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Transfert de gestion: Benana, Tsinjoarivo

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Background
The rural commune of Tsinjoarivo, 45 km southeast of Ambatolampy, contains the most intact and continuous eastern rainforest remaining in Antananarivo province (Fig. 1). Very few biological surveys have been conducted in the Tsinjoarivo region, but considerable biological biodiversity has already been documented with at least: 9-10 primates, 17 insectivores (including 16 endemic lipotyphlans), 7 rodents (including 5 endemic nesomyines), 5 carnivores (4 of which are endemic), 92 birds, 24 reptiles and 30 amphibians, and more than 200 species of flowering plants (Angiospermae). In 1999, a previously unknown local variant of *Propithecus diadema* (known as "sadabe") was discovered by K. Glander and colleagues (Fig. 2). Although morphologically distinct from other *P. diadema* populations, it is unclear whether this population is separated from *P. d. diadema* at the subspecific and possibly the species level. At the 2001 IUCN CAMP meeting in Madagascar, the Tsinjoarivo sifaka was recognized as a distinct taxon, and classified as critically endangered. Subsequently, the broader species *Propithecus diadema* (including the Tsinjoarivo variant) was also classified as critically endangered by the IUCN Redlist.

Fig. 2: Normal (left) and melanistic (right) forms of the critically endangered lemur species *Propithecus diadema* (diademed sifaka). Photos from Tsinjoarivo Forest.

Management Transfer ("Transfert de Gestion")
On August 28 2006, an association based in Beanana (Fokontany Ankazomena, Commune Rurale de Tsinjoarivo) was awarded a management transfer agreement by the Ministry of the Environment, Water and Forests (Antananarivo). In early 2007, the agreement was amended to include four associations – the one original association (based locally at Beanana) and three others (including one association based in Antananarivo). The decision to grant the transfer came from the Ministry in Antananarivo rather than the local water and forest offices in Antsirabe and Ambatolampy. The local government of Tsinjoarivo Commune had been working with biological researchers since 2000 and advocated the continuing protection of the Commune's forests, but lacked the authority to block the management transfer. The original agreement covered 800 hectares within Tsinjoarivo Commune, 20 km southeast of the town of Tsinjoarivo. The agreement was later amended to include 900 hectares. The eastern boundary of the area coincides with the administrative limit between Antananarivo and Toamasina provinces, and the area enclosed includes the most intact and undisturbed forest remaining in both Tsinjoarivo Commune and Antananarivo Province. The area was divided into three approximately equal-sized zones: a conservation area, an area of exploitation, and previously-cleared areas (cultivated or secondary forest). The agreement for the management of the three areas is as follows:

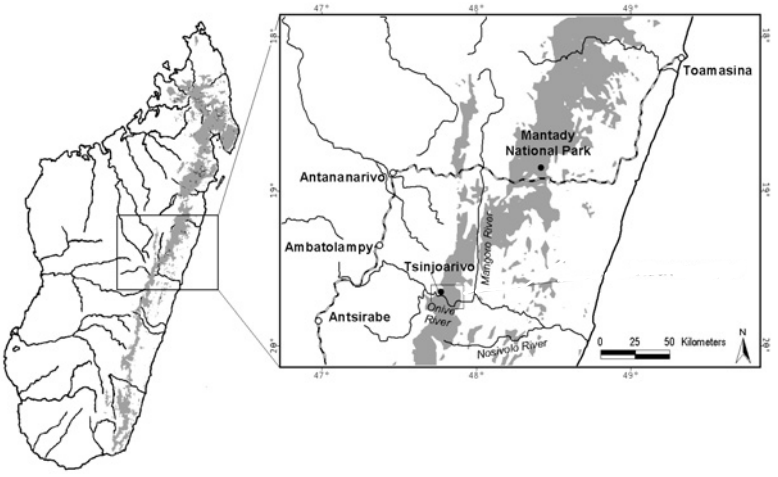

Fig. 1: Location of Tsinjoarivo forest within Madagascar. Forest cover after Green and Sussman (1990).

1. *Area conservation*: Within the conservation area, no exploitation is allowed.
2. *Exploitation area*: Within the exploitation area, the four participating associations are permitted to cut trees for sale, within specified limits. Specifically, harvesting is limited by: tree species, tree size and number of trees per hectare. Only trees marked by the Chef de Cantonnement Forestier (Ambatolampy) may be harvested.
3. *Previously-cleared areas*: Within the previously-cleared areas, the association is obliged to plant trees within all areas of >15 degrees slope, in order to return these areas to forest cover. Additionally, the association agrees to stop all tavy activities (slash-and-burn clearing of primary *and* secondary forest) but local people may continue to cultivate already-cleared areas of <15 degrees slope.

In general, the logic of the transfer dictates that local people:
1. Stop the clearing and burning of primary and secondary forest.
2. Return to forest cover all areas of slope >15 degrees.
3. Receive a share of the profits from exploitation as a compensation for the loss of previously-cultivated areas.

Assuming that the rules of the convention are followed, and that selectively-logged forest may effectively regenerate and continue to support its resident biodiversity, this logic seems to be an appropriate framework for managing the landscape. The water and forest team who delimited the transferred area in the field expressed the philosophy that it is better to control the use of the forest, than to leave it vulnerable to illegal slash-and-burn clearing.

However, the reality of the situation on the ground is inconsistent with the original logic of the transfer, for the following reasons:
1. Research in Madagascar and elsewhere has shown that selectively-logged forest (even with low harvest levels) supports only a fraction of the biodiversity it once contained. The transferred forests are therefore likely to lose a significant proportion of their biodiversity. The most vulnerable species tend to be large-bodied and frugivorous – therefore the three largest lemur species found at Tsinjoarivo are at risk of local extinction within the transferred area – the brown lemur (*Eulemur fulvus*), the red-bellied lemur (*Eulemur* rubriventer) and the critically-endangered diademed sifaka (*Propithecus diadema*). The time required for selectively-logged tropical forests to return to their natural state is on the order of several decades, and many forests never return to their natural state.
2. Research teams at Tsinjoarivo have already observed several breaches of the original agreement on the part of the local people. First, they continue to cultivate areas >15 degrees slope. Second, they still burn secondary forest to prepare land for cultivation. Third, areas of primary forest continue to be cleared by slash-and-burn activity. Fourth, local people have exceeded the harvesting limits by cutting trees not previously marked by the Ambatolampy Water and Forests Personnel.
3. Observing the ongoing exploitation has a significant and negative impact on the motivation of the local people to conserve the remaining forest areas. Previously, local farmers did not completely follow the national laws regarding land use (e.g. they cultivated high-lying areas), but much of the remaining forest area remained relatively intact. Now, seeing that many of the larger trees are being cut and taken to Antananarivo by truck, the motivation for local people to cut illegally has increased. First, because of the ongoing legal cutting, illegal cutting is less likely to be noticed by authorities. Second, the land transfer has lead to an "if the government can exploit the forest, so can I" attitude – and many local people seem to be cutting trees either for sale or for local construction. As a result, the impact on the exploited areas will be much greater than predicted by the original harvesting limits.
   This negative impact is not limited to the transferred area. People from all surrounding regions have been observing the exploitation at Beanana and are already starting to: (1) increase illegal exploitation of the forest, and (2) seek to form associations and negotiate management transfers of other areas. Thus, even people who previously were in favor of conserving remaining forests seem to be reconsidering their position and seeking to profit from their local forests. Therefore, all forest within Tsinjoarivo commune (as well as the adjoining forest in Toamasina province to the east) is threatened by the complex social effects of the management transfer.
4. Financial benefits of exploitation are not being evenly distributed among the local community. Specifically, members of the original association receive financial compensation for the trees sold and pay workers (most of whom have arrived from other regions) to cut the trees. This has caused discontentment among people living within the transferred area who are not within the association. This has in turn contributed to many of the breaches of the original agreement (e.g. burning of secondary and primary forest, continued cultivation of areas >15 degrees slope).
   Additionally, many of the tree-cutters were originally local people but they have gradually been replaced by workers from other areas, often far away. This contributed financially to the local community in a very small way – for example, one team of workers might receive 3,000 Ariary (USD 1.50) for each large tole (18 x 18 x 200 cm) that they cut and deliver to the staging area where it can be picked up by the truck. However, these workers generally have more experience cutting trees and can work faster than the local people, further reducing the local financial benefit.
5. The acquisition of the legal papers to transport cut trees by truck to Antananarivo may contribute to illegal exploitation of the conservation zone and areas around the transferred forest. Because police on the road cannot determine where trees were cut, it is relatively easy to transport illegally-cut trees using the legal papers from the Management Transfer.
6. The construction of the road in order to allow access by rented trucks to collect the cut trees required the clearing of a substantial forest area and caused associated disturbance of the forest edge near the road.
7. Very little terrain has been subject to planting of trees, and those planted have been the exotic *Eucalyptus* species but not native forest trees. Such reforestation will provide timber for local communities in the future but will not support populations of endemic plant and animal species. Additionally, most of the areas >15 degree slope have not been reforested as per the original agreement, but actually remain under cultivation as of July 2007.

Fig. 3: Forest exploitation at Beanana, Tsinjoarivo Commune.

An Alternative: Tsinjoarivo as a Tourist Destination

Because it is located near Antananarivo (about 140 kilometers south/southeast), Tsinjoarivo is a natural destination point for Malagasy and foreign tourists to visit and experience the vast diversity of animal and plant life for which Madagascar is known. The behavioral research of TFFP has already led to the habituation of four groups of *Propithecus diadema* which can be observed at close range (to 2 m). The topography of the region has also resulted in steep escarpments, mountain peaks and well-known waterfalls both at Tsinjoarivo and farther east in the continuous forest, adding a scenic component to the potential tourist experience. Finally, Tsinjoarivo also contains the historically important Rova (Queen's summer palace), which is currently being rehabilitated by the partnership for development between Vakinankaratra Region and Auvergne Region (in France). This unique combination of biodiversity and history provides a unique opportunity for a combined and integrated tourist attraction unmatched in other protected areas in Madagascar.

The protected area system at Analamazaotra/Mantadia could be used as a model for designing the Tsinjoarivo protected area, with one or more smaller, more accessible parcels dedicated to tourism and a larger, more remote parcel dedicated to biodiversity conservation. The administrative and financial linkage of two such parcels would allow the income generated by the tourist-accessible forest to fund the continued protection of the larger, more remote parcel.

The exploitation activities constitute a direct threat to the potential for ecotourism. The most accessible *Propithecus diadema* population is found at Mahatsinjo, 15 km southeast of Tsinjoarivo (currently the only population accessible by car). However, this population is extremely small, numbering approximately 5 groups and 20 animals - not sustainable in the long-term without gene flow from other areas. The only nearby forests containing *P. diadema* are to the south and southeast: the regions currently being exploited under the management transfer. If the populations in these areas are driven to extinction by the exploitation, the Mahatsinjo population will become isolated and will almost certainly go extinct.

Tsinjoarivo Forest, a Unique and Irreplaceable Part of Madagascar's Natural Heritage

There are 4 reasons that Tsinjoarivo Forest makes a rich and unique contribution to the natural heritage of Madgascar's remaining forests:

1. Under-representation of Antananarivo Province in protected area system: Presently, only one of Madagascar's protected areas is found in Antananarivo province: RS d'Ambohitantely, a fragmented, high-altitude central plateau forest ecosystem. Addition of Tsinjoarivo forest to Antananarivo province's protected areas would ensure the protection of more of this province's forest, and add a new forest type (rainforest) to its collection of protected areas.
2. Under-representation of high-altitude eastern rainforest in protected area system: High-altitude eastern rainforests are under-represented in Madagascar's protected area system. Because of its unusually high altitude (1400-1650 m), Tsinjoarivo forest is likely to contain many plant and animal species not found in pre-existing protected areas.
3. River barriers: Presently, no protected area exists north of the Onive river and west of the Mangoro river. These barriers to species dispersal have likely led to a unique animal and plant community in the Tsinjoarivo region, containing species not represented in other protected areas.
4. High potential for development of rich and successful integrated tourism programs: The combination of scenery, rich biodiversity, rich cultural history (Queen's summer palace) and proximity to Antananarivo are all contributing factors which could make Tsinjoarivo an attractive destination for Malagasy and foreign tourists.

Therefore, we hold the position that:

1. The reality of the management transfer on the ground is inconsistent with: (1) the original motivation of the transfer for better management of land use at Tsinjoarivo, (2) a long-term vision of improving life for local people over the long term, and (3) conservation of the rich and unique biodiversity found in Tsinjoarivo Forest.
2. The biodiversity of Tsinjoarivo Forest (including the critically endangered lemur *Propithecus diadema*) represents both a unique part of Madagascar's natural heritage and the world's natural heritage. As such the national government and international stakeholders should strive to assure its continued existence.
3. There are viable alternatives to the short-term strategy of forest exploitation which may provide a more sustainable benefit for local people while conserving biodiversity - such as the ecotourism initiative alrea-

dy initiated by the Tsinjoarivo Forest Fragments Project in collaboration with the partnership for development between Vakinankaratra Region and Auvergne Region (in France).

Inventaire biologique des lémuriens diurnes et nocturnes dans la forêt classée de Matsandre, Fokontany de Fenaivo, Commune rurale d'Ifotaka, District d'Amboasary Sud, Région d'Androy

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Mots Clés: Lémuriens, Densité de population, Forêt dense sèche, Plateaux calcaires, Matsandre

La biogéographie de certaines populations de la faune des lémuriens présente encore des incertitudes. Ainsi, la limite de la distribution de quelques espèces de ces lémuriens est encore floue. Le but de la présente mission était d'effectuer un inventaire biologique des lémuriens dans la forêt classée de Matsandre, du Village de Fenaivo, Commune rurale d'Ifotaka, District d'Amboasary Sud, Région d'Androy.
L'objectif principal de cet inventaire est de collecter des informations sur la communauté des lémuriens de la région en vue d'établir une base scientifique pour un programme de protection, de conservation et de gestion environnementale de cette zone en utilisant la technique d'évaluation rapide.

Méthodes

Site d'étude: Forêt classée de Matsandre
Cette forêt se trouve dans la rive Est de la rivière de Matsandre, dans le Fokontany de Fenaivo, Commune rurale d'Ifotaka. Les villageois de Fenaivo utilisent beaucoup cette forêt. Ils s'adonnent à une exploitation illicite et sélective du bois de forêt pour la construction et l'ébénisterie en quantité relativement importante (fabrication de planches sur place et leur transport en charrettes). La collecte d'ignames sauvages et l'élevage bovin, caprin dans la forêt qui détruit les composantes biologiques de la forêt s'observent dans cette forêt. On a pu noter tout cela lors du comptage des lémuriens le long du transect effectué. Malgré cela, cette forêt est remarquable: Elle est dominée par l'abondance des espèces des *Alluaudia procera* de 12 à 15 m de haut, dont le substrat est constitué de roches sédimentaires. L'inventaire intensif des lémuriens a été effectué dans une partie de cette forêt xérophile.

Observations: Les méthodes directes
Elles comprennent les observations éventuellement, voir l'animal ou écouter les cris ou autres sons. Pour la plupart des comportements, les animaux communiquent de trois manières (1) Visuel – démonstration, signes (vue), (2) Auditif – production de sons (écouté), et (3) Olfactif – traces d'odeurs (sentir). Au cours de la présente étude, nous avons compté et identifié les groupes d'animaux en suivant des itinéraires – échantillons définis selon les différents types d'habitats et de niches écologique existants, de l'altitude, bordures de cours d'eau et de différentes pistes dans la forêt.
Nous avons utilisé un transect de 3500 m dans lequel, on a mis en place des flags tous les 25 m. Nous avons appliqué la méthode de transect pour compter les lémuriens rencontrés ici, le long de ce trajet préalablement choisi. Les heures d'observations sont effectués entre 7 heures 34 et 11 heures 02, le 1er jour et entre 7 heures 05 et 9 heures 35, le 2ème jour au mois de mars. 2008. Pour chaque animal rencontré, on mesure la distance perpendiculaire au chemin. La moyenne de ces distances est prise comme la distance qu'on a surveillée ou observée est calculée à gauche et à droite comme suit: Soit S, la surface surveillée (S) = longueur du transect (L) x 2 x distance moyenne (W). Le nombre des animaux trouvés ou observés (N) divisé par la surface (S) donne une estimation de la densité (D) de la population d'où la formule:

$$D = \frac{N}{L \times 2 \times W}$$

Parfois, le son et les cris des animaux permettent de les connaître à distance. On n'a pas effectué des observations nocturnes dans cette forêt.

Observations: Les méthodes indirectes
Cela implique la recherche de traces indiquant la présence dans une zone et éventuellement les types d'activité (comportement). Les principaux types de traces sont: les traces de nourriture, restes de nourritures, farces (crottes ou autres), et les habitations, abris, nids et trous d'arbres. En effet, le recensement devrait se faire par la détection de ces indices de présence.
Un autre aspect de l'étude indirecte est d'interviewer la population locale sur l'apparition de l'espèce qui vous intéresse. Dans ce cas, on mène des enquêtes sur: la présence des autres espèces de primates, la fréquence

Fig. 1: *Propithecus verreauxi* (Sifa-bilany) sur *Alluaudia procera.*