach. Some move to offshore islands, living under their sails as tents, and specialize in collecting and drying trepang (sea slugs) for export to the Far East.

There is, therefore, a great range in subsistence pursuits and settlement patterns with the Mikea. I was told that south of the Namonty area there were even one or two groups that were in *kizo* all year, i.e. complete subsistence hunter-gatherers, very rare in the world today. At the other end of the spectrum we have Mikea who are full time agriculturalists living in *trano* and villages like the Masikoro. Individuals and groups, such as Benofy, also change their emphasis on how they will make a living in response to what seems the better deal. In short, most Mikea are opportunists, a common theme amongst foraging peoples anywhere.

Unfortunately, *hatsake* is destroying the Mikea forest, and although much of it still remains, a natural resource management plan is urgently needed to both conserve the rich biodiversity and look after the long term interests of the Mikea and other Malagasy who benefit from it.

II. Trade

Trade is very important for the Mikea. The most important thing men want is tobacco snuff (*paraky*). They can't live without it and will go into *sidze*, a nicotine fit, if they can't get it, during which they will do anything to obtain it. Other wanted items are metal tools, cloth or clothes, rice, salt, and rum (needed for religious ceremonies). In return, they trade honey, wild tubers, and meat (tenrec and lemurs mainly). In the past silk cocoons (*koohok* and *landi*) and wild rubber (*pira*) were important. The forest Mikea trade mainly with Mikea-Masikoro or Mikea-Vezo, as they dislike outsiders, and the Mikea-Masikoro will trade with Masikoro and other tribes living in the villages on the R.N. 9. This small trade, often barter, is called *kinanga*. The people of Benofy use their oxcart to haul tubers to Vorehy. I was told one man could fill a cart with tubers in only six hours of digging. Honey is the most important trade item, however, and the Mikea construct simple hives (*tohoke*) from hollowed out logs which they leave on the ground. They are individually owned. Much of the small maize harvest is also sold.

Mikea-Masikoro will exchange wild tubers with Mikea-Vezo or Vezo on the coast for dried fish, and in turn trade the fish with Masikoro for cassava. In effect, they are trading wild tubers for cultivated tubers, with a great deal of time and energy involved. It would be difficult to explain this particular trade in terms of nutrition, and I believe it is carried out by young men as an excuse to travel east and west across Mikea country in search of brides. In addition, foragers are known to carry out trade with dominant neighboring peoples in order to foster good social relations.

The Mikea-Vezo have a wide range of sea products they trade with Indian merchants (*Karani*) or their agents (*duka*, from Swahili). These include various fish, sea food (lobster, crab, prawns), sea slugs (to Hong Kong), mother-of-pearl, and an incense (*fimpy*) taken from the opercula of the mollusk *Murex trunculus* that the *Karani* particularly value. Salted fish and octopus are traded with the Masikoro for cassava or maize. The Mikea-Vezo differ from the Vezo in that the latter do not exploit forest products. It is the Mikea who procure all of the different kinds of woods, cordage and caulking materials from the forest for the construction of the Vezo outrigger boats, and some Mikea are expert boat builders (Koechlin, 1975).

As said, the young, unmarried men do much of the transporting of the trade items, and they move around frequently from camp to camp and to the villages. They call this moving around *tsangatsanga*, which gives the name to the lean-to, as this is what they usually sleep in.

SOCIOCULTURAL FEATURES

The Mikea are patrilineal and when women marry they move to their husband's

band. Although my research is very limited here, bands seem to be made up largely of kin-related families and individuals. The ideal is to marry outside of the clan, but I have recorded people of the same clan married, which could have two possible causes. The first is that there is a shortage of eligible potential spouses of the appropriate clans, and the second is that some clan affiliations are fictive. It is common for hunter-gatherers to adopt the clan names of more powerful neighbors in order to build good relations with them. Several clan names are shared by Mikea and Masikoro. One of the spouses of a married couple sharing the same clan name might not actually be genetically of the lineage.

Mikea can marry first cousins on the male side, but not the female (i.e. two sister's offspring). They often intermarry with Vezo, but apparently never with Masikoro (but this needs more checking, there is a very fuzzy line between Masikoro and Mikea-Masikoro).

I have recorded seventeen Mikea clan names, at least five of them also found with the Masikoro. A Mikea-Masikoro of the Sambeymangetse clan told me that they shared a common ancestor with the Masikoro Sambeymangetse, and that they were of the same lineage. If true, this could be evidence that some Mikea and Masikoro share common origins, though other explanations are possible. This particular informant, 65 years of age, knew of no Mikea married to a Masikoro, however.

The supreme god is called Ndranangahary, to whom tobacco or tubers are offered, or even an ox might be sacrificed (*soro*). A male patron of the hunt, Ndrianabolisy, is evoked as an ancient hero at the time of successful wild pig hunts. The more important quotidian sacred symbol is the *hazofaly*, the sacred tree. (*Hazo* means 'tree' and *faly* means 'taboo'; *fady* in most of Madagascar). These are usually *fony*, a species of baobab (*Adansonia fony*), or a tamarind tree (*kily*). The Mikea believe ancestral spirits (*koko* or *komba*) live in them. For all Malagasy, ancestors are the base of traditional religion. As said previously, most Malagasy have a wooden post (*hazomanga*) for the purpose of worship.

Another interesting cultural feature is the taboo of eating certain domestic animals. One clan will not eat chickens, though they keep them, and others will not eat sheep. A sheep/goat *faly* is common amongst many clans of the neighboring Sakalava, Bara, and Vazimba people (Kent, 1970: 151). Even the Beosy have a goat *faly* (Birkeli, 1936), suggesting the practice is quite ancient.

The Mikea, like other Malagasy, have 'witch doctors' called *ombiasy*. The Mikea *ombiasy*, however, are believed by outsiders to have particularly effective powers of healing with herbal medicines and of making charms (*oly*) for various purposes. *Ombiasy* also use flat boards inscribed with patterns of holes which they use for divining (*sikily*).

DISCUSSION

So why are there Mikea? I think they are there primarily due to what is called resource partitioning. The Mikea could live further to the east on land with better soils and higher rainfall, it is available (Dina & Hoerner, 1976). But they choose to live in an area that is harsher, because it is in a forest that provides abundant food,

construction materials, trade products, and security. Farmers want the trade products, but are too far from the forests to regularly go get them for themselves. It is a type of symbiosis, each giving the other what they lack. The economic argument is strengthened by a cultural one. The Mikea are stigmatised by outsiders, and at times treated harshly. This was more true in the past than today, however. The Mikea prefer to live away from outsiders where they do not experience stigmatism as much. The Mikea-Masikoro have taken on many Masikoro cultural traits to blunt some of the causes of stigmatism. The Mikea-Vezo situation is different, as the Mikea are terrestrial foragers and the Vezo are marine foragers, variants on the same theme. Thus they intermarry and treat each others as equals.

I think that the Mikea situation has relatively deep historical roots. In fact, the mechanisms which reinforce resource partitioning might have been stronger in the past than today, when overseas traders from Indonesia, East Africa, and later the Europeans made frequent calls to Madagascar's shores in search of food, water and trade goods, and inter-tribal warfare was very common. When one considers how easy it is to make a living by foraging, it is surprising more people don't take it up.

The *hatsake* system of agriculture is threatening the forest. The principle crops of maize and cassava are needed to supplement food resources, particularly during the *limberano* transitional season, and the maize is an avenue to other goods through trade. It would not be feasible to forbid agriculture completely to conserve the forest, unless an alternative could be provided to maintain the Mikea standard of living. Two solutions seem possible:

1. Develop trade in wild forest products and crafts and services based on them to provide adequate income with which to buy supplemental food and necessary goods. Feasibility studies could be carried out to investigate whether there are markets for wild rubber, silk cocoons, aromatics, medicines and cosmetics (*volo hazo*), or other sustainable offtake products in addition to the ones already exploited. In essence, the Mikea would be encouraged to expend the time currently employed in clearing the forest to collecting economic products.
2. Identify inexpensive fertilizers that the Mikea could employ that would allow them to reuse cleared fields over extended periods, thus reducing or eliminating the need to clear and burn additional forest. Government and/or NGOs could assist the Mikea in this, and in developing an organized system of field rotation consistent with their land tenure customs.

Much more research needs to be conducted with the Mikea to clarify other research questions in both the anthropological and environmental domains.

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NOTES

(1) This paper derives from a paper given at the 8th International Conference on Hunting and Gathering Societies held at the National Museum of Ethnology, Osaka, Japan, 26-30 October, 1998.

(2) I have used Malagasy spelling, which yields the following phonetics:

Malagasy	English
o	ou
ao	o
e	é
j	dz
s	s/sh
y	a/i (or silent)

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APPENDIX 1 MIKEA PLANT LIST

Mikea Name	Botanical Name	Uses
(h)afi(h)afy	<i>Avicennia marina</i>	Mangrove; timber for houses, make mortars (<i>leo</i>), firewood; sap (<i>loko</i>) used as antiseptic and for toothaches
ahidambo	<i>Heteropogon contortus</i>	Grass; house walls and roofs
akao	<i>Casuarina equisetifolia</i>	Boat masts
amaminomby	<i>Terminalia boivini</i>	Cart yokes and tool handles
amiana	<i>Urera radula</i>	Water in root; bark rope
anatsiko	<i>Securinega seyrigii</i>	Poles
andrarezana	<i>Celtis madagascariensis</i>	Bark, treat gum disease
angily	<i>Dioscorea</i> sp.	Edible tuber
antake	<i>Psophocarpus longipendunculabus</i> (?)	Smelly vine with edible seeds that are boiled and can be sold
antaly	<i>Dioscorea antaly</i>	Edible tuber
antso	<i>Euphorbia antso</i>	Sap used as poison; in past, used to start fire by friction
arofy	<i>Commiphora guillamini/mafaidoha</i>	Bark used to treat wounds
ba	<i>Ipomoea</i> sp.	Large tuber with much water
babaka	<i>Curcubitacaeae</i> (?)	Squash, make containers; (Hoerner 1986: 21 mentions a grass by the same name, <i>Sorghum alepensa</i>)
babo	<i>Dioscorea bemandy</i>	Water source in dry season
bakakely	<i>Tribulus terrestris</i>	Herb with spicy seeds
banakipaky	<i>Bauhinia grandidieri</i>	?
bararata	<i>Phragmites communis</i>	Reed
bevory	?	Vine, soap made from roots
bokaby	?	Vine, latex from fruit sold

borovy/dray	<i>Strychnos spinosa</i>	Edible fruit
boy	<i>Physena sessiflora</i>	Planks in construction; wooden cylinders used in iron piston bellows
famata	<i>Euphorbia stenoclada</i>	Masikoro use sap (<i>loko</i>) to stun fish
famehifary	<i>Clitoria lasciva(?)</i>	Vine, sap a purgative
famoahalambo	<i>Dichrostachys</i> sp.	?
fanamba	<i>Cadia elisiana(?)</i>	Bark, grind into fish poison
fantsiholotse/ fantsiholitra	<i>Allaudia procera</i>	Similar to <i>sono</i> , no uses (not local)
fandsihotse	Mimosoideae	Bark cordage for nets
fany	<i>Entada chrysostachys</i>	Seeds used in divination (<i>sikily</i>)
farafake/ farafatse	<i>Givotia madagascariensis</i>	Boat construction; bark used by women to make skin cream masks (<i>tabaky</i>)
fengoky	<i>Delonix bioviniana</i>	Wood too spongy to work
fiamy	<i>Ficus</i> sp.	Attracts sifakas
fony	<i>Adansonia fony</i>	Bark, make cordage (<i>haftse</i> or <i>hafuke</i>) and roofing; fruits eaten and made into juice; seed pods used as scoops; wood boiled and drunk to treat fevers and colds; sacred tree (<i>faly</i>) in which spirits (<i>koko</i>) live
giradivahiny	<i>Flemingia congesta</i>	?
hafihany	<i>Avicennia</i> sp.	?
halimboro	<i>Albizia bernieri</i>	?
hamafana	<i>Cissampelos pareira</i>	Vine
handy	<i>Neobeguea mahafaliensis</i>	Timber, construction; boil bark in water to strengthen post-natal mothers, wash infants, and treat back aches
harahara	<i>Phyloxylon ensifolius</i>	Construction
hatafa	<i>Terminalia catappa</i>	Tool handles

hazo mafinto	Stadmania oppositifolia	Boat construction
hazo mafio	?	Treat gonorrhoea
hazo malany	Hernandia voyroni	Planks for carts, floors, doors and coffins; leaves and bark used to treat jaundice and infected sores
hazo manitse	?	Edible seeds
hazo mbalala	Croton mahafaliensis	No uses
hazomby	Strychnos madagascariensis	House construction; roots an anti-inflammatory
hazo tsakorova	Grewia sp.	Boil leaves and drink for malaria
hola	Dracoena reflexa	No uses
intisy	Euphorbia fihherensis	Sap used as caulking
kapaiko	Nelumbo nucifera (?)	Lotus, boil tuber as food
katra/kata	Cesalpinia dunducella	Seeds used in board game
katrafay/katrasafa	Cedrelopsis greivei	House construction, digging sticks; bark and leaves used to treat many problems-rheumatism, back ache, diabetes or to reinvigorate; bark used in <i>toaka gasy</i>
katramantse	?	Bark, house walls and roofing
kidresy	Cynodon dactylon	Weed that harms cultivation
kily	Tamarindus indica	Some are sacred (<i>hazo faly</i>); sell fruit pods
kinanya	Ricinus communis	<i>Ombiasy</i> keeps oil in cow horn and uses in charms
kirondro	Perriera madagascariensis	Fruits highly toxic
kiseny	Cucumis melo	Gourd
komokomoky	Grewia grevei	Poles, tool handles; edible fruit
lalanda	Ipomoea pescaprae	Edible tuber

lamoty	Flacourtia indica/ramoutchi	Boat caulking; edible fruit, <i>toaka gasy</i> ; bark is an antirheumatic
laro	Euphorbia laro/ Leucodendron sp.	Sap as fish poison
latabarika	Grewia cyclea	Tool handles
laza	Cyphostemma laza	Vine
lombiri	Cryptostegia madagascariensis	Extract rubber (<i>pira</i>); “cotton” from fruit used for blowgun dart fleches
lopingo	Diospyros platycalix	Black (ebony), make sagai shafts
maintifototse	Diospyros sp.	Leaves pounded and boiled as diarrhea medicine for children, root is an anti-inflammatory, and bark is used as tooth-paste
mainte-mpo	Indigofera depauperata	Boat construction
makamby	Nymphaea stellata(?)	Waterlily root, edible
mampandry	Cedrelopsis gracilis	Poles in construction; bark infusion to treat fever
manary baomby	Dalbergia greveana	Construction, firewood; pieces of branches cut to use for medicinal purposes (<i>volo hazo</i>), rubbed on stones with water to produce a paste which is applied to the face (<i>tabaky</i>) for numerous purposes; sacred tree for Mikea-Vezo
manary fotse	Dalbergia purpurescens	Construction
manary tsiatondro	Dalbergia trichocarpa	Construction, house poles
mandrofo	Trachylobium verrucosum	Gum copal (not in area)
mangarahara/ mangerahane	Stereospermum rufus/ euphoroides	Boil bark to treat diarrhea; wood for coffins
mangiliakeliky	Brachylaena microphylla	No uses
manjakabenitany	Baudouinia fluggeiformis	Sacred tree

mantaora	Cedrolepis microfoliolata	Firewood and poles
maro sarana	Moringa drouhardii	No uses
mita	Cyperus articulatus(?)	Reed, baskets and mats
moky	Ipomoea sp.	Edible small tuber
monongo	Zanthoxylum tshanimposa	Cart construction; bark infusion to treat fever
nato	Sideroxylon sp./ Capurodendron perrieri	Timber for coffins; fruits not eaten; bark used for red-brown dye used on cloths (<i>lamba</i>)
nonoke	Ficus megapoda/melleri	Bark cloth (in past); holds water in cavities; boiled leaves treat many illnesses
ovotra	Typha augustifolia	Reed
ovy	Dioscorea ovinala	Edible tuber
rafia	Sagus rofia	Raffia palm, basketry, mats, etc.
raketa	Opuntia dillenii/inermis	Cactus, eat prickly pear; cattle forage
ravinengitra/ fingitry	Landolphis madagascariensis(?)	Vine, extract rubber
renala	Adansonia grandidieri	Bark, cordage; edible fruit
robotsy	Acacia morandaviensis	Firewood
roitra/roy	Acacia asperata	Firewood
rombe	Commiphora sp.	Fragrant leaves and flowers, boil and inhale vapors for colds
sakoa	Poupartia sylvatica/ caffra	Wood, make mortars; edible fruit; fire resistant
sambalahy	Albizia perrieri	Bark used to treat asthma and leaf infusion for stomach ache and fever
saonjo	Colocasia sp.	Taro, edible tuber
sarongaza	Colvillea racemosa	Beautiful red-orange flowers

sasavy	<i>Salvadora augustifolia</i>	Fruit; treat toothache with ground root
satsa/satrana	<i>Hyphaene shatan/</i> <i>Medemia nobilis</i>	Basketry; fruit (<i>lakoko</i>), <i>toaka gasy</i> house thatch
sogno	<i>Didiera</i> <i>madagascariensis</i>	No uses
somotsoy	<i>Fernandoa</i> <i>madagascariensis</i>	Colonizes deforested areas; leaves in infusion to treat fever, ground up to treat diarrhea
songery	?	Mangrove
sono	<i>Allaudia ascendens</i>	Remove spines and use for house poles
sosa	<i>Dioscorea sosa</i>	Edible tuber
talafotsy	<i>Rhopalocarpus lucidus</i>	Tool handles; bark cordage
talamena	<i>Apaloxylon tuberosum</i>	Bark cloth in old days
taly	<i>Terminalia tricristata</i>	No uses
tanga lahi	<i>Rhizophora mucronata</i>	Mangrove, tannin for trade
tanga vave	<i>Ceriops tagal</i>	Mangrove, boat masts
tapia	<i>Uapaca bojeri</i>	Fire resistant tree; leaves feed silk worms
tavolo	<i>Tacca pinnatifida</i>	Arrow root- grind up and put in cloth, pour water over it, use starch precipitate in water as food
tongarivomena	<i>Sesbania rostrata</i>	No uses
tsanaoday	<i>Robetelia</i> sp.	Giant grass, no uses
tsiakondrokondro	<i>Augraecum superbum</i> (?)	Orchid
tsiana	<i>Sporobulus indicus</i> (?)	Grass, fodder
tsilaiby	<i>Stadmania oppositifolia</i>	Fire resistant
tsinefo	<i>Zizyphus vulgaris</i>	Jujube fruits and <i>toaka gasy</i>
tsingilofilo	<i>Calastrus linearis</i>	House and boat construction

tsitake	<i>Rhus perrieri</i>	Resin used by girls as a depilatory and by <i>ombiasy</i> in rituals
vahe mainte	<i>Secamonopsis</i> sp.	Rubber vine, latex strong enough to patch tires
vahintana	<i>Albizia masikororum</i>	Construction, firewood
vaho	<i>Aloe vahombe</i>	Treat skin lesions with raw juice; boil leaves and drink for yellow fever
vakakoa	<i>Strychnos vacacoua</i>	Medicine to treat leprosy
valotsy	<i>Breonia perrieri</i>	Found in humid depressions, wood can be worked
vaovy	<i>Tetrapterocarpon geayi</i>	Cart frames and wheels, boats; boil bark and drink as an anti-malarial
varo	<i>Cordia</i> sp./ <i>Hibiscus liliaceas</i> (?)	Boat construction
vero	<i>Hyparrhenia rufa</i>	Tall grass around water depressions
voa manga	<i>Citrullus panatus</i>	Gourd
voandry	<i>Ficus</i> sp.	No uses
vondro/vondzo	<i>Typha augustifolia</i>	Reeds, house construction
voro	<i>Alleanthus greveanua</i>	No uses
vontaky	<i>Pachypodium geayi</i>	Soak sapwood in water as bush pig poison; bark cloth
vory	<i>Alleanthus greveanus</i>	Construction
za	<i>Adansonia za</i>	Bark used as cordage; fruits eaten; pods used as scoops
zaha/hazo foty	<i>Grewia microcyclea</i>	Shaft (<i>voloso</i>) for spear used in pig hunting and tool handles; roofing; edible fruit; bark string
zavy	<i>Ficus</i> sp.	No uses

Note: *Toaka gasy* is a home-made alcoholic brew.

APPENDIX 2 FAUNA

akanga	<i>Numida mitrata</i>	Guinea fowl, meat
akohoala	<i>Lophotibis cristata</i>	Crested wood ibis, meat
amboalava	<i>Chamaeleo</i> sp.	Chameleon
angavo	<i>Pteropus</i> sp.	Fruit bat, meat
aomby	<i>Bos madagascariensis</i>	Cow, almost never owned by Mikea; in past “Hattoy’s cattle” feral and hunted
bengy	<i>Capra capra</i>	Goat, used mostly in ritual
boenga	?	Large rodent(?), meat
boky-boky	<i>Mungotictus decemlineata</i>	Viverrid, meat
fosa	<i>Cryptoprocta ferox</i>	Largest carnivore in Madagascar, similar to civet, meat
gidro	<i>Lemur fulvus</i>	Brown lemur, meat
hira	<i>Lemur catta</i>	Ring-tailed lemur, meat
kapiky	<i>Pyxis planicauda</i>	Turtle, meat
katrakatraka	<i>Eremialector personatus</i>	Sand grouse, meat
kibodolo	<i>Turnix nigricolis</i>	Small quail, meat
kituky	?	Bee, wild honey
kivahy	<i>Canis canis</i>	Dog, used in pig and fosa hunts
lea; reny tantely (‘mother of honey’)	<i>Apis unicolor</i>	Honey bee
mangoro lambo	<i>Potamochoerus larvatus</i>	Bush pig, meat
moky	<i>Anopheles</i> sp.	Mosquito
ongiky	<i>Cheirogaleus medius</i> (?)	Dwarf lemur(?), meat
rere	<i>Erymnochelys madagascariensis</i>	Sideneck turtle, food and offerings
sakondry	Fulgoridae	Edible insect

samaky	<i>Phoenicopterus</i> sp.	Flamingo, meat
sifaka	<i>Propithecus verreauxi</i>	Lemur,meat
sora	<i>Hemicentetes semispinosus</i>	Small Banded tenrec, meat
sotroso	<i>Platelea alba</i>	African spoonbill, meat
tambotsike	<i>Echinops telfairi</i>	Tenrec, meat
tandraky	<i>Centetes ecaudatus</i>	Common tenrec, meat
tsangafiafy	?	Caterpillar, can burn skin
tsingaokaoke	<i>Hippobosca maculata</i> (?)	Tiny fly that is numerous in dry season in forest and sucks blood
valavo	<i>Rattus rattus</i>	Rat, meat
vivihy	<i>Dendrocygna viduata</i>	Whistling duck, meat
vorombengy	<i>Threskiornis aethiopicus</i>	Sacred ibis, meat
vositsy	<i>Hypogemus antimena</i>	Jumping rat, meat