

Explaining Compliance with Rules Governing Common-Pool Forest Resource Use and Conservation: Dynamics in Bara Country, Southwestern Madagascar

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Introduction

This paper examines the conditions under which compliance with rules governing the use and protection of common-pool forest resources is more or less likely to occur. I analyze resource-conserving compared with resource-degrading behavior, focusing on two communities drawn from a pool of five cases, all located on the periphery of protected forest areas in southwestern Madagascar. My purpose in doing a cross-sectional comparison is to analyze patterns of compliance and to construct systematic explanations of conditions under which different rule regimes produce different outcomes.¹

Looking at protected areas around Madagascar, one can observe considerable variation in compliance with the rules governing use of forest resources. Even in the smaller context of the area under study, some resource users follow certain rules while others break them. What accounts for this? Are there characteristics of the *rules themselves* that make them more likely to be complied with in a domain like forest resource management, or does the differential effectiveness of rules depend on the contexts in which they are interposed, or on *other factors*? How can more effective rule regimes be established? This is an urgent question for forest protection, but it has broader implications as well.

Rules can be understood as statements that specify the types of actions that are permissible (may), obligatory (must), or forbidden (must not) (Crawford and Ostrom 1995). Most rules pertaining to forest resources have been of the latter type. Is it only coincidence that we see significant rates of deforestation occurring in many countries around the world? Can variations in rule compliance be explained in terms of the rules themselves (as they fit into the above mentioned categories), or are explanations that relate to resource users, the resources themselves, and the context in which users interact with resources more predictive?

This paper is divided into six sections. Following this brief introduction of the puzzle at hand, I present theories of compliance in general. I then present my focal cases, one after the other, describing two distinct contexts within which forest users make decisions about extracting resources from the forest or not. A discussion on existing rules about the forests is included in this section. The analytical section presents a comparison between the two cases in order to identify variables that may influence compliance behavior in different ways from one case to the next. In the analysis, I consider additional study sites in an attempt to better isolate causal factors. Finally, the conclusion is a discussion of the conditions, or contexts, under which rule regimes are better able to produce compliance behavior conducive to forest resource conservation.

Conceptualizing compliance

The majority of theories of compliance fall under the general rubric of rational choice theory, whereby humans are seen as rational agents who behave in accordance with known preferences, choosing strategies conducive to their realizing the most desired outcomes (Cook and Levi 1990): humans are regarded as interest or utility maximizers. Researchers' emphases vary, however, on what constitutes the values to be maximized. This variation in emphasis

¹ While it is true that private forest reserves exist and that their management is also subject to institutional arrangements of various forms, I am interested in common-pool resources whose access, by definition, is difficult to restrict (there are no permanent forest guards posted around Madagascar's protected areas; nor are there fences around them). Inferences made from this analysis apply specifically to forest habitats, but since it deals with common-pool resources, it could also apply to marine and other terrestrial habitats *mutatis mutandis*.

revolves usually around one central question, namely: What factors determine compliance behavior?

Economic models of compliance suggest that individuals subject to regulatory constraints act rationally so as to maximize the material gains obtained from complying (or not complying) relative to the costs of their course of action. According to Schwartz and Tullock (1975), compliance is determined by the effectiveness of *sanctions*, which is defined as the product of the amount of the penalty and the probability of the penalty being imposed. Echoing Schwartz and Tullock, Sutinen and Gauvin (1989) claim that individuals' calculation of the costs and benefits of compliance is influenced by the probability of detection and conviction, i.e., of effective *enforcement*. However, moving beyond the assumptions of a purely economic framework, where compliance is a function of maximization of expected utility, Sutinen and Gauvin add factors to material ones and include enforcement resources, personal characteristics and skills of resource users, and the individual user's violation rate itself.

Other scholars besides economists emphasize enforcement of rules as a determinant of compliance without assigning so much weight to the calculation of net benefits. Elinor Ostrom (1990) offers eight principles for designing robust common-pool resource (CPR) management institutions, two of which relate to rule enforcement. Ostrom specifies that (1) "[m]onitors, who actively audit CPR conditions and appropriator behavior, [need to be] accountable to the appropriators" and (2) "appropriators who violate operational rules [need to] be assessed graduated sanctions ... by other appropriators, by officials accountable to these appropriators, or by both" (p. 90). According to Ostrom, the likelihood of compliance with rules governing CPRs will increase with the fulfillment of at least these two conditions. John Scholz (1985) challenges the basic assumptions of deterrence theory when examining the impact of legal regulations on compliance. As he points out, deterrence theory emphasizes the role of fear and punishment in shaping human behavior, i.e., compliance. In order to gain better understanding of compliance, Scholz suggests that models of compliance should include influences such as markets as well as social and personal norms.

Robert Wade (1988) examines social and personal norms, as they influence compliance with rules, when he assesses the extent to which Indian irrigators are moral rather than "calculative" (i.e., maximizing material gains) decision makers. Wade's study of Indian villages leads him to the conclusion that irrigators' compliance ("obedience") with the rules governing irrigation systems is motivated by material gains rather than social (reputation) and moral considerations: "it should be remembered," Wade writes, "that for many in the population whatever sense of obligation they feel is probably *secondary* to the sanctions they would face as a result of their general subordination" (p. 196, emphasis added).

While many scholars focus on enforcement or rules as the determinants of compliance, another group of scholars emphasizes *perceptions* about rules. Margaret Levi (1988) contends that compliance is "quasi-voluntary," that is, shaped by a combination of coercion and ideology. She, too, considers the effectiveness of sanctions (looking at the cost of enforcement and monitoring), but her contribution to understanding compliance behavior lies in her pointing out the importance of perceptions about rules (is the contract fair?) and satisfaction (do citizens get a return from their paying taxes?).

Nancy Peluso's theory of compliance differs from Levi's notion that compliance is influenced by concepts of *legitimacy*. Looking at Kenya and Indonesia, Peluso (1993) examines how states have tried to legitimize their use of force to induce compliance in the name of natural resource conservation. The concept of legitimacy is central to Peluso's theory of compliance,

pointing out that “from a local perspective ... both states and international conservation groups may be seen as *illegitimate controllers* of local resources” (201, emphasis added). A valuable contribution which Peluso makes to understanding compliance rests in her showing linkages among decisions made at the international, national, and local levels.

Implicit in these models of compliance is the idea that individual decisions to comply with or disobey rules reflect a calculation of costs and benefits, be they material or other, achieved by making such decisions. New institutionalists take a somewhat different approach to studying human behavior when they regard rationality not simply as a matter of decision makers making skillful calculations of costs and benefits. Instead, they emphasize that *institutions* play a significant role in creating incentives which, in turn, influence cost and benefit calculations, and hence behavior (North 1992).

What, then, are institutions? Although the term often refers to organizations (Uphoff 1986), I use the language of institutional analysis to refer to institutions as “the shared concepts used by humans in repetitive situations organized by rules, norms, and strategies” (Ostrom 1996, p. 2). Rules, in turn, are “shared prescriptions (must, must not, or may) that are mutually understood and enforced in particular situations in a predictable way by agents responsible for monitoring conduct and for imposing sanctions.”

Research Methods

I relied on a mix of methods to collect data on numerous variables related to compliance and to verify my research hypotheses (Annex 1). To be systematic across sites, my assistant and I conducted individual household surveys with 170 informants, interviewing an almost equal share of men and women.² We spent three to five weeks in each community, also weeks in Sakaraha (intermittently), a few days in Tuléar, and weeks (also intermittently) in Antananarivo, talking to people at various echelons of decision-making. For one of my six sites, Iarindrano, I joined a team of IFRI (International Forest Resources and Institutions) researchers and used data collected with IFRI instruments to complement my own data.

At these different levels, we conducted in-depth interviews with key informants as well as with groups of forest users. At the community level, we complemented our household surveys with focus-group interviews to get more details on particular resources. Beyond the community level, interviews were useful to understand the context in which village forest users make their decisions. Finally, and to assess the extent of non-compliance as objectively as possible, we used two sets (1949 and 1991) of aerial photographs and satellite images showing forest cover.

Analavelona Sacred Forest: An Institutional and Ecological Wonder

Site Overview

A quick look at the evolution of forest cover for the period of 1949-1991 gives an idea of how exceptionally conserved Analavelona sacred forest is, although spatial data show evidence of some pasture activities inside the forest (for instance, there is a patch northwest of Andranoheza that was cleared and subsequently burned on a regular basis; in fifty years, however, this patch of about 12.5 acres has not expanded). Though some degradation, most likely due to fires, is observable on the southeastern edges of the forest, the changes are negligible, especially compared to other surrounding forests, not to mention the rest of the country's forests.

² This statistic does not include the 24 additional surveys conducted around Mantadia National Park (east).

Everything about Analavelona evokes awe and mystery. Biologists refer to it as a nature sanctuary because of the high levels of plant and animal biodiversity it hosts and also because the forest has characteristics of a tropical forest though it is located in Madagascar's semi-arid region. The forest is believed by surrounding Bara communities to be home to the spirits (*lolo*) of their ancestors (Moizo 1997). Both gentle and mean (*angatsy*) spirits are said to occupy the forest. Rules therefore exist to ensure that the forest remains a clean and tranquil place so as to keep the spirits contented. Within the forest, some spots are particularly sacred. They include waterfalls and some of the forest's largest trees (Rakotonirina 1999). It is at these spots that Bara people worship and pay their respects to the ancestors.

Analavelona provides surrounding villagers with much appreciated goods such as honey, whose exceptional reputation for food and medicine makes it a much-sought-after commodity, along with other foods such as tenrecs and lemurs. The most commonly cited forest products in our survey were fuel wood (cited by 90% of respondents), construction wood (67%), food to supplement rice and cassava such as tenrecs, lemurs and honey (27%), and pasture (13%). Most importantly, Analavelona is the villagers' main source of water, which they depend on to produce rice and other crops.

Three rivers, in fact, surround Andranoheza Bara's village territory. These rivers are the Manasay, Manadabo, and Andranoheza.³ The settlement is located about eight miles southeast of Analavelona, right above the point where Manadabo and Manasay rivers meet. This village is separated from Analavelona by abundant gallery forests, which follow the course of these three rivers. On average, it takes two and a half to three hours to get to the edge of the forest from the village, and there is no other way to get there but on foot. The terrain is steep which, by villagers' own account, discourages frequent trips to the forest. In fact, given the difficulty of access, most women with whom we spoke had never been there.

Rules about the Forest

According to our informants, Analavelona is used only supplementary food, pasture, wood for coffins (*hazon-dolo* or *tamango*), worship, and recreation. For the other forest products mentioned above, surrounding gallery forests are sufficient. These products are seasonal and so harvesting them does not require frequent trips to the forest (the exception is for pasture, however). For this reason, and again because Analavelona is hard to access, trips to the sacred forest are infrequent, ranging from once a week during a particular season to once a year.

Village communities cultivate a certain mystery about the forest of which they are proud and even jealous. They are eager to remind visitors that this forest belongs to them, since it sits on their *tanin-drazana*, or ancestors' land. Given this frame of mind, it is hardly surprising to note that rules about Analavelona sacred forest are predominantly expressed as being community-based (inherited from previous generations).

The rules that Rakotonirina (1999, pp. 42-43) compiled during his four-month stay in the area also show that community rules are mainly prohibitive ("one must not...or else") and proscriptive ("one must... or else") in nature. Based on his compilation, one can distinguish light offenses from serious offenses. It is worth noting that the worst possible offense has to do with deforesting Analavelona.

³ What Andranoheza villagers currently call Andranoheza River is called Analanbinday River on the 1957 topographic map.

Table 1: Summary of Rules Governing the Use of Analavelona Forest (Rakotonirina 1999)

Rule	Sanction
LIGHT OFFENSES	
• One must not call someone by their name in the forest	Or else they will get lost from a few hours to a few days
• One must not wear gold or silver jewelry in the forest	Or else they will lose their jewelry (to the spirits)
• One must bring rum (<i>toaka mena</i>), incense (<i>ramy</i>) and ask for the blessing of the ancestors upon entering the forest with new visitors	Or else they will get lost and may run into a series of annoying events
SERIOUS OFFENSES	
• One must respect cleanliness, especially in sacred spots	Or else serious illness, possibly leading to death, awaits them
• One may not introduce pork meat into the forest	<i>idem</i>
• One must not have sexual relations in the forest ⁴	<i>idem</i>
• One must not cut down trees, especially large ones, in the forest	Or else serious illness, death, and curse on descendants await them

A closer examination of the rules governing the access and utilization of Analavelona gives a somewhat more balanced picture in terms of proscriptions, prescriptions and permissions. Indeed, our survey revealed that some actions are forbidden, others are permitted, and yet others are obligatory. Survey results are summarized as follows (sanctions are not discussed here):

Proscriptions (% of all informants surveyed)

- Killing birds inside the forest 100%
- Doing “dirty” or “bad” things 56%
- Taking pork, sheep and goat meat into the forest 33%
- Taking women into the forest 33%
- Selling products from the forest 22%
- Killing animals (e.g., lemurs) 22%

Permissions

- Hunting tenrecs and harvesting honey 60%
- Selling products from the forest 33%
- Harvesting large trees to make coffins 20%
- Harvesting honey 10%
- Hunting lemurs 10%
- Harvesting food for self-consumption 10%

⁴ It used to be forbidden to bring women into the forest at all because of the temptation of sexual relations and also because of menstruation.

Prescriptions

- Observe Bara customs and rituals (rum, honey, incense, money, tobacco, zebu) 70%
- Ask for ancestors' blessings prior to entering and harvesting from the forest 50%
- Get a cutting permit from *Eaux et Forêts* prior to cutting trees inside the forest 30%
- If an outsider, get permission from the *fokonolona* (community) prior to entering the forest 20%

Three observations are important to make here. First, the rules most frequently evoked are community rules in all three categories (the state rule about cutting permits is the exception). Second, some contradictions arise regarding selling products from the forest and hunting lemurs, and these contradictions pertain to *faly*.⁵ Third, state-imposed restrictions on time and location of fires to improve the quality of pasture were not once mentioned, though 13 % of respondents specifically said that pasture is a forest product.

Local Reactions to Rules

Reported Infractions

Informants acknowledge that there are state rules about cutting large trees for construction wood. They are aware that prior to cutting large trees, they must obtain a cutting permit from *Eaux et Forêts*, or else they are subject to sanctions ranging from hefty fines to incarceration. They are clear on the fact that there are no graduated sanctions: once caught, the penalty is immediately heavy. However, as will become clear later, they also know that money can buy one's way out of serious sanctions.

Yet, when asked if anyone from the community had ever been caught breaking a rule, most of those who answered to the affirmative reported breaking of formal (vs. community) rules. Cutting trees without a permit appears to be a common offense, and setting bush fires come next. As far as cutting trees for construction is concerned, there are two forms of non-compliance: either the person cuts without a permit or the person gets a cutting permit but ignores E&F's regulations about tree species, tree size and expiration date. For those who admitted to breaking a formal rule and who got caught, the story goes, a hefty collective fine was imposed for a bush fire (hamlet of Belemokafo). The same applied for an informant who was caught cutting trees without a legal permit. He was fined heavily.

On the one hand, villagers say that fear of incarceration motivates them to comply with state rules. But, on the other, one informant was bold enough to say: "People pay no attention to the rules. They just go ahead and build homes without a permit." Perhaps this comment has a simple explanation, as it came from a person who lives in a hamlet whose inhabitants have not seen a forest guard since 1990.

⁵ Not all Bara have an equal taste for lemur meat. Apparently, descendants of particular ethnic groups are allowed to eat lemur, whereas others are not (it is *faly* or *fady*).

Are local reactions to community rules uniform? For the most part, community rules are not questioned, and rarely are they challenged. Our survey for this area shows that only a small portion of informants (2 out of 30) reported cases of breaking community rules. In one case, someone broke a *fady* in Analavelona and, supposedly, got lost in the forest temporarily. A particular *angatsy* did not forgive him until he sacrificed a zebu at the spot where the infraction had been committed. The second case was of someone who cut trees in Analavelona. He was reprimanded by community leaders and, subsequently, became chronically ill. Eventually, one of his children died, and the rule breaker became without descendants.

Based on comments gathered during our conversations with various informants, three important observations should be made. First, people learn from others' unfortunate experiences. Fear of being fined, jailed or becoming ill, all appear to be powerful motivators for compliance. Second, one can argue that the cost of breaking community rules far exceeds the cost of breaking formal rules. For instance, illegal bush fires were sanctioned at rates that barely reached a third of the cost of sacrificing a zebu for breaking a *fady*. Likewise, though incarceration is viewed as a highly undesirable experience, chronic illnesses and the loss of loved ones are permanent conditions and, therefore, worse punishments. Third, it is more possible to get out of sanctions for breaking formal rules than it is with community rules. In the case of formal rules, a fine is imposed in order to avoid incarceration, giving the rule-breaker an option. When a community rule is broken, however, negotiations with the spirits are unpractical (!) and harsh sanctions are imminent.⁶

About Modifying the Rules

Analavelona users are the second most numerous (out of five communities studied in this area) to claim that they wish to have modifications in formal rules. Fifty three percent of men and 27% of women answered to the affirmative when asked if they wished to see changes in formal rules. There are three aspects of formal rules that users consider problematic. The first has to do with paying a fee for cutting permits. More than other transaction costs (such as the effort it takes to make a trip to Sakaraha, where the closest E&F office is), the fee itself, small as it may seem, bothers informants the most. Thirty seven percent of those who discussed their feelings about formal rules mentioned this. The second aspect has to do with the disproportionately heavy sanctions: hefty fines and incarceration hardly seem to match infractions. One person mentioned this. Finally, one informant said that all fines should be imposed by the state on the collectivity so that no single person carries the burden on his or her own (given that most people do not comply but only a few get caught). In other words, punishments are perceived to be ill distributed.

Perceived Legitimacy of Rules

The fact that almost half of informants expressed dissatisfaction with formal rules does not, however, mean that they wish for access to Analavelona to be open; quite the contrary. In fact, 87% of men and 47% of women anticipate *negative* environmental and social consequences if rules regarding accessing and using Analavelona and surrounding forests are nullified.

⁶ It is true that sacrificing a zebu may appease an angry spirit, but this option is not automatically available, however.

It seems, rather, that most people do not understand why state rules exist given that any intrusion into Analavelona by outsiders is controlled by the *fokonolona*. Indeed, the community reserves the right to prevent access to the forest whether or not visitors hold a permit from the state in their hands. The general attitude is best expressed in the words of two villagers: “Even if the state did not protect the forest, our *fokonolona* would do so effectively.” Another informant added: “Anyone wishing to go into the forest, if not stopped by the state, would still be prevented from doing so by the *fokonolona*.”

The history of this community of five (arguably six) hamlets is particularly interesting in terms of its inhabitants’ relationship with the *vazaha* (the generic local term for whatever is alien to the community, whether educated, city people or foreigners). Two successive waves of migrants from the southeastern part of the country approached a local Bara king in the late 1800s and then early 1900s to look for opportunities to “pasture and prosper.” Poinimerina, the Bara king, granted these migrants the right to use the territory currently known as Andranoheza Bara in exchange for their promise to expand and defend his kingdom. The migrants settled in, adopted Bara customs, and founded the Bara Mitiria clan.

What stands out in the history of the Bara Mitiria is their perpetual efforts to contain outsiders’ intrusion into their territory and, put bluntly, their aversion for outsiders and outsiders’ habits. This closed society is a proud one, as revealed by their (voluntary?) omission of the passage in their history where the French chased them out of their territory and burned down their settlements in an effort to eradicate small kingdoms around Madagascar during the colonial period (1895-1960). Today, the line is blurry between inherent pride and the mere desire to be autonomous and independent from outside authority. It is no surprise, therefore, that this community feels that it has protected Analavelona *on its own* and that its members are capable of containing intrusions into the forest by outsiders without state assistance and intervention.

Zombitse National Park: a Conservationist’s Worst Nightmare

Site Overview

Also part of Bara country, the forest of Zombitse used to be a sacred forest. Its fate, however, is dramatically different from Analavelona’s. According to the 1957 topographic map, the village of Andranomaitso did not even exist in 1949.⁷ By 1991, however, not only had this settlement appeared, but the forest around it was also cleared. In 49 years, some 4,500 acres of forests were cleared, leaving a big hole in the middle of the northern portion of Zombitse forest.⁸ Though no spatial data are available for the period after 1991, numerous testimonies indicate that rates of deforestation peaked precisely around 1991. Eventually, clearing tapered off, though deforestation has yet to be controlled to this day. By the time this research started, the forest had been classified as a national park (in 1997).

As is often the case with Bara settlements, Andranomaitso started off as a *toest’aomby*, or zebu camp, in 1973, with four huts located inside the forest, just North of *Route Nationale 7* (RN7). Eight Bara herders from Sakaraha occupied this territory and pastured their cattle there. Two years later, E&F granted an influential Antandroy politician from Tuléar a permit to harvest

⁷ This map was completed in 1957 based on 1949 aerial photographs and subsequent ground truthing (verification on the ground).

⁸ Andranomaitso people are not solely responsible for this massive deforestation, as several communities have put pressure on this particular part of the forest.

in the northern section of Zombitse (*Coopérative AVOTSE* project, 1974-81). This *exploitation forestière* brought in migrant loggers of various ethnic origins during a period that stretched from 1976 to 1989.

The RN7 paving project, which required more clearing on both sides of the road, brought another wave of migrant workers to Andranomaitso in 1985. Subsequently, more ethnic groups became represented in the settlement.

A final wave of migrants came to settle in Andranomaitso as the result of two developments. On the one hand, migrants left behind from the *exploitation forestière* and the road project began to practice *hatsaka*, or slash-and-burn maize culture, first away from Andranomaitso and then progressively closer to the settlement. They were quite successful at producing abundant maize (an extremely lucrative crop) and, since their fields were visible from the main road, passers-by could easily appreciate their prosperity. This encouraged in-migration. On the other hand, the period between 1990 and 1993 was a time of famine in southern Madagascar. A place like Andranomaitso, known for its water resources, became a point of attraction especially since it was relatively close by and since various ethnic groups were already represented. During these days of extreme hardship, Andranomaitso settlers welcomed their Bara, Betsileo, Mahafaly, Masikoro, Tanala, Tañalaña, Tandroy, Tanosy and Merina relatives.

As more and more migrants settled in Andranomaitso, the original Bara occupants were progressively forced to move south of RN 7. Eventually, they retracted and went back to Sakaraha. This withdrawal symbolizes the victory of migrant agriculturalists over Bara pastoralists in Andranomaitso.

Not only did migrants begin to expand their fields, thereby clearing more and more forest, but illegal tree harvesting also became a common practice. Uncontrolled *hatsaka* caused fires in the village first in 1988, then in 1993 (some 80 houses burned down) and finally in 1998 (30 houses burned down).⁹

By 1991, rates of deforestation were so high that the state took measures to control the damage. One such measure was to replace the existing *Chef de Cantonnement* with a young E&F engineer who had acquired the reputation of a “tough guy” in other parts of the country. This replacement has been the Sakaraha *Chef de Cantonnement* ever since. With his arrival appeared the notorious *dinan'ny mpanao hatsaka* (discussed in detail below). In 1994, the World Wildlife Fund (WWF) came to support E&F's conservation efforts through Project MG 0048 Zombitse/Vohibasia.

Rules about the Forest

The three main forest products discussed in the survey were fuel wood (mentioned by 84.6% of respondents who answered the question), construction wood (53%) and food that supplement households' diets (28%). In addition, about 7% of informants mentioned taking medicinal plants out of the forest. In reality, illegal *hatsaka*, and especially illegal timber harvesting and charcoal making continue to be Zombitse forest products.¹⁰ Not surprisingly, informants were noticeably silent about these activities.

⁹ This is one version of the story. Some suspect that angry and frustrated Bara pastoralists may have set the fires, which is plausible.

¹⁰ This is so according to reports made by WWF agents to the *Chef de Cantonnement* and also based on infractions reported to the *Tribunal* by the E&F agent.

From responses to the survey questions about what rules apply in Zombitse, it is impossible to guess that this forest was once a sacred forest. In fact, all rules mentioned by respondents have a formal ring to them. This observation flies in the face of project documents that establish the project as a model for community-based conservation.

Fuel Wood

In the case of Andranomaitso, survey results are particularly useful in including rules outside of the *dinan'ny mpanao hatsaka*, for which this community is so famous (or infamous).

In the case of fuel wood, proscriptions dominate users' understanding of regulations on access to and uses of Zombitse. The most frequently mentioned rule has to do with not being allowed to sell fuel wood (79% of those who discussed fuel wood mentioned this). Another frequently discussed rule has to do with not being allowed to harvest (even dead wood) in the park (70%). Otherwise, just under half of respondents mentioned that it is forbidden to cut trees down for fuel wood (46%), and 46% cited species that are specifically forbidden.

As for enabling rules, the majority of those who discussed this product specifically said that they are allowed to pick up dry wood (70%), albeit exclusively from their fields. Hardly one or two people specified that they were allowed to pick up fuel wood on the edges of the forest and for cooking only.¹¹ Somehow, seven informants (about 21% of respondents) think that they are allowed to sell fuel wood. Of those, four think that they can sell fuel wood to anyone, whereas three say that there are restrictions on who may purchase the fuel wood.

With the exception of one respondent who said specifically that users are to follow rules, no prescriptions about fuel wood were discussed.

Construction Wood

Examining rules about construction wood further shows that state rules dominate Andranomaitso villagers' understanding of restrictions to accessing Zombitse and surrounding forests. Out of 21 respondents, 8 (i.e., 38%) mentioned that they harvest timber for construction in specific sections *outside of* Zombitse National Park. All the other informants said that the forest of Hazoroa, south of Zombitse, is their source of construction wood.

Here, proscriptions and prescriptions dictate. Respondents are unanimous (100%) about prescriptions: one must obtain a cutting permit from E&F prior to harvesting wood for construction. In addition, one must follow regulations specified in the permit.

As for proscriptions, five types were mentioned, most important of which were harvesting in the park or in unauthorized areas (91%) and selling timber (91%).¹² Just over half of respondents additionally said that there are restrictions on species and size of trees (52%). Strictly forbidden are *hazo malagny* (*Hazomalania voyroni*), *magnary* (*Dalbergia trichocarpa*) and *hazomena* (?). 29% specifically said that it is forbidden to harvest trees from October to April.

In this case, it is difficult to say that enabling rules per se exist, since what is allowed is merely what is not forbidden. Specifically, species not listed under proscriptions appear under

¹¹ When actually asked where they pick up their fuel wood, however, almost all respondents specified the area that separates the village from the limits of the park.

¹² This is confirmed by the fact that 95% of respondents who discussed construction wood said that it is forbidden to sell timber in answer to the question specifically about selling forest products.

permissions, most commonly *katrafay* (*Cedrelopsis grevei*) and *forofoky* (*Securinega seyrugii*). Though these species are abundant and strong, their drawback is that they tend to be small in size.

Other Products: Food, Medicine, Hatsaka

Barely 34% of people surveyed discussed a third forest product, and 11 out of the 15 who did mentioned food, though only 5 discussed rules pertaining to food. Three people mentioned medicine and only one discussed *hatsaka*. The thin survey information nonetheless allows us to see that for food and *hatsaka*, state rules dominate, whereas for medicine, customary rules apply.

As far as food is concerned, entering and harvesting from Zombitse is forbidden, but taking honey out of dead trees is permitted. No prescriptions regarding collecting food in the forest were mentioned.

The Dinan'ny Mpanao Hatsaka

No discussion about rules regulating the use and conservation of Zombitse would be complete without examining the *dinan'ny mpanao hatsaka*. As mentioned earlier, this *dina* was a measure taken by E&F to control deforestation due to the practice of *hatsaka* in the area of Zombitse. It acquired fame in conservation and decentralization milieus because it was one of the first and, indeed, rare attempts to effectively decentralize resource management in Madagascar.

Faced with an increasing number of agriculturalists, local Bara pastoralists, led by two prominent *mpanarivo* (the Bara term for owners of a large number of zebus), took the initiative to curb the problem in two ways. One *mpanarivo* followed legal channels, going through the various echelons of decision-making, to file complaints and draw the attention of state authorities to the fact that his (and others') pasture was going to flames. The other one took matters into his own hands and sabotaged crops by letting his zebus pasture in *hatsaka* at night. These local initiatives did not yield change, as *hatsaka* persisted and tensions grew dangerously in the community (Koto 1996).

Partly in reaction to weak local initiatives, E&F attempted to come to join forces with Bara herders in 1991 by instituting a *dina*, or convention, and by involving the community in the drafting of it. In its first form, the *dina* spelled the following: "It is strictly forbidden to clear new parcels [of forest]. Or else, rule-breakers will have to abandon their land to the state and their crops to the community. In addition, they will be fined." Although this initiative was promising, the results turned out to be disappointing, as enforcement was weak.

In 1994, WWF came to the area to manage the complex of Zombitse and Vohibasia forests (See Map 1). One of the first actions WWF took was to reinforce E&F's initiative and update the 1991 *dina*. In some ways, the 1994 *dina* was a reminder that a *dina* applied, but what distinguishes the second from the first version is the inclusion of community-based monitors. In an attempt to show good faith and flexibility, the state exceptionally granted rule-breakers permission to keep their crops that season, but it also ordered them to abandon their parcels for good once the growing season was over. The fine was also increased supposedly to the point of making a difference in villagers' behavior (according to villagers themselves). This time again, and in spite of the presence of village-based monitors, problems of enforcement made the *dina* less effective than desired.

So, in 1995, having realized that some state actors from Sakaraha were sharecropping (and thus encouraging *hatsaka*) in Andranomaitso, WWF sought to include a wider range of Sakaraha-based authorities so as to tighten monitoring. In fact, the 1995 version of the *dina* goes along the following lines: “The *dina* is maintained, and an effort is explicitly requested for enforcing the rules (which is the responsibility of both community and state authorities). Rule-breakers will be turned in so that state authorities duly sanction them. A fine will be imposed for infractions.” This time around, *hatsaka* came under better control, but the fact that WWF decided to place agents in the community of Andranomaitso to reinforce monitors’ efforts may be an indication that results remained inconclusive. In the words of a villager, “It is the presence of WWF agents in the village that created fear of entering the forest,” thereby reducing the number of infractions.

Local Reactions to Rules

Reported Infractions

The people of Andranomaitso have the reputation of being bold and rebellious. Not surprising, therefore, this community has the highest percentage (27% of respondents) of people admitting to having broken a rule at one time or another.¹³ Although more respondents claim that community members as well as outsiders tend to comply with rules, reported rates of rule breakers who got caught are particularly high for this community: around 87% of respondents acknowledged that someone got caught breaking a rule (forest legislation, *dina*, and *faly* taken together).

Strangely enough, when asked if they consider the rules to be binding (for each product), a greater share of respondents claim that they feel bound by formal/state (vs. community) rules, especially for construction wood for which 95% claim to be constrained by E&F regulations. The gap is not as great for fuel wood (52% feel restrained and 49% do not as much); and the situation is actually reversed for the third forest product for which 40% feel bound (and 60% not so much) by those (community) rules that apply.

Though some distinction between formal and community rules was made in the survey discussions, contrary to Andranoheza, formal rules largely dominate the institutional landscape in Andranomaitso, especially if one considers the *dina* to be more state-imposed than community-based. It is no exaggeration to say that all uses, for all products discussed in or outside of the household surveys, are regulated by state rules.¹⁴

Perceived Legitimacy of Rules

How, then, do respondents assess the legitimacy of rules? Many respondents (61%) acknowledged that they had problems with the fact that existing rules do not take their needs into account; that the rules are not fair; that the rules get in the way of people’s aspirations (mostly expanding their agricultural fields). When asked, however, if there are rules that they reject, most respondents (86%) said “no” on the grounds that they had no choice, anyway. This seems to be a

¹³ The average figure for all five sites surveyed in the south is 18% of respondents admitting to having broken a rule at some point in time.

¹⁴ Some *faly* apply for fuel wood (some species are forbidden), but these *faly* do not concern everyone uniformly. This is different from Andranoheza.

clear indication that Andranomaitso people are not engaged in rule-making, contrary to the “participatory” discourse one often hears about the *dinan’ny mpanao hatsaka*.

What do respondents think about the absence of rules? Opinions can be summarized as follows: open access yields negative environmental and social consequences in the long run. Most of all, it is clear to 86% of respondents that resource depletion will be the result of no rules. Though about 16% of respondents consider the consequences to be economically beneficial (more agriculture, more yields, increased revenues from selling forest products), 73% nonetheless fear that forest depletion will lead to less rain, poorer crops (and the possibility of famine), no resources left for future generations, environmental degradation and, eventually, out-migration. Rules, therefore, are desirable and necessary. In fact, only one respondent suggested that rules be done away with.

On Modifying the Rules

Does that mean that people are satisfied with existing rules? In terms of what to do with or about existing rules, those who expressed their opinion on whether or not they wish for rules to be modified (36% of surveyed people) specifically said that a change in the rules was desirable. The biggest point of contention seems to be about increasing people’s opportunities to cultivate (some think that land already confiscated under the *dina* should be returned to those who cleared it; others are in favor of the state granting the community a portion of the forest of Zombitse for the community’s use) and to harvest fuel wood and construction wood by allowing limited uses of the park. For now, they feel that they are restricted to their own land for fuel wood and that the areas where they are authorized to harvest lumber are too remote.

Interestingly, some feel that sanctioning mechanisms are inadequate: first, there are no graduated sanctions and sanctions (notably incarceration) seem too harsh. Second, there is an imbalance in WWF’s vs. *fokonolona*’s power to sanction rule-breakers: WWF should turn the latter in to the *fokonolona* rather than to state authorities to decide on appropriate punishment. Surprisingly, one informant felt that repeated offenders should be expelled because they are a bad influence on other community members.

61% of respondents said that they had no opinion on this matter. This seems to suggest that more people are passive vis-à-vis these rules than not. Again, this is probably indicative of their lack of involvement in the rule-making and –modification processes.

How Illuminating Are These Two Cases?

The cases of Andranoheza and Andranomaitso communities, in some ways, may be easier to contrast than to compare. While it is true that the two communities rely heavily on forests that are protected by distinct sets of rules, the context in which their members utilize these forests present differences that should not be ignored.

First, proximity to the protected forest varies. In fact, in the case of Andranoheza, alternative sources of forest products are closer to the settlements, and they are in fact easier to access. Topography and distance make it rather unappealing for inhabitants of Andranoheza to frequently enter and make consumptive use of Analavelona forest. Gallery forests that surround the village territory provide ample supply of fuel wood and construction wood, which are the most frequently needed forest products. The situation is reversed in Andranomaitso since the settlement sits inside the forest, while accessing the authorized forest of Hazoroa, south of the main road, requires additional efforts in time and energy on the part of forest users. However,

fuel wood is readily available from surrounding agricultural fields, which allows people to think that this resource is not (yet) scarce.

Nor do Andranoheza and Andranomaitso people have equal access to markets for forest products and to alternative mechanisms of dispute resolution, both of which are concentrated in urban centers such as Sakaraha and Tuléar. The main weekly market and administrative center that Andranoheza residents go to is Mahaboboka, a small town located on RN7 some 27 kilometers from Sakaraha on the way to Tuléar. Reaching Mahaboboka is not as intimidating as reaching Analavelona except, perhaps, for the mandatory crossing of *Fiherenana River*, which is dangerous, if not impossible, during most of the rainy season. On average, it takes villagers less than three hours to reach Mahaboboka (several informants said that the travel time is equal to reach Analavelona and Mahaboboka). Most often, they travel by foot or zebu cart (*katraka*), following a relatively clear path. Modest health care services are available in Mahaboboka for both humans and animals (zebus), and so it takes a health emergency or some special administrative papers for Andranoheza residents to go to Sakaraha or Tuléar.¹⁵

Andranomaitso dwellers exclusively go to Sakaraha's weekly market and administrative offices when need be. On average, it takes them less than two hours to reach Sakaraha, traveling by car or bus and sometimes by foot (the distance to cover is about 12 kilometers). On average, they go to the market three Saturdays out of four, and they take care of administrative matters twice a month. When disputes are not resolved locally, trials take place in Tuléar's court, which is where most cases opposing E&F or WWF to Andranomaitso residents are heard. Frequent recourse to state institutions for dispute resolution tends to weaken local institutions (it dilutes the power of ethnic leaders to control the behavior of their fellow villagers) and increase the community's dependence on the state to resolve its disputes.

Another key difference between the two communities has to do with a sense of being a community, a collective unit that shares a past history (including institutions), customs and traditions, as well as a language. The histories of the two settlements of migrants allow us to understand why Andranoheza people share a sense of belonging to a *fokonolona* in the original sense of this Malagasy term (Razafintsalama 1981) while Andranomaitso people do not, at least not as much.¹⁶ The key difference seems to lie in the fact that the migrants of Andranoheza readily adopted Bara customs on Bara land, whereas Andranomaitso people maintained and even exacerbated ethnic differences by ignoring Bara customs. The clearest indication of this is the introduction of goats and sheep, which are strictly *faly* in Bara culture.¹⁷ Another indication is the necessity to have instituted "social contracts" to foster solidarity and mutual trust (Randriatavy 1994). These social contracts are mechanisms by which individuals or groups of individuals of, say, two ethnic clans, swear to always help each other (*ziva, fati-drà, vaky lio*, or *ati-kena*) or to never betray their common interest (*titike*).

In terms of ethnic composition, nine ethnic groups are represented in Andranomaitso. In Andranoheza and surrounding communities, only women claim non-Bara ethnic origins, but they understand that the *sine qua non* for joining the community is the respect of Bara customs.¹⁸ In the case of women, this is manifest in the rules regulating collection of fuel wood: *mampisaraka*

¹⁵ Only four respondents (13%) mentioned that they "rarely" go to Sakaraha to take care of administrative matters.

¹⁶ Razafintsalama offers a definition based on family origins (i.e., the *fokonolona* is a group of people who descend from a common ancestor) rather than settlement per se.

¹⁷ 18% of surveyed households keep sheep and 7% keep goats in the village.

¹⁸ For instance, the survey included Tanosy, Betsileo and Masikoro women.

(*Potameia thoursii*.) may not be used nor may it be burned without causing spouses to separate. All surveyed women acknowledged this *faly*.

In Andranoheza, more people think of the *fokonolona* in traditional terms (e.g., it is made up of the descendants of a common ancestor) than in administrative terms (i.e., it is made up of the inhabitants of the *fokontany* comprised of, say, five villages made up of one or several settlements). In the surveys, of those who answered the question, 65% used a traditional definition, whereas 35% used an administrative definition. In Andranomaitso, most informants (82% of those who answered the question) offered a village-based definition of the community: the *fokonolona* is made up of all inhabitants of different ethnic origins who live in the village. Four respondents offered a specifically ethnic/clan-based definition of the community, and three insisted on an administrative definition. It is important to note that even the “village-based” definition is more administrative than traditional, as revealed by the fact that the leaders are mostly thought of as administrative/state representatives rather than as traditional leaders per se.

Variations in ethnic diversity and differing reactions to being on Bara territory appear to influence the way these two communities organize and govern themselves. In Andranoheza, there is a clear separation between *fokonolona* affairs and *fokontany* (administrative unit) affairs. *Fokonolona* affairs tend to be about observing Bara customs, usually relating to death, disease, or agricultural tasks. Most commonly, a particular family organizes the event or ceremony that requires the participation of the community. In this case, participation in collective action is elective and voluntary. In the case of *fokontany* events, *fokonolona*-appointed leaders, or state representatives, convey orders from higher levels of the administrations and participation by all adults is mandatory. Repeatedly, informants mentioned that they gladly participate in *fokonolona* events because their desire to participate “comes from the heart” (*sitra-po*), because it is about livelihood, and simply because it is “fun.” They participate in *fokontany* affairs only because they are “forced” to (*terena*) and because they fear having to deal with the state if they do not. Given the option, they would likely participate in *fokonolona* events only. Overall, and in spite of motivational factors, there is no marked difference in participation between the two types of collective endeavor.

Likewise, people in Andranoheza are well aware of the difference between traditional leaders (called *Ray aman-dReny* or *olobe*, or *mpisoro*, or again *mpitakazomanga*) and leaders whom they appoint to be representatives of the state to them and of their community to the state. A *mpisoro* is a leader by virtue of his age and to whom he was born. His main role is to perform ceremonials, resolve conflicts from the household to the community level, and to reprimand, sometimes sanction, those who display behavior not considered socially acceptable. He is a well-respected figure whose final words are the words that all community members go by. Administrative leaders are appointed based on their personality and their ability to govern the community partially and fairly as well as to protect the community’s best interests.

In Andranomaitso, leadership is simply comprised of a community-appointed *président de fokontany* assisted by the heads of the nine lineages represented in the community. A president is head of this group of patriarchs. The latter institution is sometimes referred to as the group of *Ray aman-dReny*. In general, the *fokontany* president conveys the orders from “above” for collective work, whereas the lineage heads are in charge of mediating and solving disputes (often within their own ethnic groups).

In terms of what separates *fokonolona* from *fokontany* collective endeavors, culture plays little if any role. Rather, what is considered *fokonolona* work is work initiated by the community (e.g., hiring security guards from the military or clearing zebu paths). *Fokontany* work is work

initiated and ordered by the state. An often-cited example is cleaning the village. According to informants, what motivates participation in *fokonolona* work is the fact that monitors are close. The temptation to shirk on government work is great when monitors are not so close, though, in principle, a hefty fine awaits those who get caught not participating.

Production systems are also drastically different in the two communities. The most striking difference has to do with the practice of *hatsaka*, or slash-and-burn culture in Andranomaitso, where all surveyed households claim to grow maize and/or manioc using this technique. In Andranoheza, 80% of surveyed households practice paddy (irrigated) rice culture, while no one practices *hatsaka*.¹⁹ Additionally, while almost 67% of Andranoheza households own zebus, only 36% do in Andranomaitso. *What this means in terms of consumptive use of the forest is that Andranoheza pastoralists depends heavily on Analavelona and surrounding forest as standing forests, while Andranomaitso maize growers need to clear Zombitse to secure their livelihood.*

For forest products, nearly 97% of surveyed households of Andranoheza and 84% in Andranomaitso rely heavily on nearby forests for their subsistence. This difference in dependence on the forest may be due to the fact that sources of livelihood not derived from agriculture exist in Andranomaitso, where nearly 41% of respondents said that they derive income from a variety of activities including teaching, small commerce, mining sapphires, and working as mechanics. Charcoal making and selling fuel wood were also significant sources of income there until they were outlawed in the past decade. Again, these two uses are highly extractive and thus destructive of the forest.

The fact that production systems are drastically different and that rules regulating access, use and conservation of the two forests are designed to protect these forests against massive destruction reveals two significant facts. First, existing rules about these forests are compatible with Andranoheza people's production system, whereas they are at odds with that of Andranomaitso inhabitants. This fundamental tension between rules and production systems explains variance in compliance behavior. Second, the fact that community-devised rules such as the ones encountered in Andranoheza are conservation-minded makes these rules compatible with formal legislation. One can therefore offer that economically, institutionally and culturally, Andranoheza people are predisposed to comply with the rules that apply to Analavelona and surrounding forests.

This is not say that Andranoheza people do not break formal rules. For instance, it is a known fact that some cut timber without obtaining cutting permits from E&F first. Also, the fact that Belemokafo people (one hamlet in Andranoheza Bara) were fined for burning savanna without first getting a burning permit from E&F is an indication that herders can and do go about their business without taking formal rules into account.

Spatial data confirms this allegation: within Analavelona, a patch of forest has been burnt regularly for at least fifty years without creating trouble for the community. Again, the fact that Andranoheza is so removed from where law enforcement agents are used to operating that their infractions have largely remained unnoticed (or ignored). The opposite is true for Andranomaitso: *hatsaka*-related and other infractions are quite visible from a paved road, and so little effort is required to detect rule breaking. Even with illegal timber, charcoal and fuel wood commerce, the products have to travel on the paved road and pass through Sakaraha to make it to Tuléar. Clearly, thus, the probability of detection is higher in Andranomaitso than it is in

¹⁹ The surveys indicate that the inhabitants of Andohavondro used to practice *hatsaka* outside of Analavelona, but the practice has ceased for reasons that remain unclear.

Andranoheza. At the same time, however, the proximity of both the forest and the paved road makes it easier for Andranomaitso dwellers to harvest and market forest products.

Effectiveness of rule enforcement varies substantially between these two sites. As far as state rules are concerned, enforcement capabilities are clearly concentrated in Andranomaitso. According to survey participants, the *dina* is the rule most applied in Andranomaitso. In principle, the *fokonolona* is entrusted, through its lineage heads, with monitoring rule breakers. WWF agents assist the *fokonolona* in this task. If caught, the rule-breakers are referred to the *Président du Dina*, who decides on the sanction, depending on the nature and severity of the infraction. The sanction is called *von'ny dina*, which is usually a fine ranging from FMG 100,000 to FMG 500,000.²⁰ In addition, illegal forest products are confiscated. If the violator fails to pay the *dina*, then he is referred to state authorities, usually by WWF agents, and is most likely to be arrested by the *gendarmes* (the rural police force) to be sued and tried at the Tuléar court of justice. If found guilty, the accused serves time in jail.

While one can argue that lack of personnel and means of transportation seriously undermines E&F's monitoring capabilities, WWF has deployed more than enough force, so to say, to curb this shortcoming. Not only are WWF agents posted in the village of Andranomaitso (there were two permanent and at least two intermittent agents at the time of research), but Sakaraha-based agents check infractions practically every day. Besides, it is not all that clear, according to some, that increasing E&F's ability to tour the area will yield a decrease in infractions rather than the opposite.

Unlike E&F, WWF is well equipped (the project has two working all-terrain vehicles and six motorcycles for agents to use) and well staffed. There is no question that Andranomaitso residents view WWF agents as guards of Zombitse rather than a mere catalyst of decentralized, community-based, resource management, as project documents would have us believe. Instituting village-based monitors has yielded modest success, partly because the social contracts mentioned earlier render difficult telling on one's neighbors, but also because the village guards themselves have been the first rule-breakers according to some.

Such drastic a measure as implanting WWF project agents in the community to monitor behavior is indeed indicative of the weakness of enforcement mechanisms in place in the first two iterations of the *dina*. Before WWF came to support E&F, numerous informants mentioned that state agents (E&F and *gendarmes*) were the first to encourage rule-breaking by offering advice to known rule-breakers on how to conceal their infractions. Villagers, for instance, were advised to smuggle forest products (e.g., charcoal or fuel wood) at night rather than in the daytime. This advice was offered in exchange for gratification of various forms, most commonly financial. In addition, influential figures based in Sakaraha had a financial stake in overexploiting Zombitse, and so it was difficult to stop infractions without compromising one's physical or professional security.

Even if and when Sakaraha-based authorities do their job properly, i.e., if they refer rule-breakers to other branches of the government, namely the Tuléar court, there is still a problem with enforcing the law. Just for the 1998 year, the Sakaraha *Chef de Cantonnement* referred some 26 rule-breakers to the Tuléar court, and none of them were convicted. On several occasions, politicians praised this *Chef de Cantonnement* for doing his job, but they explained to him that it was not good to "kill the little people." Part of the reason some Andranomaitso residents are so arrogant with and challenging to Sakaraha-based authorities is because their and others' experiences indicate to them that they have the means to pay off judges and other court

²⁰ At the time of research, US\$1= FMG 6,000.

authorities and go home on the same bus as those who sue them. It is no wonder, then, that Sakaraha authorities grab their share of the pie instead of letting Tuléar authorities enjoy it.

In Andranoheza, in principle, law enforcement follows the following procedure: Every winter, the local state representative gathers the *fokonolona* to inform or remind its members of regulations regarding bush fires and cutting permits for construction. External enforcement agents are then in charge of monitoring behavior. If one gets caught breaking a rule, he is referred to the E&F Chef de Cantonnement who may or may not choose to fine him or to refer him to the gendarmes for arrest and incarceration. In Andranoheza Bara, no one has seen an E&F agent for at least a decade. When asked if someone from outside the community was entrusted to enforce the law and sanction rule breakers, only 20% of Analavelona respondents answered “yes,” while over 84% of Andranomaitso residents did.

Since 1998, two WWF agents have been assigned to the communities that use Analavelona. To village people these agents are “the spies” of the state. The Sakaraha *Chef de Cantonnement* himself says that he has never traveled to Andranoheza. He has, however, entrusted some *gendarmes* touring the area, usually for problems related to zebu theft, to monitor and report on infractions, just as he has with the two WWF agents.²¹ While the latter have been able to detect and report infractions regarding construction permits (with no apparent consequences for the communities), *gendarmes* have taken advantage of highly visible infractions such as illegal bush fires to solicit bribes from villagers.

Compared to Andranomaitso, state rules are known without being too clear to the people of Andranoheza. For instance, as far as enforcement is concerned, very few people make the distinction between the fine one can pay to avoid incarceration and a bribe. When asked, therefore, if there is a way out of punishment, twice as many respondents from Andranoheza (50%) than from Andranomaitso (25%) think that there is a way out because they have heard of fines paid to state authorities. Nor are some capable of distinguishing between an E&F agent (and how could they?), a WWF agent and a *gendarme*. To them, so long as one monitors their behavior vis-à-vis the law, they are grouped into a “*vazaha*” category, that is, individuals from whom to stay away. One of the reasons the people of this remote area want nothing to do with state authorities is because of multiple accounts of physical abuse on the part of *gendarmes*, be it for zebu theft or illegal bush fires. When asked how the law was applied in their community, one informant shared the following with us: “The gendarmes take whoever gets caught breaking a rule—whether or not he has actually broken a rule—to a quiet place, then they beat him up, and they force him to pay money.”

Clearly, the *fokonolona* of Andranoheza have little, if any involvement, in enforcing state rules. This is different from Andranomaitso, where almost 73% of survey respondents confirmed that some community members were entrusted with enforcing state rules (at the level of monitoring). This rate is much lower (less than 17%) in Andranoheza.

With community-based rules, the need for external enforcement agents has been minimal in Andranoheza since community members, having internalized rules, believe that the spirits are watching them and will punish them if they do not respect rules about Analavelona. This is not to say that villagers do not watch each other, quite to the contrary. However, monitoring has been necessary more for outsiders (people not considered part of the community of Analavelona owners) than for insiders. In fact, the only community members who could be considered outsiders are women who married into the community. Women’s uses of the forest are, however,

²¹ This is authorized by Madagascar’s forest legislation.

limited to fuel wood (and sometimes food) collection, which does not require them to travel to Analavelona. Therefore, they pose no threat to the integrity of the forest.

Rules or Context?

The main question this paper seeks to address is: *Are there characteristics of the rules themselves that make them more likely to be complied with in a domain like forest resource management, or does the differential effectiveness of rules depend on the contexts in which they are interposed or on other factors?* While my research hypotheses are undeniably rule-focused, research results suggest that rules do matter, but only if and when considered in the context in which they are applied. This context is ecological, political, economic, and cultural. I chose the cases of Analavelona and Zombitse to illustrate the point that both rules and contextual variables need to be taken into account to lay down the conditions under which rule regimes produce resource-conservation vs. resource-degradation behavior (Uphoff and Langholz 1998), respectively.

Looking at variables exclusively related to rules, the two cases confirm that rule fit; perceived legitimacy of rules *and* of authority; effectiveness of rule enforcement; and compatibility of community rules with state rules, on the one hand, and compatibility of rules-in-use with production systems, on the other hand, are valid explanations for rule compliance. Of those variables, two stand out as being particularly useful, namely compatibility of rules-in-use with production systems, and effectiveness of rule enforcement.

Compatibility of Rules-In-Use with Production Systems

Around Analavelona, community rules, which are based on beliefs about the forest, on norms, and on tradition, have proved effective in containing abusive uses of this sacred forest. For instance, birds may not be killed, as they are believed to host the souls of ancestors. The same goes for large trees. Rituals must be observed prior to extracting products from the forest. Small offerings are acceptable for hunting small mammals and harvesting honey, but a zebu must be sacrificed prior to cutting down a large tree to make a coffin. This forest thus is a toll good whose access is restricted by entrance fees of different kinds. In addition to balancing rules according to use, sanctions reflect the gravity of offenses committed: the bigger the offense, the heavier the sanction.

As was shown earlier, state rules dominate the institutional landscape in Andranomaitso, and they are not so adaptive as community rules of the sort mentioned above. For the main forest products that this community uses, namely fuel wood, construction wood, and land for maize culture, its members are required by law to stay out of Zombitse National Park, the closest forest, and use alternative sources to meet their needs. Yet, forest users feel that alternative sources are either scarce or too distant. Hence this community's aspiration for access to the park for selected uses such as picking up dead wood for fuel wood or for having access to an entire section of the park reserved for community needs. Even for Analavelona communities, state rules are predominantly expressed in terms of proscriptions and prescriptions.

There are two crucial differences between Analavelona and Zombitse communities as far as production systems are concerned. The first lies in the former community's livelihood relying heavily on the *standing* forest, with the latter heavily reliant on the *cleared* forest. Analavelona communities cultivate paddy rice, which renders their livelihood dependent on irrigation water. Analavelona constitutes their main water reservoir. Analavelona communities are also

predominantly Bara, an ethnic group that Elli (1993) refers to as a “cattle civilization” Analavelona communities’ culture and economies are based principally on cattle breeding and so they need the forest to shelter and graze their cattle. They also use the forest as a hiding place from zebu rustlers.

State proscriptions and prescriptions are therefore more of a hindrance for Andranomaitso than they are for Andranoheza. Another way of putting this is to say that state rules that restrict entry into and harvesting of the forest are not only compatible with community rules, which aim for the same limitations on access and use, but they also serve the purpose of Analavelona livelihood strategies. Simply put, rules agree with local needs for the forest. The fact that state rules are largely perceived as being illegitimate in the sense of superfluous, in this case, does not preclude effective conservation of the forest. In Andranomaitso, rules are hard to enforce because they are perceived as being illegitimate: they do not take people’s needs into account; nor are they flexible enough. Here, state rules clash with local needs for the forest. In response to this clash in purposes vis-à-vis the forest, some deliberately break the rules.

The second crucial difference has to do with the existence of cash vs. subsistence economies. Andranomaitso’s economy is based on agriculture and is essentially a cash economy. The people of Andranomaitso seek to generate income by selling products of the forests whose production requires extractive (and destructive) uses of Zombitse. This can only exacerbate problems of deforestation in Zombitse. In addition, the fact that markets for these products are easily accessible discourages changes in agricultural and commercial practices in this community. The economy of Analavelona communities is based on subsistence farming. Households consume most if not all of their crops. For those few who can produce enough rice to sell, the income is used to purchase small items such as sugar, salt, oil and coffee. Since access to markets for forest products are difficult to access (as is Analavelona, for that matter), most people are not yet eager to exploit Analavelona to generate income. At present, income generation does not generally involve forest products in this community.

Effectiveness of Rule Enforcement

Rule enforcement is said to be effective if and when it is done by way of consistent monitoring and sanctioning. Looking at the cases at hand, community rules are better enforced than state rules even when the latter seek to involve community members in the process of monitoring and sanctioning. The point has been made that forest legislation lacks flexibility, and enforcement is not so rigorous. For one thing, many actors are involved: fellow villagers (lineage heads) watch their peers; WWF agents watch villagers; E&F is called upon to sanction those who fail to comply with sanctions at the village level; then the gendarmes are needed to arrest the accused. Finally, the Tuléar court decides on the fate of rule-breakers.

And yet, village heads are bound by social contracts (not to mention family ties) that preclude honest and open reporting of infractions. WWF agents do the best they can, but they are not decision-makers. E&F lacks the necessary staff and mobility to carry out regular monitoring on its own. Besides, it is not so clear that E&F is actually willing to sanction rule-breakers if its agents can personally profit from being “forgiving” or lenient. The gendarmes have their own infractions to deal with. Finally, the Tuléar court is notoriously corrupt. In other words, there are holes in the system at every single level involved.

In contrast, Analavelona communities seem not only *capable* but also *willing* to monitor behavior in and around Analavelona. In fact, they do not rely on state intervention or assistance to protect Analavelona. Monitoring rests on both physical (fellow villagers) and supernatural (the

spirits of the ancestors) agents. This way, those tempted to break rules have to be willing to deal with a double risk of being caught. If caught by monitors “from above,” they are sure that sanctions will be hard to bear and negotiations will be unpractical.

Forest Accessibility

Our cases show that Zombitse appears to be more prone to overexploitation because of ease of access to the forest from the community. Over Zombitse, Analavelona has the advantage of being farther, distance-wise, and more difficult to access because of its terrain. One could therefore attribute differences in compliance behavior to accessibility of the forest from the community of forest users. The other cases included in this study, however, show that this is not a satisfactory explanation. I will use another “compliance case,” that of Iarindrano forest, to counter the argument that distance to the forest is a primary motivator for deforestation.

Iarindrano shares a similar experience with Zombitse in terms of how the relationship between the community and the forest has evolved. However, unlike Andranomaitso, Iarindrano is an excellent example of Bara control over Bara territory. As a Bara village, the community of Iarindrano has used the forest for pasture. However, beginning in the 1960s, the Bara lost control of the forest of Iarindrano to some *exploitants forestiers* authorized and protected by the state to harvest precious timber in the forest. The people of Iarindrano did not regain control of the forest until E&F chased the biggest *exploitants* out in the mid-1970s. Loggers left behind stayed on, but adopted Bara customs and ceased to take timber out of the forest. Instead, they converted to paddy rice culture. The travel time between the village of Iarindrano and the Iarindrano forest is no greater than the travel time from Andranomaitso to Zombitse. And yet, deforestation has not been a concern in this area since the main timber operation left the area.

The other three contextual variables our two cases have brought up are accessibility of markets for forest products, production systems, and what I term community cohesion. Since production systems have been discussed extensively, I will focus on markets and community cohesion.

Accessibility of Markets for Forest Products

Looking at the five cases under study, there is a direct relationship between ease of access to markets for forest products and incidence of deforestation. Andranomaitso is located on a main road, and therefore has particularly easy access to markets. Andranoheza, on the other hand, not only has the obstacle of Fiherenana River, but it also has no infrastructure to go to and from Analavelona. To move away from such extreme cases, it is useful to bring in another case from this area. Mitia, a community located south of Ihera forest (northeast of Analavelona) is another “non-compliance” case that shows that the existence of infrastructure, modest as it may be, and the absence of natural obstacles such as rivers and a steep terrain, combine to favor resource-degrading behavior.

As was the case in Andranomaitso and Iarindrano, the people of Mitia have experienced competition for access to their forest on the part of state-approved *exploitants forestiers*. Selective harvesting is, in fact, active to this day. The main manifestation of changes brought about by timber harvesting is the disappearance of trees large enough to make coffins. Although it takes some three hours to reach Ihera forest from RN7, trucks travel regularly to this forest to pick up timber on a weekly basis. Feeling left out from a profitable business and realizing that they too can transport lumber to the main road, using their zebu carts, some Mitia residents are

engaged in illegal harvesting, which exacerbates Ihera's deforestation problem. In all three other cases (Andranoheza and Mikoboka for Analavelona forest; Iarindrano for Iarindrano forest), potential loggers have to face the challenge of transporting enough lumber to make it worth their while.

Social Cohesion

For none of the cases studied is it true that all community members get along perfectly well and that they experience no conflicts or tensions. However, it is interesting to note that the most overtly disharmonious communities, that is Andranomaitso and Mitia, are the two "non-compliance" ones. As was discussed earlier, the history of how the community of Andranomaitso came together, its ethnic diversity, and its lack of shared traditions and past institutions preclude any feeling of forming a tight community. One way to represent the challenge that the community of Andranomaitso faces is to point out that actors belong to at least three spheres of interaction: a "community" that its members have a difficult time delineating socially; a *fokontany*, defined administratively but whose head is head of one of the nine lineages represented in the community; and a lineage, defined traditionally.

Though predominantly Bara, the community of Mitia has split up culturally (along religious lines, it seems), socially and administratively in the past two years as the result of internal conflicts which the *Ray aman-dReny* could not keep under control (presumably, in fact, the leaders were the instigators of the schism). At the time of this research, economic competition seemed to drive community dynamics. One way to keep up with the competitor has been to join in with illegal timber harvesting, as mentioned above. Clearly, this has worked against resource conservation.

Conclusion

Effective rule regimes, that is, rule regimes that succeed in producing resource-conserving behavior, are found in specific contexts. Some characteristics of rules explain why forest users follow or break them. For instance, a good balance between the three types of rules (may, must, must not) depending on the uses of the forest enhances compliance. Effective rule enforcement done by way of consistent monitoring and sanctioning (which do not preclude flexibility) also encourages compliance. Whether or not formal and community-devised rules are compatible with each other and with communities' productive systems is another important consideration to take into account in determining the chances that the rules will be respected.

As important as rules are, it is not sufficient to examine them outside of the context in which they are applied. The two cases presented in this paper show that geographic and social factors can weaken or enhance the effectiveness of rules. For instance, easy access to the forest, combined with easy access to markets for forest products, will challenge the strength of rule regimes. Likewise, communities that are eager to remain autonomous and independent from outside authority and that have maintained a strong governance system will have an easier time enforcing the rules that they devise.

It is also important to look at how two sets of actors, namely communities and state agents, agree or disagree on their purpose vis-à-vis the forest. The case of Analavelona shows us that when both the state (E&F and its partner, WWF) and communities see their interest in conserving forest resources, then community-based rule regimes are reliable for conservation.

However, as the case of Zombitse demonstrates, when the state and communities have clashing purposes vis-à-vis the forest, the state has to be forceful about implementing and enforcing rules. Moreover, the inclusion of communities in the rule-making and enforcement process is by no means a guarantee for successful resource conservation given that economic and social contexts also matter.

The rules-in-use, or rules as they are actually applied, are the result of how state and community actors interact with each other within specific and complex contexts. Whether they realize it or not, this reality constitutes the biggest challenge to advocates of decentralization of natural resource management in Madagascar as well as in other parts of the world. Policies or laws may simply obscure and never dismiss the complexities of deforestation, especially when they treat local “communities” in a reified manner.

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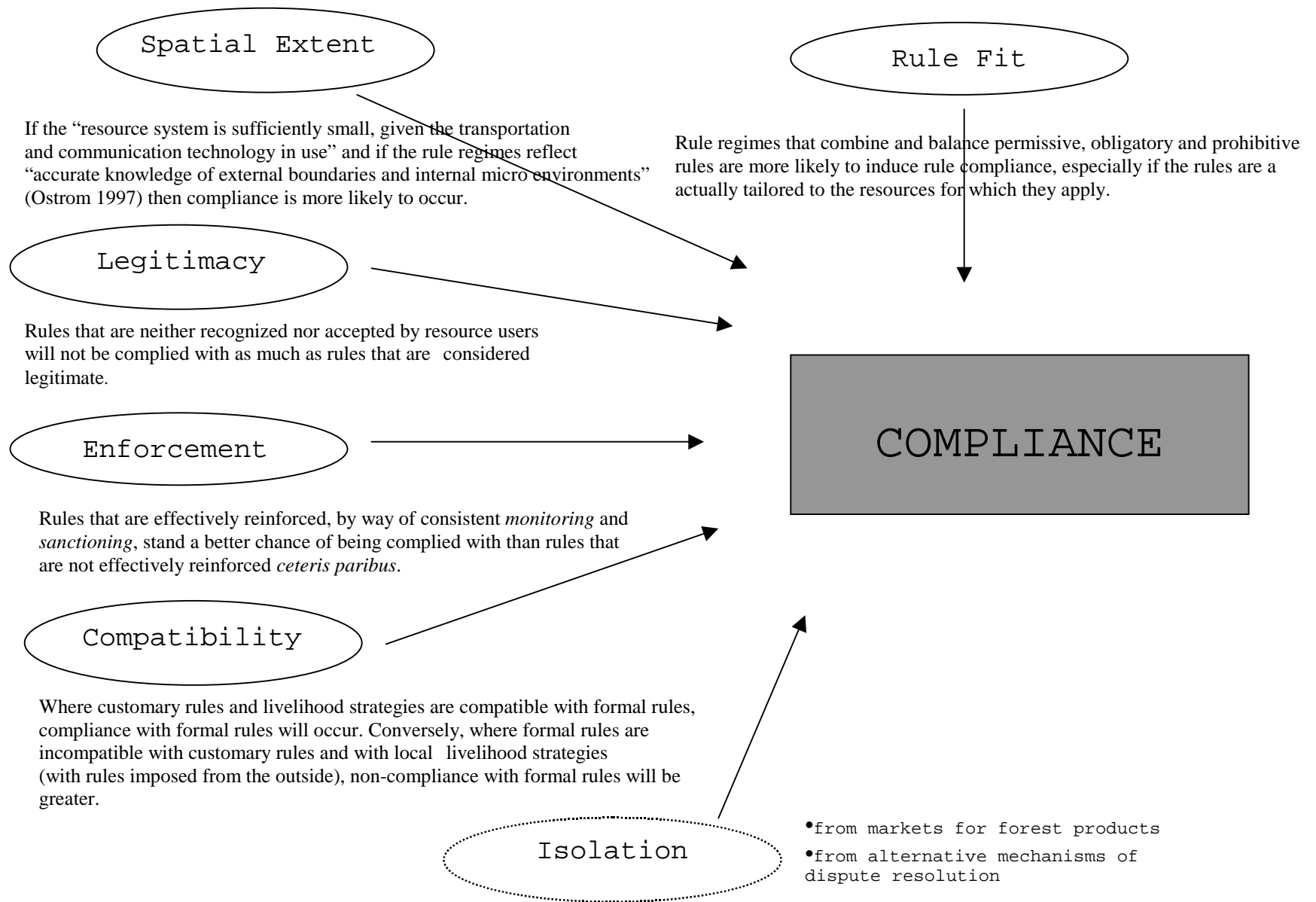
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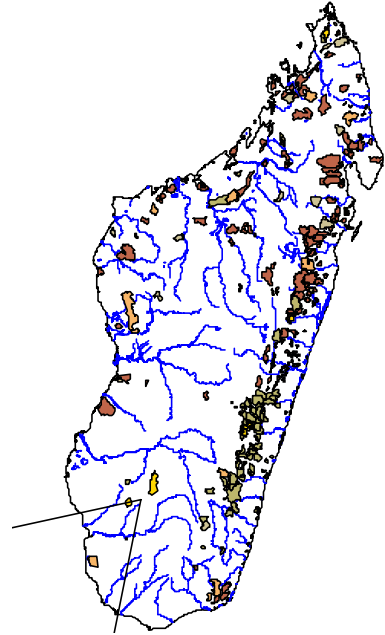
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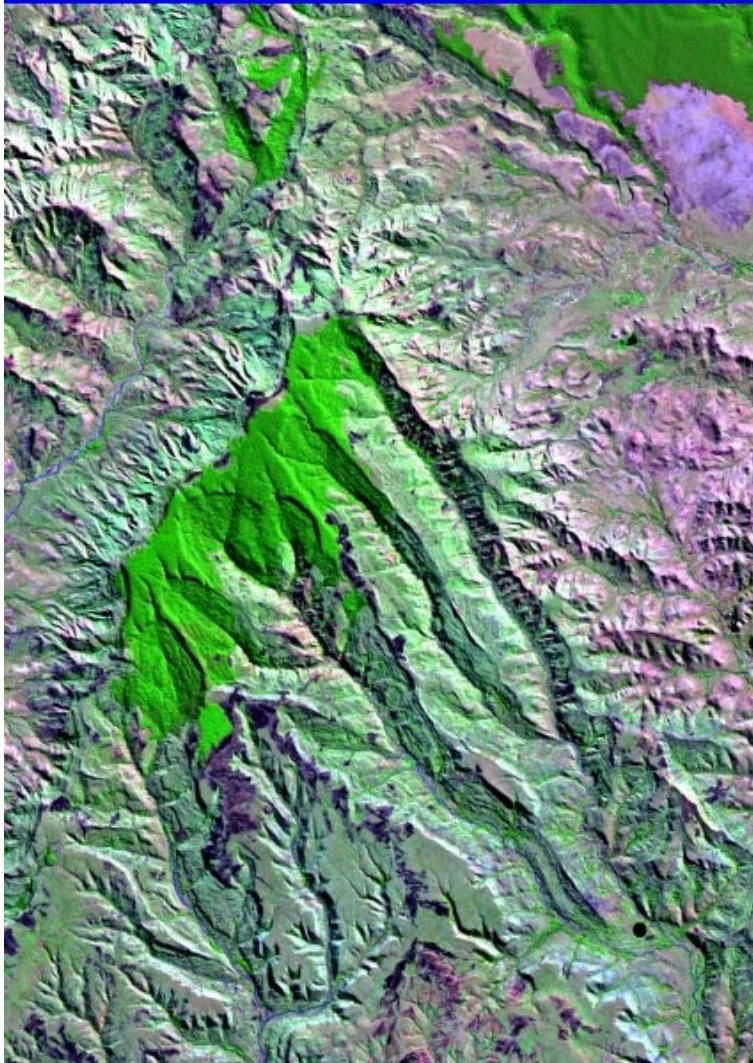
Annex 1



Annex 2: Madagascar's Protected Areas



Annex 3: Evolution of Forest Cover (1949-91), Analavelona Forest



Satellite image from 1991



Topographic map based on aerial photographs from 1949

