

THE LIMITS OF RULES:
WHEN RULES PROMOTE FOREST CONSERVATION
AND WHEN THEY DO NOT--INSIGHTS FROM BARA COUNTRY,
MADAGASCAR

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by

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To what extent can the enactment of rules achieve resource conservation? This study addresses the problem of deforestation and explores how the Malagasy state, in responding to this problem, has ignored the pluralistic arena in which forest users have devised local rule systems adapted to their respective social, political, economic, cultural, demographic, and natural environments to secure their livelihoods. These regimes coexist with the rule regime of the state, creating confusion or at least ambiguity that makes the efficacy of rules uncertain. This study explores the conditions under which rules-in-use may or may not have desired resource-conserving behavior (RCB) effects. Looking at local governance systems of five rural communities adjacent to four forests under varying protection statuses in Bara country in southern Madagascar, the relationships between rules and conservation outcomes are examined. Several instruments of investigation were combined to gather data on forest products, the rules that govern access to products and their uses, forest users' perceptions of the rules, and communities' conservation behavior. The study concludes that while rules can have some effect on conservation behavior, key actors' interests, which the rules serve, are the primary determinant of conservation outcomes. Key actors' success in monopolizing resource access, by using rules, rests primarily on the ability to enforce rules and their ability to legitimize their authority vis-à-vis forest users at the local level.

BIOGRAPHICAL SKETCH

Nadia Rabesahala Horning teaches Political Science at Middlebury College, in Vermont. Before starting her doctorate in Government at Cornell University, she worked as an international development consultant for Associates in Rural Development (ARD, Inc.). During that time, she conducted research on institutional aspects of natural resource management in her native country, Madagascar.

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*Atolotro ho fahatsiarovana ny raiko, Rabesahala Jacques, ity asa ity
noho ny fitiavana feno nomeny ahy.*

To my ancestors, including RAM Edward F. Blasser.

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CHAPTER 1

FARMERS, FORESTS AND THE STATE

"Appropriation is, after all, largely the purpose of domination."

James Scott(1992: 111)

At the beginning of the twenty-first century, environmental conservation is a matter of concern to a variety of actors, including farmers, national and international NGOs, business people and governments the world over. This thesis addresses one of the forces behind environmental degradation, namely deforestation: the ways in which this phenomenon has shaped state-society relations in the specific context of Madagascar and how it has, in turn, been influenced by these relations. To be sure, relations between the Malagasy state and forest-dependent farmers have been tense for decades. This first chapter reviews how state intervention, through formal decrees of a prohibitive nature, has largely ignored the pluralistic arena in which forest users, at the local level, have devised their own rule systems to secure their livelihoods, in terms of both subsistence and cultural survival. These rule systems co-exist or clash with state regulations.

There are two different perspectives on deforestation. One regards Malagasy farmers as the principal agents of forest degradation, associated with poverty, lack of education, and a tendency to increase in numbers. An alternative perspective considers that deforestation should be of concern as much to resource users as to policy makers inasmuch as it threatens rural livelihoods and cultural identities while at the same time it destroys natural habitats and the biodiversity that forest habitats host. The roles that rules play in governing social and political relations are very different to these different perspectives.

What follows is a discussion of the historical relationships between the Malagasy state and villagers whose livelihoods depend on their ability to access forest resources. The account shows how conventional economic and demographic explanations of deforestation have neglected other variables that help explain why the country faces crises of deforestation and what are the ecological, social and economic consequences it imposes on the nation. It further highlights the fact that, despite divergent perspectives on the reasons for a dwindling supply of natural resources, rules of some sort are involved in the respective coping strategies that both state and farmers have devised to deal with the increasing problem of resource scarcity.

The state for its part has historically responded to deforestation with forest legislation, setting and trying to enforce restrictions, while farmer communities have devised governance systems intended to adapt their production systems to environmental limitations and to social, economic and demographic changes. Within these governance systems, rules regulate the ways in which people interact with one another and with forest resources, with predictable consequences for exploiting or preserving them.

September 2003: President Ravalomanana Makes Conservation History

In September 2003, Madagascar's president, Marc Ravalomanana, made conservation history when he announced his government's intention to more than triple the total area under (state) protection, going from the current 1.7 million hectares to 6 million hectares in five years, at the Fifth World Parks Congress in Durban, South Africa. This ambitious and astonishing plan received enthusiastic praise from leading conservation organizations, whose representatives declared: "This historic decision is a gift to the Earth that clearly signals Madagascar's commitment to saving its unique and spectacular wildlife and habitats," to which another added that such a decision "was

unimaginable a few years ago and needs the fullest possible international recognition and support" (www.forests.org).

This announcement and the response that it received are a good illustration of the conservation logic on which Madagascar's conservation models have rested. The fundamental causal link that underlies conservation models there persistently attributes conservation to increased protection status under the aegis of the state. Simply put, more and stricter state rules will lead to more RCB. Yet, the cases examined in this study show that rules are consistent with resource conservation and resource degradation alike, depending on the particular contexts in which the rules are introduced and enforced.

The Deforestation Puzzle in the Malagasy Context

Beginning in the mid-1980s Madagascar caught the attention of the international community due to the alarming rates of deforestation manifested by this biodiversity-rich island (Green and Sussman 1990; Horning and Nelson 1991; Sussman et al. 1996). At the same time, Madagascar was also one of the poorest nations in the world, contrasting economic poverty with biological richness.

As development and conservation proponents faced the alarming fact of forest depletion and the environmental degradation that came with it, explanations emerged as to what could be done to slow down this degradation and the loss of biodiversity that ensued. Starting in the mid- to late 1980s, foreign donors began to collaborate with the government of Madagascar (GOM) to "stop the spiral of environmental degradation."

It is important to note at the outset that motivations for addressing the problem of environmental degradation have not always been the same for foreign donors and the Malagasy government. Interest among conservationists in preserving the

environment initially appeared to favor conservation for its intrinsic value, while Madagascar's 1990 Environment Charter calls for integrating environmental conservation into the country's overall development goals.¹ Over time, interactions, experiences and negotiations resulted in political and financial agreements that took the concrete form of conservation projects. Oddly, these negotiations over environmental protection did not begin to involve resource users until the late 1990s (Office National de l'Environnement Mission Statement).²

From this perspective, the culprits were identified. Those farmers who depended on forests, who were poor, growing in numbers while remaining uneducated, were deemed largely responsible for deforestation. For many decision-makers it stood to reason that improving the socio-economic conditions of rural people living near forests should result in successful conservation. This view subscribed to the "win, win" logic whereby livelihood improvement and environmental protection are assumed to be compatible and mutually reinforcing, as was embodied in Integrated Conservation and Development Projects (ICDP) (Horning 2005). Under the logic of ICDPs, a core area is designated as off-limits, while a buffer zone is reserved for limited subsistence uses (CIIFAD 1997-1998). In Madagascar, financial support for ICDPs was secured through the US Agency for International Development (USAID) and the Malagasy government starting in the early 1990s. Table 1.1 summarizes the type of data that state and foreign decision-makers used to marshal their arguments as to the causes of deforestation.

¹ »Cette politique nationale de l'environnement se propose (...) d'intégrer la politique de développement dans le développement global du pays. «

² Nos missions correspondent aux résultats attendus en fin de programmes (...)

- Mettre en place une structure pérenne de protection et de cohabitation saine entre la population et son environnement,
- *Dégager un schéma d'autogestion de l'environnement par les populations* (author's emphasis) (ONE 2003).

Table 1.1. Statistical Facts about Madagascar (1985-2005)

	1985	1990	1995	2000	2005 (projections)
Geography					
Total surface area (sq. km)	592,000	592,000	592,000	592,000	592,000
Demography					
Total population (million)	10.7	12.6	14.9	17.4	20.3
Rural population (million)	8.5	9.7	10.9	12.3	13.6
Percentage rural population	79.4	77	73	71	67
Population growth rate (annual)	-	3.39	3.25	3.13	3.04
Rural population growth rate (annual)	-	2.7	2.47	2.27	2.11
Population density (per 1000 hectares)	183	217	256		
Literacy rates (percent)	-	-	-	53-67	-
Economy					
Labor force (million)	4.5	6.0	8.2	-	-
GNP per capita	280	220	200	230	-
Annual growth rate			3.0		
Agriculture (including forestry and fishing) as a percentage of GDP			34		
Protected Areas					
Total protected areas (millions of hectares)				1.7	6.0.
PAs as a percent of total land area	-	-	-	3.1	10.9

Sources: CIA (2003); unhabitat (2004); abacci (2004); UNESCO (2004);

Earthtrends (2003).

Before ICDPs had a chance to show positive results in terms of conservation or livelihood (Uphoff and Buck n.d.), a new category of projects were launched to address increasing criticism to the effect that protected areas, of which ICDPs were part, failed to maintain the existence of functioning, sustainable ecological zones, or

eco-regions. This new approach called for delineation of "corridors" linking various natural habitats into larger units of conservation. This approach has been operationalized since the late 1990s.

The Malagasy State's Perspective and Coping Strategies

Since King Andrianampoinimerina united the kingdoms and societies of Madagascar into a relatively integrated political system in the late 1700s, the state has presented itself as a fierce guardian of the forests (Harper 2002). To this day, all forests are considered the sole property of the state (*domaine de VEtai*), which means that the state is the ultimate sovereign power, entitled to decide how best to exploit them. As the ultimate guarantor of sustainable forest management, the state has long exercised tremendous power over forest users, ranging from forest-dependent communities to *exploitants forestiers*? Using cumbersome, complicated legal procedures, the Malagasy state, most observers have concluded, has favored the latter, often to the detriment of the former.

From the standpoint of the state, farmers have threatened the nation's interests with their "irrational" exploitation of natural resources, whereas *exploitants forestiers* were seen as crucial instruments of economic development. The diagram in Figure 1.1 illustrates how the Malagasy state has long depicted Malagasy farmers as getting in the way of rational, sustainable forest exploitation.

³ This French term is used to refer to logging companies of all sizes.

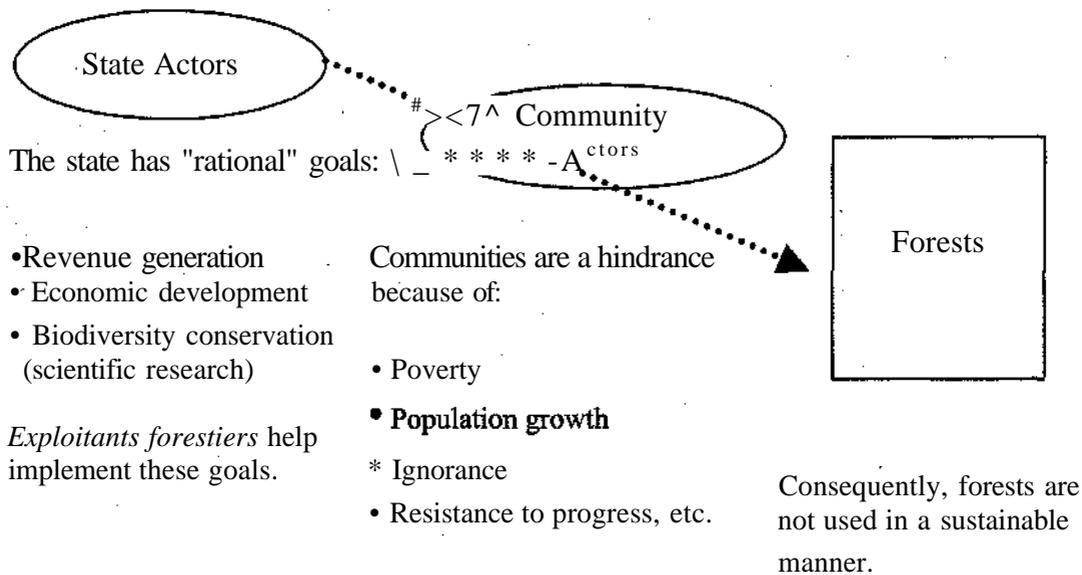


Figure 1.1. How the Malagasy State Portrays Forest-Dependent Farmers

Blaming farmers' agricultural practices has resulted in, and in some ways justified, repressive behavior on the part of the state from the days of the monarchy to the present (Jarosz 1996). There is little doubt that the practice of slash-and-burn agriculture, coupled with increasing demographic pressures in rural areas, has come at the expense of forest and, therefore, biodiversity conservation. What is questioned here is the validity of explanations for deforestation that do not pay due attention to the ways in which rules regulating the use of Madagascar's forests have affected resource conservation. To better understand the extent of the problem, one needs to shift the locus of causality away from social and economic problems afflicting farmers to institutional and historical ones.

Protected areas have represented the most explicit attempt at keeping farmers out of forests. Their protection is governed by forest legislation that was enacted when such areas were first established in the early 1930s, i.e., during colonial times. So long as the colonial state was willing and able to enforce its own laws, forest legislation

was effective in terrifying farmers into compliance. Upon independence, in 1960, the Malagasy state preserved the system of protected areas that the French had developed, as well as the forestry legislation that governed their protection. A drastic change came about, however, when the state espoused Marxist-Leninist ideals upon launching a socialist revolution in late 1975. To reflect collectivist ideologies, the state proclaimed that all resources were to be the property of "the masses," for which slogans were blasted on the radio, quickly reaching rural areas. Farmers wasted no time exercising their newly acquired "rights" to take possession of land, sometimes by clearing forests. This was an environmental disaster on the national scale. In the meantime, designated protected areas were maintained.

It was in the context of this scramble for natural resources that the severely impoverished Malagasy state opened up to the international donor community at the start of the liberalization phase of the mid-1980s. It was not long before foreigners began praising the value of the island's biodiversity and, mimicking the Malagasy state, identified farmers' practices as the main cause of deforestation. Now the state assumed the role of guardian of Madagascar's forests with outside financial and technical support.

Conservationists' insertion into the Malagasy political landscape coincided with the introduction of liberalization reforms that Western donors were beginning to recommend to the Malagasy government whose socialist policies, backed by the eastern bloc including the Soviet Union, China and North Korea, had failed to produce a functional political and economic system capable of delivering basic goods and services to the Malagasy people. Liberalization reforms thus represented a unique opportunity for conservationists to come in and have access to the island's biodiversity

capital. For the Malagasy state, environmental conservation represented a new opportunity to attract foreign aid, this time from different Western countries.⁴

It also coincided with the philosophical shift in what was to be understood by development. Whereas development had thus far entailed states meeting the most basic needs of their citizens (food, shelter, health and education), the concept was expanded to include economic growth, social equity, and environmental protection with a concern for meeting "the needs of present generations without compromising the ability of future generations to meet their own needs" (World Commission 1987). This shift came about as the result of global actors' awareness that poverty was afflicting more and more human beings throughout the world and that many of the poor were heavily reliant on natural resources to secure their livelihoods.

Partly because of the state's renewed conservation fervor and accompanying attempts at keeping farmers out of the country's forests, many farmers came to perceive conservation as a hindrance to securing their livelihood. Figure 1.2 shows how farmers' perceptions are reversed from those of the state. Policy inconsistencies, as well as arbitrary and erratic rule enforcement on the part of the state, continue to compound the problem of negative perceptions. Especially around protected areas, farmers feel that their claims to the forests are legitimate, based on their cultural heritage and the production systems that they have maintained for decades, if not centuries. While state representatives, ranging from forest agents to judges in provincial courts, have treated farmers condescendingly at best, *exploitants forestiers*

⁴ Incidentally, this phenomenon was not unique to Madagascar in that most other African leaders became adept at attracting foreign aid in order to maintain their regimes in power through strong clientelistic networks (see Chabal and Daloz 1999, Chapter 7 and Van de Walle 2001, Chapter 5).

have been given the opportunity, through cutting permits, to benefit from exploiting forests that farmers could not even touch, not matter how badly they needed them.

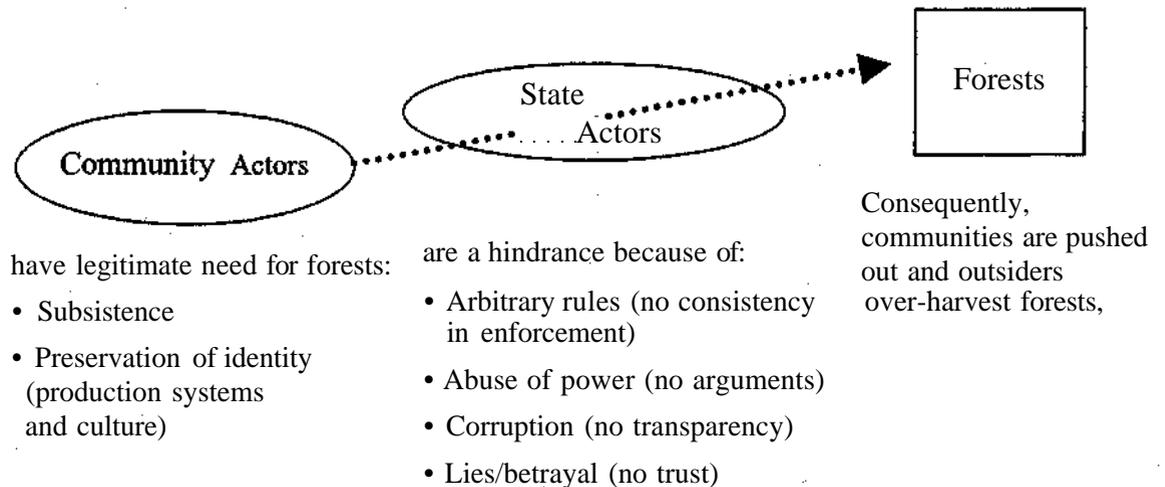


Figure 1.2. How Rural Communities Perceive the Problem of Deforestation

One of the original goals of protected areas was to preserve the uniqueness of the island's most unique natural habitats, mainly for research.⁵ In fact, the most recent legislation passed on protected area management defines a protected area as an area deserving of legal protection against natural and artificial (i.e., man-made) degradation because of its biological, natural, aesthetic, morphological, historical, archeological and cultural value (GOM Loi N° 2001-05). The scientific and other non-material values of protected forests are ones that many rural Malagasy have learned to doubt or ignore. Instead, many farmers suspect that some underground wealth is hidden in those protected areas, and this is why they are being kept out.

The relatively recent discovery of sapphires and other precious gems within forest tracts extending from the north (Amber Mountain and Akarana) to the south

⁵ *Réserves Naturelles Intégrées* (RNI), for instance, were to be penetrated by researchers only.

(Zombitse and Vohibasia), some running through protected areas, has done little to erase such suspicions. Since the sapphire exploitation of the 1990s, even the Malagasy state's political will to defend the island's protected areas has been put to the test because of the income opportunities such non-renewable resources afford. Lured by the prospect of huge financial gains, foreigner prospectors, state officials and local villages rushed to these areas to exploit their valuable mineral wealth. In the process, private business people were granted mining permits around but also inside protected areas, once again exposing the Malagasy state's inconsistent behavior.

Parks, People, Poverty and Practices: What about Institutions?

In the flurry of theoretical debates on the causes of deforestation and project development, little attention was given to institutional factors affecting forest use and management at the community level. This is not to suggest that institutions were ignored, but that the focus remained on the national level. To be fair, conservation organizations began to incorporate institutional elements into their mission statements, probably to reflect the government's push for decentralization of natural resource management in 1996 (GOM Loi N° 96-025). Increasingly, international and Malagasy NGOs and foreign donors, as well as the Malagasy government itself, began to incorporate "local communities' participation" and "institution building" into their conservation approach, a trend illustrated by the following Malagasy NGO's "conservation philosophy" statement:

Conservation Philosophy

The pervasive degradation of natural resources in Madagascar has led FANAMBY to focus on improving the way resources are managed. FANAMBY aims to develop local competence in sustainable resources management in its intervention areas. *Our conservation philosophy focuses on two objectives; one, building human resources - capable of managing and protecting natural resources; and two,*

teaching rural populations the laws governing their natural resources. We have developed over the last 5 years a replicable conservation model, which is based on the creation of legally protected areas within the framework of a regional management plan. In compliance with the decentralization policy of Madagascar, these actions aim to empower managers at the local level and involve them in all initiatives, from designing conservation and development programs to implementing them. (Fanamby 2003, author's emphasis).

In spite of conservation players' intentions, the scope of institutional goals remained limited, as "institutions" were persistently understood to mean government agencies such as the Malagasy Forest Department (*Eaux & Forêts*, or E&F), some local government agencies and, sometimes, state regulations or laws about forest resources. In order to overcome institutional obstacles, therefore, it was necessary to support Malagasy state agencies involved with resource management (E&F; the land titling agency, *Domaines*; the mapping agency, FTM; the state agricultural research agency, FOFIFA, etc.) and even to create new ones (COMODE, ANGAP, and ONE).

The creation of new conservation-focused institutions was not mandated by the need for new institutions per se, as much as it was to circumvent corrupt practices that prevailed among civil servants, particularly foresters who had much to gain financially from illicitly exploiting forest resources. Because corruption was a politically sensitive subject, at least in the mid-1980s to early 1990s, donors had little choice but to work around, rather than with the system, as the government pressured them to do, and created a "sanitized" institutional environment in which the business of conservation could be conducted in ways compatible with Western donors' principles and practices.

Improvements in biodiversity protection and rural livelihood hardly seem commensurate with the "institutional support" that Madagascar has received since the late 1980s. At best, a great deal of confusion has resulted from increasing the number of agencies and actors in charge of conservation and development. As one E&F agent expressed frankly in 1999, "So many people are now in charge [of conservation] that I

do not see how anyone can blame us [E&F] for not doing our job right." As for improvements in rural livelihood, they have yet to materialize (Zeller et al. 2000; Patemostro et al. 2001). Could it be that the strict interpretation of institutional support continued to delay progress in biodiversity conservation and economic development?

Defining Institutions and Connecting Institutions with Rules

To understand and utilize institutions in a meaningful way for conservation, they should be distinguished from organizations, regarding them comprehensively as "complexes of norms and behaviors that persist over time by serving collectively valued purposes" (Uphoff 1986, p. 9). There are thus some institutions that are organizations (structures of recognized and accepted roles) and some that are not. In *Governing the Commons*, Elinor Ostrom (1990) defines institutions in a more restrictive way as

... sets of working rules that are used to determine who is eligible to make decisions in some arena, what actions are allowed or constrained, what aggregation rules will be used, what procedures must be followed, what information must or must not be provided, and what payoffs will be assigned to individuals dependent on their actions (p. 51).

Institutions in this narrower sense involve standards of behavior, defined according to rules and norms, which are statements—written or not—specifying what is forbidden (proscriptions), what is permitted (permissions), and what is obligatory (prescriptions). Unlike norms, rules must specify what sanctions (...or else) are operative in case of non-compliance (Crawford and Ostrom 1995). For instance, in one area investigated for this thesis, community members are not supposed to sell what they extract from the forest to fellow villagers (honey being an exception). Doing so amounts to admitting one's economic desperation, a situation that is socially

viewed as downgrading and to be avoided. On the other hand, as discussed in the empirical chapters, using a particular species of wood for firewood is strictly forbidden in Bara culture. The sanction for transgressing this proscription is severe, ranging from separation from one's loved ones to illness, divorce, or even death. The latter is an example of a rule (one must not... or else), whereas the former is a norm ("it is not done").

Institutionalists argue that rules provide incentives and disincentives that influence users' cost and benefit analyses when it comes to deciding whether to conserve or exploit forest resources (Ostrom 1990; Thomson 1992). To be sure, rules are not static. Rather, they emerge from dynamic interactions that entail collaboration, competition and, sometimes, mutual ignorance among actors who, in the case of forest management, find it in their interest to exploit, overexploit, or conserve forest resources at a given time and over a period of time.

Do Rules Matter?

The state discourse on farmers as the main agents of deforestation curiously bypasses the question of how come some forest users treat forest resources as open-access goods, i.e., as if no rules governing their use and conservation existed, while others employ rules to limit their access and uses. Given that both state and farmers' coping strategies rely on the formulation and enforcement of rules (formal legislation and community-devised rules), one should ask whether explanations for deforestation that pertain to rules do not apply, as well. More broadly, how important are rules to the management of natural resources? Could they be efficacious in certain environments and less so in others? What components of these varied environments, other than economic and demographic ones, might be significant?

This study examines what kind of rules, with what purposes, devised and applied in what contexts, are likely to induce resource-conserving or resource-degrading behavior. It looks at the conditions under which compliance with rules is more or less likely to occur. Understanding compliance with rules is important because it helps illuminate the question of what causes people to use forests in ways that may compromise future, and even current, generations' ability to rely on them for livelihood. Ultimately, it helps account for deforestation, albeit possibly in indirect ways.

The empirical chapters that follow show that, under certain conditions, rules can and do foster resource conservation, as the Malagasy state's logic suggests. In other contexts, however, rules are largely irrelevant. This research indicates that when rules matter to conservation, compliance with them depends on two key factors. The first factor involves the key players and their purposes vis-à-vis forests. Essentially, players' choices are: conserve, exploit in a sustainable manner, or overexploit the forest for immediate gain.⁶ While demographic and economic forces may motivate these purposes, as the state discourse suggests, state ideology and communities' cultural values also come into play. In addition, the relationships evolve, since key players and the resource supply evolve, as well.

Key players involve both state and community actors. More often than not, these actors are best portrayed as competing camps. As presented earlier, each camp considers the other to be a barrier to resource appropriation. However, to the extent that there are instances of cooperation between the two sets of actors, systematically

⁶ Those who need the forest as a standing unit derive benefits from it by conserving it. These benefits include watershed conservation, shelter for cattle, refuge, and pasture areas. Those who need a steady flow of resource supply to benefit in the immediate- and long-run are interested in exploiting forest resources in ways that do not compromise their ability to derive benefits in the future. Finally, those who are interested in benefiting in the short-run, with little concern for future benefits, prefer exploiting as much as they can immediately.

pitting one camp against the other can be misleading. To understand rules, the ways they are implemented, and the conservation outcomes that their implementation produces, one needs to look beyond divergent perspectives on what causes forest resources to become more and more difficult to access.

The second factor concerns specific attributes of the rules, namely: (1) "rule fit," i.e., the ways in which rule regimes balance, or do not balance, prescriptions, proscriptions and permissions; (2) whether resource users consider the rules and authorities in charge of implementing them to be legitimate; and (3) whether monitoring and enforcement are effective and predictable and enforcement authorities credible.

Main Argument

Ultimately, I argue, rules are not best understood as tools of administration, as they often are understood to be. Rather, rules are tools of exclusion that key players use to exclude other potential forest users from appropriating forest resources. Drawing from cases of successful resource conservation and cases of severe challenges to conservation, I show that rules-in-use, or rules as applied, do not emerge in a vacuum. Instead, they result from dynamic relationships that involve calculations by both state and community actors, given particular interests and contexts. When actors' interests diverge, actors from each of these camps compete over forest access and control. When their interests converge, they cooperate to monopolize control over forest resources. In the end, key players' ability to (1) devise and diffuse rules-in-use that are compatible with local production systems; (2) monitor compliance and enforce rules; and (3) legitimize their authority and the rules that they enforce vis-à-vis forest users determine whether and to what extent they succeed in achieving and maintaining this power of exclusion.

Key Actors' Interests	Key Actors' Purposes	RCB Rules	Most Likely Conservation Outcome
Converge	(A) on resource conservation	RCB rules can be effective	RCB can result
	(B) on resource degradation	RCB rules are irrelevant	RDB is the most likely result
Diverge	(C) stronger party wants to conserve, weaker party wants to degrade ⁷	RCB rules can be effective	RCB can result
	(D) stronger party wants to degrade, weaker party wants to conserve	RCB rules can be ineffective	RDB is the most likely result

For (A) & (C) the positive effect of rules on conservation outcomes is contingent upon (stronger) party's/parties' ability to

1. implement rules that are compatible with production systems;
2. successfully legitimize their authority to implement rules so that users deem rules and enforcement authorities legitimate and
3. devise monitoring and enforcement mechanisms that induce compliance on the part of resource users.

Figure 1.3. Theoretical Framework: Rules vs. Interests

⁷ A party is said to be *strong* when its enforcement and legitimation capacities are strong at the level of resource users; conversely, the party is said to be weak when these capacities are weak or non-existent.

Figure 1.3 is a representation of the theoretical framework used in this analysis. This framework frames the causal link between rules and expected conservation outcomes (RCB vs. RDB) within the larger context in which conservation rules are devised and enforced in light of key actors' specific purposes vis-à-vis forest resources (conserve or exploit) that, in turn, serve key actors' economic, social, and political interests. The theoretical propositions found in Chapter 2 are based on this analytical framework.

What follows is an examination of what rules are and what aspects of them might influence forest users' behavior and, thus, deforestation. Several definitions of rules are considered to introduce the concept of pluralistic legal arenas of the kind that prevail in many rural settings (Chapter 2). In that chapter, I also present a framework that takes into account key actors, the nature of their interactions, the resources that engage them in cooperation, competition or no relations, as well as the appropriation outcomes that result from the rules produced by key players' dynamic interactions. This framework guides the descriptions in the empirical chapters (Chapters 5, 6, and

In Chapter 3, research methods are laid out. In Chapter 4, background information on Bara country in general, and on the five communities under investigation more specifically, is presented as background for the subsequent empirical chapters. In these three chapters, five community contexts are described, and varying governance contexts and conservation outcomes are examined. In each chapter, rules and the way they apply are studied in particular natural management settings that offer different mixes of economic, demographic, ecological, as well as institutional environments.

- Chapter 5 presents a case in which two communities have devised rules that successfully help preserve a sacred forest.

- Chapter 6 offers a case in which no rules, state- or community-devised, have managed to deter deforestation.
- In Chapter 7, two communities are compared to show how one recovered its governance system following the exogenous shock of commercial logging while the other did not.

At the end of each empirical chapter, I analyze the reasons why conservation outcomes are what they are, focusing on the differential effectiveness of rules in producing resource conservation.

- In the final chapter (Chapter 8), theoretical propositions are drawn from the empirical observations in order to appreciate, in a systematic and predictive manner, the conditions under which community vs. state governance systems are more or less likely to induce compliance behavior and, thus, resource conservation.

The questions addressed by this research are relevant beyond its scope of inquiry. On a theoretical level, this research not only focuses on rules and the contexts in which they function and evolve, but it also seeks to illuminate the connections between what Ostrom (1990) has termed various "levels of analysis" (pp. 50-53) which should be considered in any study of common-pool resources.⁸ In addition, and since rules have little relevance unless they are complied with, this study concerns itself with compliance. As described in the next chapter, compliance theories have been informed by a number of disciplines, but seldom have they focused on natural resource management. Many theories are derived from observing phenomena at the

⁸ The three levels of analysis that Ostrom proposes are (1) operational (in which operational rules directly affect appropriation decisions; (2) collective-choice (in which rules affect choices, albeit indirectly, at the operational level by determining what operational rules will apply in the management of the common-pool resource (CPR); finally, (3) constitutional-choice level, where rules determine who is eligible to make decisions at the collective-choice level and to whom rules apply at the operational level.

international level (The Stanley Foundation 1993; Chaye's and Chayes 1996), while some have focused on compliance observable at the national level (Levi 1988). A third group of theories links international forces to compliance observable at the national and local levels (Peluso 1993). Finally, although Hirakuri (2003) addresses the question of whether or not law can have positive effects on forest conservation, her analysis remains limited to the national level and to the formal arena (state legislation). Understanding the probable effectiveness of different rule regimes under differing conditions, focusing on the community level, can contribute to theory about rule-making and compliance across various domains, at the same time elaborating explanations about the effect of rules on resource conservation.

On a practical level, understanding the limited extent to which formal legislation and community-based governance systems can produce conservation outcomes should help not just whoever is interested in conservation in Madagascar, but also people trying to achieve or enhance conservation outcomes in other parts of the world. Examples of challenges to sustainable forest management abound the world over, and substantial empirical evidence suggests that resource conservation policies often fail to achieve sustainable uses of forest resources. One should ask: To what extent do rules matter? Beyond this, what factors other than the rules themselves drive behavior that the rules are intended to affect? What is the influence of implementation and enforcement factors compared to other factors (social, historical, economic, demographic, ecological, cultural, and political)? My research aims to inform policy makers concerned with sustainable uses of tropical forest resources, to improve understanding of how conservation policies, laws and rule-making generally can be more effective and sophisticated.

CHAPTER 2

THE ROLES OF RULES

What kinds of rules, applied under what conditions, does one need to achieve resource conservation? Under what conditions are rules by themselves effective in inducing resource-conservation behavior? When do they fail to prevent resource degradation? Ultimately, what purposes do rules serve in conservation? This chapter addresses these questions.

The preceding chapter proposed that official discourses about environmental degradation have singled out forest-dependent rural dwellers as the principal agents of deforestation. Rural dwellers' conservation choices, we are led to believe, are constrained by demographic and economic pressures as well as lack of education. While these offer some evident explanation for deforestation, they remain incomplete because they largely ignore village-based forest users' management strategies which, in fact, rely largely on their devising governance systems in which rules hold a prominent role. In these management systems, rules specify what behaviors are proscribed (must not be done), which are prescribed (must be done), and which are permitted (may be done). Sanctions for violating proscriptions and prescriptions and rewards for complying with rules are also specified, either in terms of lived experiences or in ways that belong to the realm of beliefs and superstitions.

Exploitants forestiers, or logging companies, for their part, are partners in economic development to the extent that they collaborate with the state to exploit forests in ways that are, at least in principle, "rational" and sustainable. Logging companies, instead of devising their own governance systems, rely heavily of formal forest legislation to gain access to forests. They operate under the protection of state-

sanctioned cutting permits (*permis d'exploitation*) wherever their interests are best served, including in forests that are located on villagers' territories.

The fundamental point that is missing from official explanations for deforestation is that, at the community level, forest users operate within a pluralistic legal arena. That is to say, a mix of regulations (formal and informal; rules and norms, etc.) governs relationships among community members, on the one hand, and between community members and actors external to these communities, on the other. To be sure, some such governance systems integrate formal state laws, while others ignore or even reject them. Yet the Malagasy state has historically assumed a decidedly monolithic position from which formal laws are expected to, by themselves, channel farmers' behavior into conservation. It has used rules to limit local uses while at the same time ignoring laws to counter illicit extraction whose negative impacts are potentially greater than local uses'. The state's persistent failure to recognize and respect the diversity inherent in local governance systems is a prime factor behind state and farmers' mutual misunderstanding, miscommunication, mistrust, all of which jeopardize the chances of devising governance systems capable of achieving conservation.

The main argument that I make is that rules are not mere tools of administration. Rather, they are tools of exclusion that key actors use to gain or maintain their power to monopolize access to forest resources. These key actors come from two traditionally competing camps: the state and rural communities of forest users. The nature of the relationships among key actors varies, depending on their purposes vis-à-vis forests. Sometimes, key actors from both camps agree on extracting from the forest. At other times, they derive more benefit from keeping the forest as a standing forest. In both cases, they cooperate in order to achieve their shared goal of monopoly, i.e., exclusion of others. When key actors' purposes vis-à-vis the forest

diverge, they compete, still using rules as tools of exclusion, with the goal of prevailing over each other. Cooperation, competition, and mutual ignorance occur, depending on the specific context in which rules are interposed and applied. Ultimately, rules-in-use, or rules as applied, result from these dynamic relationships. That is, rules are dynamic and contested, not static.

Whether rules-in-use translate into resource-conserving (RCB) or resource-degrading behavior (RDB), it will be shown in the empirical chapters, is contingent upon three key variables, namely: (1) key actors' enforcement capacity; (2) whether or not resource users perceive authorities and the rules that they enforce as legitimate; and (3) whether rules are compatible with users' production systems.⁹

To make clearer the richness and complexity of farmers' institutional environments, an examination of theories of rules, norms, laws, as well as the purposes that they serve follows. This review of the roles of rules serves as background for introducing the analytical framework, which highlights the connections among four key factors, namely (1) key players' purposes vis-à-vis the forests, (2) the rules-in-use that result from the dynamic interactions among players, on the one hand, and between players and (3) forest resources, on the other hand and (4) actual conservation outcomes. Before discussing the various functions that rules can serve, it is important to examine the types of resources whose access and utilization are governed by them. A discussion of protected areas as common-pool resources and the implications of this for conservation is presented before the main theoretical discussion in this chapter.

⁹I borrow the terms resource-conserving behavior (RCB) and resource-degrading behavior (RDB) from Uphoff and Langholz (1996).

Are Protected Area Forests Common-Pool Resources?

Despite the large literature that seeks to clarify what "the commons" are, it is challenging to come to some agreement on what is meant by the term. The term is often used interchangeably with the acronym CPR(s). There are several ways to read this: one way is as (a) common-property resource(s), and the other is as (b) common-pool resources; yet another reading of CPR is (c) common-property regimes.

Berkes and Farvar (1989) distinguished between common-property *resource* and *regime* by warning us that the distinction is not trivial, since a particular resource can be found under more than one property and management regime (mobile resources such as fish and birds are examples). Four types of property and management regimes exist: open access (*res nullius*), communal property (*res communis*), state property (*res publica*), and private property (Cernea and Bromley 1989). Alternatively, according to Ostrom et al. (1994), common-pool resources are one of four types of goods, the other three types being public goods, toll-goods, and private goods (Ostrom, et al., pp. 6-7).

The general classification of goods by Ostrom et al. (1994) follows from distinctions according to two attributes: (1) the difficulty of *excluding* individuals from benefiting from the good, and (2) *subtractability* of the benefits consumed by one individual from those available to others. The feasibility of legal and economic exclusion is derived from both the physical attributes of the goods and from the institutions used in a given jurisdiction. I use Ostrom's definition of common-pool resources in my analysis, since it allows me to include a richer variety of resources, including forests. Common-pool resources are those for which exclusion of potential beneficiaries is difficult and subtractability of benefits high. Extractability is high when, because of the nature of the resource, once a user appropriates units of the resources, those units are no longer available for other users to appropriate. Exclusion

of other users is difficult unless physical (e.g., fences or terrain) or institutional (such as property regimes) barriers stand in the way of free appropriation (treating resources as open-access, free-for-all, commodities).

Following Oakerson's framework for analyzing the commons, I look at (a) the feasibility of excluding resource users, (b) jointness and divisibility of consumption, and (c) subtractability of appropriation to determine whether protected area forests are common-pool resources (Oakerson, in Bromley et al. 1992). Making this assessment is important because, as Ostrom argues, the nature of the good (in this case, forests) and the physical conditions in which the resources evolve are crucial in evaluating the performance of institutions governing the resources (Ostrom 1990).¹⁰ Looking, in general, at forests, forest products, agricultural land, and water for irrigation, which are critical resources across communities in the periphery of Madagascar's PAs (Rabesahala et al. 1994; Gage et al. 1994), one can establish that PAs are common-pool resources. The implications for conservation become clear, once the nature of the resources in question is defined.

Although it may seem that land and water for irrigation are quite distinct from forest resources per se, they should be considered as such for two reasons. First, it is not uncommon for communities to gain access to agricultural land by clearing forests using the technique of "slash-and-burn" agriculture commonly known as *tavy* (this phenomenon occurs principally in eastern Madagascar, in Betsimisaraka and Tanala country). In the present study, slash-and-burn agriculture occurs in Zombitse forest, where the practice is referred to as *hatsake*. In other words, the agricultural techniques that these communities use make it coterminous with forest resources land resources. Moreover, some communities grow crops inside the forest. Second, the water used for

¹⁰ Institutions' performance is measured in terms of economic efficiency, equity, accountability, and adaptability in Ostrom, Schroeder and Wynne (1993).

irrigation generally originates in protected-area forest watersheds. To the extent that this is true, it seems reasonable to include water within the category of forest resources. An important fact to point out is that all resources considered here are, within limits, renewable natural resources.

Protected area forests provide *dejure* public goods: clean air, soil erosion control, recreation (in the case of national parks), and biodiversity. These are "goods" whose consumption is joint and not subtractive. The fact that one appropriator enjoys one such good does not prevent other appropriators from doing the same. As well, PAs contain resources that have the attributes of common-pool goods: when neighboring communities access protected areas for wood products, for land, and even for water for irrigation, consumption is divisible and subtractive: whatever one consumes is no longer available for others to appropriate. Under these circumstances, appropriation is subtractive, and a common-pool resource situation exists.

Confusion about what types of resources exist in protected areas arises, however, when one considers access rights for protected area resources. For one thing, by law, protected areas are public in that they are part of the "public domain."¹¹ In Madagascar, all forests are the exclusive property of the state, and all protected areas are, *dejure*, managed and controlled by the State's Forest Service or *Département des Eaux et Forêts* (DEF). This means that exclusion of potential appropriators, such as the communities living around protected areas, is feasible, at least in principle.

Different categories of protected areas exist in Madagascar. Some PAs are designated as National Parks (Amber Mountain, Zahemena, Ranomafana, Zombitse); others combine various statuses (Andohahela, for instance, is a combination of strict nature reserves and special reserves). What this means is that in PAs such as

¹¹ The French term is *domaine public*, which translates as "the realm of the State." In this case, "public" is a misnomer since it refers to "the realm of the State" rather than of the public at large.

Ranomafana and Amber Mountain, some access is permitted, but resource uses are restricted and controlled: tourism is allowed and neighboring communities are allowed to exploit certain forest products upon receipt of a permit from E&F authorities. In parts of Zahamena and Andohahela, all access is forbidden, with the exception of scientists conducting research (strict nature reserves); in other parts, however, access is free, but harvesting of animal and plant species, grazing livestock, and introducing foreign species are "strictly" forbidden (special reserve) (Kull 1996: p. 50). *De jure*, restrictions on access to protected areas are clearly spelled out.

The perception of natural resource users who live closest to the resources themselves is more often than not different from that of E&F, however: To people living in the periphery of protected areas, protected area resources are available for all to appropriate. *De facto*, thus, neighboring communities treat protected areas as common-pool resources, and more often than not, protected area forests are open-access resources; That is, until rules, of different types, are put in place to restrict this access.

Several reasons for this can be offered. One reason is the lack of systematic rule enforcement on the part of DEF. Another relates to demographic changes (the number of appropriators is increasing as the result of higher birth rates and migrations from other communities as well as from the cities). These factors, in some cases, combine with what one might call a local political culture of dissent to allow communities to consider protected area forests as common-pool resources. The Betsimisaraka of eastern Madagascar, for instance, reconstruct history as a series of confrontations between them and an exploitative government. For the Betsimisaraka, it is therefore a norm, defined *a la* Coleman (i.e., internalized), not to trust the government (and any strangers for that matter) and to challenge external authority whenever the occasion presents itself (Rabesahala et al. 1994; Coleman 1987). Within

the framework of the present study, this is also clearly the case with the two Analavelona communities discussed in Chapter 5. Likewise, communities of central and northern Madagascar have a long tradition of expressing political discontent with bush fires that destroy forests. For this reason, bush fires have acquired a reputation as tools of protest rather than tools of resource management, as Kull (1996) argues they are.

When appropriators¹ actions result in the destruction of natural habitats, thereby actively contributing to the disappearance of plant and animal species; when soil erosion results from cutting down the trees; when water is taken by one appropriator upstream, a head-ender, so that appropriators whose rice fields are downstream, the tail-enders, get less if any of it, negative externalities result among appropriators as well as between communities and the government. When loggers selectively harvest trees of a particular species and a particular size, the wood occasionally needed to make coffins ceases to be available. *De facto*, therefore, such appropriation is subtractive and a common-pool resource situation prevails with protected area forests.

While it is true that many commons have tragically disappeared (Hardin 1968), it is also true that not all commons are destined to a tragic end. If proper rule regimes are in place to mitigate the adverse effects of factors such as demographic pressure, poverty, lack of education, RDB outcomes are not necessarily the inevitable outcome (Ostrom 1990). As discussed in Chapter 7, communities are even capable of extracting themselves from tragedies of the commons. As is made clear in the case of Iarindrano, rules and the ways they have been enforced had a lot to do with regaining control of the forest for purposes compatible with conservation.

Unpacking the Rule Box: Rules, Laws, Norms

In Chapter One, working definitions of institutions were discussed and the concept of rules was introduced. In a broad sense, "institutions are enduring regularities of human action in situations structured by rules, norms, and shared strategies, as well as by the physical world" (Crawford and Ostrom 1995, p. 582). In this sense, rules and norms are integral parts of deliberate strategies that take into account the physical environment in which they are interposed. Such a holistic view of institutions is particularly fitting for forest-dependent farmers in Madagascar, as the empirical chapters will show.

What are rules? One useful way to think of rules is to view them, as Crawford and Ostrom do, as statements structured by a grammatical syntax containing five components (ADICO), namely,

- A Attributes, which distinguish those persons to whom the institutional statement applies;
- D Deontic separating what is permitted (may) from what is obligatory (must) and forbidden (must not);
- I Aim, which describes the actions or outcomes to which the deontic ascription is assigned;
- C Conditions, which define when, where, how, and to what extent an aim is permitted; and finally
- O Or Else, which specifies the sanctions to be imposed for not following the rule.

One example the authors offer is for the following rule: "All male U.S. citizens, 18 years of age or older, must register with the Selective Service by filling out a form at the U.S. Post Office or else face arrest for evading registration."

Showing how the syntax operates, the authors present the statement as follows (I

modify the transcription somewhat for simplicity's sake): U.S. citizens [age > 18, gender = male] (A) must (D) register with Selective Service (I) by filling out a form at the U.S. Post Office (C) or else face arrest (O). Since this statement contains all five components (ADICO), it qualifies as a rule. Using the same syntax, Crawford and Ostrom further specify the distinction between rules, norms, and shared strategies: shared strategies can be written as [attributes] [aim] [conditions] (AIC), while norms can be written as [attributes] [deontic] [aim] [conditions] (ADIC) (584). The important thing to note here is that what distinguishes rules from norms is "O" ("or else," the provision for sanction).

In somewhat less technical terms, other theorists have also attempted to distinguish between rules, norms, and laws. For instance, Ellickson (1991), who focuses particularly on norms, defines norms and laws according to their source. Norms are those rules that emanate from social forces, and laws are rules emanating from the government. On rules, he writes: "a system of social control will be defined as consisting of *rules* of normatively appropriate human behavior. These rules are enforced through *sanctions*, the administration of which is itself governed by rules" (124, emphasis added). Further, "[a] guideline for human conduct," he writes, "is a rule only if the existence of the guideline actually influences the behavior either of those to whom it is addressed or of those who *detect* others breaching the guideline" (128, emphasis added). A possible reason Ellickson does not elaborate on a definition of rules is his preoccupation with "what social contexts and with what content informal *norms* emerge to help people achieve order without law" (123, emphasis added). In the end, norms and laws are understood as two types of rules whose locus

of origin distinguishes one from the other, both types belonging to the same "Third-Party Control" category.¹²

Two points are important to mention, based on these ways of defining rules, norms, and laws. Though Ellickson does not define rules as rigorously as Crawford and Ostrom do (in fact, he does not define them at all), the important commonality of the two approaches touches on sanctions. Another point worth singling out concerns the association Ellickson makes between law as a type of rule (a conception Crawford and Ostrom share) and government as its source. These two points invite a series of criticisms that deserve to be mentioned. The criticisms draw on the works of Feeley (1978) and on the literature on legal pluralism.

The Command View of Law

If one takes law to be a type of rule and if a rule is only a rule if some sanction for rule violation applies effectively, then one faces the danger of falling into the command law view against which Malcolm Feeley warns us. With an interest in law as a tool for social control, Feeley elaborates on the weaknesses of the approach taken here (at least by assumption), which is to think (grossly) of law as an independent variable affecting practices, the dependent variable. His position is clear:

In sum, despite many important differences, two main features characterize the approaches of most of the current social science research on law and society: 1) the basic research problem is regarded as the investigation of the "gap" between the legal ideal and actual practices, and 2) law is understood as a command supported by sanction. It is my contention that both these views are inadequate and misleading (1978, p. 14).

¹² The Third-Party Control category comprises social forces, organization, and government as sources of rules; Second-Party Control concerns the person acted upon (this actor is engaged in a contract); and First-Party Control is about a self-controlled actor.

On the latter point, the author specifies that positive benefits derived from complying with the law are too often given less attention than negative sanctions received from transgressing it; on the former point, he says that there exist laws that do not necessarily mandate specific behavior. For instance, some laws define offices and/or grant authority; others confer rights--as in tenure laws—or provide selective incentives rather than negative sanctions (p. 19).

Feeley is correct in saying that the command view of law dominates social science research, and that negative sanctions are given importance to such an extent that they distort the view of law. Certainly, law does not exclusively command behavior. Looking at the three levels of decision-making mentioned in the preceding chapter, for instance, it is possible to distinguish different types of rules, depending on the purposes that they seek to serve. Operational rules affect the day-to-day decisions of participants; collective-choice rules determine who is eligible to be in a setting as well as the specific rules to be used in changing operational rules; constitutional-level rules affect activities at the other two (lower) levels by determining rules to be used in crafting the set of collective-choice rules (Ostrom, et al. 1994, p. 46). Clearly, therefore, rules can be crafted to modify rules rather than behavior per se.

Likewise, it is possible to deem inadequately static any analysis built of the idea that rules, among which laws, are "a set of do's and don't's, as direct command requiring specifiable, particular responses" (Feeley 1978). Such is the case for the study of behavior in natural resource management only because, and contrary to what Feeley would have us believe, one is hard-pressed to think of legislators "effectively depoliticiz[ing] the policymaking process" (p. 26). In fact, as Peluso (1993) and Ascher (1998) remind us, natural resources are the object of manipulation and contention in many countries of the world. On empirical grounds, therefore, it seems difficult to conceive of laws defining access (behavior) to and identifying legitimate

controllers (positions) of resources to be part of a "depoliticized" process.¹³ Again, the argument here is that rules as they are applied at the level of resource users to control resource access are tools of exclusion that key actors manipulate to gain, maintain or enhance their power to monopolize access to forest resources and derive benefits from exploiting or conserving forest resources.

The Law-Government Association

Though Ellickson's effort to single out law from the realm of rules is useful, scholars from various disciplines, particularly legal anthropology and sociology, are likely to find his association between the "legal" and government (as a source, a guardian, and an enforcer of rules) problematic. Indeed, as Tamanaha (1993) points out, the field of legal pluralism is built on the rejection of legal centralism, the ideology that views the state as the one and only source of order. In countering this perspective, legal pluralists highlight the fact that there are multiple ordering principles, hence the inaccuracy of both legal-centralist and legal-positivist assumptions. Ellickson would be the first to agree with legal pluralists that norms and their system of enforcement are embedded in a larger social-control system. He would also concur with them that informal norms exist outside of and, to some extent, against a formal legal system. Finally, he shows that informal norms are effective in establishing order, as illustrated by the case of dispute resolution in cattle grazing in Shasta County, California. But Ellickson remains outside the legal pluralism clan so long as he posits that laws are rules whose source is the government.

Tamanaha (*ibid.*), in his internal critique of legal pluralism, raises objections on analytical as well as instrumental grounds. As he points out, legal pluralists extend

¹³ To be fair, I should mention that Feeley's objections to traditional theories of law concern criminal behavior in post-industrial American society, not natural resource management in tropical countries.

the definition of law to encompass patterns of social ordering, on the one hand, and the institutionalized production and application of norms, on the other. According to Tamanaha, since these two components are different phenomena, they cannot and should not be meshed together, as legal pluralists are so apt to do (more follows).

The other objection he raises relates to Ellickson's law-government association, as it concerns the state vs. non-state law, a distinction that presents difficulties in distinguishing non-state or indigenous law from social life generally (p. 206). Tamanaha's recommendations to legal pluralists are radical, as he advocates cutting off all ties with law and the legal in studying multiple legal orders. Whether or not legal pluralism should detach itself from law as a discipline is beyond the scope of this thesis, but it raises a point that is relevant to the analysis: What exactly is legal pluralism and how is it relevant to the study of conservation in Madagascar?

Legal Pluralism

This is not the place to discuss the history of the sub-field of legal anthropology, but we should note its theoretical and empirical turning points have been to indicate how this approach helps to explain behavior in natural resource management in a place like Madagascar.

The term legal pluralism emerged from the works of Dutch anthropologists interested in understanding the workings of law in society in (former) colonies of Southeast Asia. The Adat-Law School, in particular, contributed to the field of legal anthropology by studying traditional *adat* law (mainly in Indonesia), the way it works by internalization rather than through sanctions, and the way it interacts with formal (colonial, then state) law at the micro level. This school pointed to the existence and effectiveness of folk or customary law. Its main contribution can be described as bringing legal pluralism to the fore "as a descriptive concept which does no more than

state that more than one legal system exists in a certain society"(von Benda-Beckmann and Strijbosch 1986, p. 8).

Building on the work of prominent legal anthropologists, especially Sally Falk Moore, Griffiths (1986) defines legal pluralism as "that state of affairs, for any social field, in which *behavior* pursuant to more than one legal order occurs" (2, emphasis added). As pointed out earlier, this definition essentially flies in the face of (a) the concept of law as a single, unified and exclusive hierarchical normative ordering, and (b) the idea that "the state is the fundamental unit of political organization" (ibid.). As suggested by Moore's definition of law, and in spite of Feeley's skepticism, scholars of legal pluralism are intrigued by the aforementioned gap between law and behavior. They also have devoted considerable efforts to understanding how customary law has been integrated into formal state law.

An interesting distinction Griffiths makes by way of a plea against a legal-centralist mode of thinking is between legal pluralism "in the weak sense" and legal pluralism "in the strong sense." In the weak sense, legal pluralism is understood as the existence of "multiple systems of legal obligation.. .within the confines of the state" (Hooker 1975, cited by Griffiths). In this sense, law is the primary ordering principle, and it is monolithic. To avoid confusion between legal diversity and legal pluralism, Griffiths introduces the concept of legal pluralism in the strong sense.¹⁴ In this sense, legal pluralism is viewed as "an attribute of a social field and not of 'law' or of a 'legal system'" (p. 38). Society, in the legal pluralist context, is "rather a chaotic mess of competing, overlapping, constantly fluid groups, more or less inclusive, with entirely heterogeneous principles of membership, social functions, etc., and in baffling variety of structural relationships to each other and to the state" (p. 27).

¹⁴ Manifestations of legal *diversity* would be different rules for different classes of people in one population, different rules in different geographical areas—all understood to belong to the larger system of state law.

Functions of Law in Legal Pluralism

The most valuable insight afforded by legal pluralism lies in the way that law is viewed by its adherents as fulfilling societal functions rather than as constituting a system apart from interactions within society. The ways in which legal pluralists place law in society, conceiving of rules as social constructions, make the field of legal pluralism particularly relevant to settings such as Madagascar's rural communities. Three points should be noted.

The first has to do with the phenomenon of colonization. Mommsen and De Moor (1992), not to mention Dutch anthropologists from the Adat-Law school, bring a host of cases in which colonial law came to contact with customary law to transform the latter into what they call "a sort of neo-customary law no longer comparable to the customary legal usage of pre-colonial times" (p. 12). In the case of Madagascar, a question too often ignored in debates about the causes of environmental degradation is why the majority of protected areas (PAs) were created in the first place and then protected by decrees during the colonial period (1896-1960) and later on maintained by successive governments. Residents in the periphery of PAs are reminded that access is restricted to people other than themselves (Strict Nature Reserves, the most protected of protected areas, can be penetrated by scientists for research only), while at the same time they witness harvesting of forest products (mainly timber and minerals) in large quantities by foreigners or agents authorized by the "government." Contrary to what is often suggested, it is very relevant to investigate the rationale for creating protected areas, if only to see if it has tenable linkages with current (arguably legitimate) biodiversity concerns. (Have not savvy conservation agents tried to establish biodiversity conservation as a *norm* in many communities?) In the meantime, the creation of protected areas, at best, looks like an illustration of colonial (and subsequent state) law encountering and too often ignoring or even weakening

community-based systems of rules. The advent of courts of law, for instance, undermined traditional community leaders' power to resolve disputes over access to natural resources peacefully (Rabesahala et al. 1994).

A careful examination of the consequences of the "legal" meeting the "folk" or "customary" should prevent one from falling into a reductionist mode of thinking about law as a means of conflict resolution only. As Austin Turk (1978) points out, the "moral functionalist" conception of law, which considers law as a means to settle or preclude disputes, has a methodologically superior and empirically grounded alternative in the conception of law as power, "a set of resources whose control and mobilization can in many ways... generate and exacerbate conflicts rather than resolving or softening them" (pp. 213-218). According to Turk, five types of resources are fought over through law: physical violence (war and police power), economic power (production and allocation of material resources), political power (decision-making), ideological power (knowledge, beliefs, values), and "diversionary" power (human attention and living time) (p. 218).

Starr and Collier (1989) and their colleagues in *History and Power in the Study of Law* elaborate extensively on the point that law is not just a conflict resolution tool. The thesis of Starr and Collier is that individuals and groups in particular times and places have used legal resources to achieve their ends, rather than simply comply with them as directed. Like Turk, the authors consciously move away from the idea that law is a resource for dispute resolution. Instead, they invite anthropologists to "study disputes and invocations of rules for what they reveal about systemic processes" (p. 2).¹⁵

¹⁵ By pointing to asymmetries in power relations involved in social and legal change, the authors go as far as to avoid using the terms "legal pluralism" and "dual legal systems" because the terms can carry connotations of equality that misrepresent these asymmetrical

Another important contribution that Starr and Collier make lies in their rejection of a positivist view of law, presenting it as the construction of human agents. As they put it, this "thing" constructed by human agency is advantageous to some to the detriment of others (p. 3). Finally, the various contributions can be grouped into three perspectives on law: (a) instrumental or "interactional" (individuals and groups use laws and legal processes to pursue their own ends); (b) cultural (laws and legal systems are elements of a discourse); and (c) institutional (individuals represent particular economic interests and social groups, whereas laws represent particular ideological positions) (pp. 21-22). The perspective chosen in the present analysis is what Starr et al. label "interactional," since the endeavor is to explain behavior as influenced by rules, norms, and laws in the pursuit of secured means of subsistence through the exploitation of natural resources.

The volume on *Law as a Resource in Agrarian Struggles* (von Benda-Beckmann and van der Velde 1992) is probably the best resource from which to put together a framework for taking into account how rules affect conservation behavior. First, this volume represents the sophisticated treatment of law introduced by Starr et al. It rejects the view that "interrelations between law and practice" can be "reduced to simple relations between *state* law and behavior" (pp. 9-10, emphasis added). Second, it provides a transdisciplinary approach to the issue of what roles rules play in shaping behavior, while treating law as the *subject* of social struggle, as a *medium* of political, economic and social struggle, and as a *resource* of social interaction. Finally, the focus of the authors' accounts is specifically on agriculture and rural development, both of which relate to natural resource management.

power relationships. Power relationships are viewed as being embodied in particular social and legal forms (pp. 3 -9).

What main points can one draw from this collection of essays, and how are they related to resource conservation? I raise the question because, building on the above analyses on law, its definitions, its functions, and its purposes, this thesis offers certain insights that help situate rules within the resource conservation puzzle. The first point is that rules establish structures through which people define their economic and social interests and make claims according to them. Rules provide a platform for rationalizing one's interests and for justifying or defending one's interactions with others regarding control over and access to natural resources. By the same token, rules can impose constraints on one's behavior. Rules are therefore enabling as well as constraining.

The next point is that law can be embodied in social practices, i.e., not necessarily external to them.¹⁶ It is therefore more appropriate to study the organization of *social rights* to resources on which their users depend for subsistence and income. Though this point is well taken, we need to remember Tamanaha's observation that it then becomes practically difficult to distinguish state law or customary/folk law from social life in general. In fact, there are concrete cases in which the line separating state law from customary rules is far from blurry. Take, for instance, resource tenure around protected areas of Madagascar.¹⁷ The Land Tenure Center's report on tenure security around those areas hypothesizes that there is a relationship between farmers' perceptions of having secure tenure rights and the way they interact with the resources (Gage et al., 1994). People's perceptions on whether

¹⁶ It follows from this point that "the social significance of law cannot be derived from the conceptualisations and objectives which are inscribed into and/or associated with the *legal texts* themselves" (von Benda-Beckmann and van der Velde 1992, p. 9, emphasis added).

¹⁷ "By definition, land and natural resource tenure is rights which people and communities have regarding their land and natural resource base" (Gage et al., 1994, p. 2, authors' emphasis).

they have secure tenure rights is socially determined to the extent that rights to resources are acquired when they are recognized and respected by one's peers.

An important contribution that this report makes is to highlight, based on observations of social interactions at the community level, the respective comparative advantages of the state rule system and of the customary rule system. For instance, customary law (expressed in the form of *dina*) is more flexible than state law in terms of ability to adapt rules to new circumstances (there are no bureaucratic delays); customary law is also better understood and better respected than state law. Finally, customary conflict resolution procedures are better understood (and more accessible)

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to resource users than are state ones.

To illustrate how state law and customary rules are not so readily meshed into social practices in the minds of those whose behavior is targeted by the rules, one needs to scrutinize the language used by many of these communities. This language, which by the way is an important part of social practices, clearly reflects a "we-they" dichotomy in the minds of its users: whatever is alien to the community is *vazaha* (not just foreigner but also outsider); whatever is related to the state is considered *am-panjakana* (proper to the government); and whatever pertains to the community is *am-pokonolona*. I would argue that these linguistic nuances are indicators of a conscious effort to maintain clear boundaries between state legality and community legitimacy.

As von Benda-Beckmann (1989) argues, law should not be viewed as a panacea to environmental problems and, more broadly, to challenges to development.¹⁹ The author points to two faulty premises on which development

¹⁸ An important limitation of the analysis, however, lies in reliance on those rules explicitly acknowledged by the people surveyed.

¹⁹ One can apply his thinking on law in development projects to issues of environmental degradation because solutions to the latter problem increasingly have to be incorporated into the former, given the importance of a healthy natural environment as a *sine qua non* for rural development in general.

projects are based: (a) social and economic change is achievable mainly through government law, and (b) when this change (often called development) fails to happen, it is due to incompatibilities between state law and local laws and customs. The analysis focuses on the interaction between villagers and the normative structures of development policies and projects they face. It also shows how, in turn, state bureaucrats are confronted with the villagers' law. In the end, the interactions between villagers and state bureaucrats yield a "vicious circle in which the existence of structuralist legal notions provides the empirical basis for the maintenance of such misconstruals" (p. 32). Not only do government laws fail to reach villagers in their original version, von Benda-Beckmann points out, but villagers themselves use a modified model, which is legalistic for convenience, of their *adat* (traditional) law. The result is rather unsatisfactory and, to use the author's phrases, villagers view development as being "propagated by arrogant dummies" (p. 144), while state bureaucrats see villagers as "hypocritical opportunists" (p. 139).²⁰ Whether or not the author is correct in making such assertions, the main point to be drawn for this analysis is that observations of behavior presumably affected by law should be context-specific and made with multiple considerations and levels of interactions in mind.

In the context of Madagascar, and as alluded to previously, the fact that the national government and state authorities are not legitimate in the eyes of many resource users ostensibly influences whether or not they are likely to feel bound by rules that emanate from this source of authority. This, in turn, influences their decisions to go with or against state rules, leading to resource conservation or degradation.

²⁰ Of course, von Benda-Beckmann realizes some exaggeration is built into these expressions. They are nonetheless close to being accurate, certainly in the case of Madagascar.

The issue of legitimacy is central to explaining farmers' behavior vis-à-vis forests as it defines what rules exist at the level of resource users, that is, *de jure* rules (rules that have been formally promulgated by some state institution with formal-legal authority) and *de facto* rules (rules that have arisen from practice without the sanction of authority or law and are sanctioned, in both senses of the word, by community consensus and opinion).

Rules are contingent, not essential, and, with regard to resource conservation, they produce three types of results: intended, unintended, or no effect. One important empirical question is thus: What kinds of rules (formal/informal; legislated/normative; proscriptive/prescriptive/permissive), used and enforced in what particular contexts, are more or less likely to induce compliance, thereby producing resource conservation?

The Issue of Compliance

To say that there is a causal relationship between rules and conservation behavior is hasty unless one considers the dynamics and *problématique* of compliance. Presumably, rules are ineffectual unless they are complied with. One should ask: Once rules are operative, what factors induce resource users to conform to them, to ignore them, or even to go against them? In each of the three empirical chapters (Chapters 5, 6, and 7), users' reactions to the rules-in-use are examined to understand their motivations for complying or not complying with the various rules. In the meantime, this section is devoted to examining the ways in which various disciplines in the social sciences have conceptualized compliance. It presents some general theories on compliance and then moves onto studies of compliance in the domain of natural resource management. It is not intended to be a thorough review of all the literature on

compliance. Rather, the purpose with respect to resource conservation, as well as show how one can relate this phenomenon to this outcome.

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 their most desired outcomes (Cook and Levi 1990): humans are regarded as interest or utility maximizers. Researchers' emphases vary, however, on what constitute the values to be maximized. This variation in emphasis 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. 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. 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 factors such as markets as well as social and personal norms.

Wade (1994) 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 more by material gains than by 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).

Sociologist Douglas Heckathorn (1990) gives compliance theoretical and normative bite by looking at how external sanctions and intra-group normative control enforce or weaken each other to produce compliance. Using formal modeling and focusing on group responses to sanctions, he offers that individual compliance does not derive directly from sanctions but is, rather, mediated by group-devised "compliance norms." That is, compliance is to be analyzed at two levels: individual

and collective (secondary). The merit of Heckathorn's analysis lies in his pointing to the fact that individual behavior, in the face of external (to their group) sanctions, is best analyzed within the social context in which it is shaped. Group members, he proposes, have a stake in regulating each other's behavior because sanctions imposed on individuals create a (negative) spillover for the collectivity (p. 367).²¹ Moreover, external agents, who are trapped in bureaucratic structures, tend to rectify strategies slowly, whereas group normative control proceeds swiftly (pp. 381-382).

While many scholars focus on enforcement or rules as the determinants of compliance, another group of scholars emphasizes perceptions about rules. 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?) Most importantly, Levi considers at some length the notion that compliance is influenced by concepts of legitimacy.

Legitimacy is precisely psychologist Tyler's (1990) focal variable when he tries to explain why Americans are typically law-abiding people. Tyler is, in fact, one of the very few who systematically study the effects of legitimacy on compliance. Using statistical analysis of telephone interviews with 1,575 individuals (804 of whom were interviewed twice) in the city of Chicago, Illinois, Tyler explicitly tests the hypothesis that perceived legitimacy positively influences compliance. One important question he asks is: "Does the extent to which people view legal authorities as having legitimate power influence their compliance with the law?" (p. 57). He finds that,

²¹ It then becomes tricky to ascertain which of the two "forces," external sanctions or intra-group control, most determines compliance.

indeed, perceived legitimacy of legal authorities affects compliance behavior. He also finds that "instrumental" factors such as deterrence and "sociological" factors such as personal morality, perceived obligation to obey the law, legal authorities' performance, and peer disapproval determine compliance. A useful distinction that Tyler makes in his study of compliance is between what he calls the *normative* and the *instrumental* perspectives on compliance. In his words, "A normative perspective leads to a focus on people's internalized norms of justice and obligation," whereas "an instrumental perspective regards compliance as a form of behavior occurring in response to external factors" (p. 4).

Nancy Peluso (1993) offers a somewhat different perspective on legitimacy as it relates to compliance than do either Levi or Tyler. Looking at Kenya and Indonesia, Peluso examines how states have legitimized their use of force to induce compliance in the name of natural resource conservation. Though the concept of legitimacy is central to Peluso's theory of compliance—she points out that "from a local perspective ... both states and international conservation groups may be seen as *illegitimate controllers* of local resources" (p. 201, emphasis added) the more valuable contribution her works brings to understanding compliance derives from 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 to 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 decision-makers making purposeful 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). The descriptive chapters that follow discuss incentives and disincentives for following rules, thereby reinforcing conservation or compromising it.

Studies of Compliance in the Domain of Common Pool Resource(CPR) Management

CPRs are unique in that their provision and protection demand that collective action problems be solved. That is, mechanisms must be in place that deter shirking or free-riding. Because CPRs are collective goods, it is relevant to tie in the study of compliance with rules governing those natural resources whose consumption is joint and benefits separable with the collective action literature. In particular, an important question should be isolated from this vast literature: Under what conditions do users of a collective good overcome the collective action problem successfully?

Studies of compliance in the field of CPR management are helpful in addressing this important question, although they are few. Nor do they place compliance at the core of their inquiries. I use a few such studies to highlight what variables have been put forth in the study of why compliance occurs or does not occur when it comes to the provision and maintenance of collective goods such as CPRs. The "goods" represented here, if not natural resources, at least involve them in some capacity. They are irrigation systems (Wade 1994; Ireson 1995) and forests (Agrawal 1994; Banana and Gombya-Ssembajjwe 2000; and Hirakuri 2003).

As already mentioned and according to Tyler's characterization, Wade's portrayal of South Indian irrigators is instrumentalist: material considerations, generated by external forces, prevail over moral ones to produce compliance behavior. Wade (1994) looks at the likelihood of successful organization, or "corporateness," as a function of variables related to (a) the resources, (b) technology, (c) the relationship between resources and the user group, (d) the user group itself, (e) "noticeability," and (f) the relationship between users and the state (p. 104). What organizing entails for

rural irrigators is devising and abiding by the rules governing the use and maintenance of the irrigation system. At this juncture, two variables which specifically (more so than the others) deal with rules are worth singling out (Wade 1987).

The first variable relates to the *user group* and (i) the "extent to which users are bound by mutual obligations: the more likely that promises entered into will be kept the better the chances of success" as well as (ii) "punishment against rule-breaking: the more users already have joint rules for purposes other than common-pool resource use, and the more bite behind those rules, the better the chances of success." The second, variable takes into account "*noticeability*," namely (iii) ease of detection of rule-breaking free-riders: the more noticeable is cheating on agreements, the better the chances of success" (ibid.).

As Wade does, Ireson (1995) focuses on irrigation, this time in rural Laos. Ireson's concern is almost identical to Wade's. The question he asks is: How do Lao irrigators go about *securing agreements* to construct irrigation systems, and how do these farmers mobilize to operate and maintain these systems? Ireson's contribution to answering this question lies in his focusing on how *social norms* of Lao village life reinforce cooperative behavior, which entails household compliance with irrigation rules (p. 543). More importantly, Ireson contends that individual compliance behavior is not to be explained outside of their *social context*. He joins Levi in saying that compliance, or cooperation, has a lot to do with cooperators having "adequate *assurance* that others will also contribute to the activity under consideration" (emphasis added). He also reminds us of Wade's contention that farmers' cooperation has to do with their belief that the technical staff and other farmers will contribute to the common good. Ultimately, Ireson reminds us that models of behavior such as Wade's and Levi's inadequately lock compliance decision in an "immediate payback" (neo-classical economic) mode of analysis, while "the institutional context of a society

is an important variable" (p. 544). That is, individual compliance is contingent upon social context.

Within this social context, *communication* (frequent face-to-face contacts) and *negotiation* among actors who make the choice to cooperate or defect exist. Ireson further insists that social considerations such as maintaining a good reputation with one's peers influences decisions to cooperate vs. defect (p. 551). Finally, Ireson points out that, unlike other resources such as fish and forest products, irrigation systems are confined to a single location, are highly visible, and their provision requires collective rather than individual efforts. Rejoining Wade, he also notes that irrigation water is perceived by farmers as being scarce, which enhances their willingness to comply with rules.

Agrawal (1994) examines compliance in the context of *panchayat* forest management in six villages in India's Uttar Pradesh region. Agrawal labels three out of the six villages "successful" in terms of institutional solutions to the governance and management of forests. Looking specifically at rules, Agrawal attributes variation in successful governance and management to monitoring, sanctioning and arbitration rules. In this regard, he writes: "Therefore, it is only when rules are not enforced or monitored and violations not sanctioned that formal rules become meaningless as guides to behavior" (p. 275). Successful villages, he explains, had *van panchayats* which invested close to or more than three-quarters of their revenues on monitoring (of both monitors and forest users) and legal expenses (from reporting rule violators to the courts of law).

Looking at forest reserves' management in Uganda, Banana and Gombya-Ssembajjwe (2000) corroborate with Agrawal when they argue that rule enforcers from the Ugandan Forest Department lack the means and motivation to "carry out their duties," which results in forest users' non-compliance with regulations because

of the possibility of escaping detection. By contrast, local residents are effective guards of Namungo Forest. In this particular case, privately employed forest guards and local security in tenure rights allows for more effective monitoring (p. 94).

In a recent study, Hirakuri (2003) addresses the question of whether law can save the forest, looking at the cases of Finland and Brazil. Hirakuri asserts that unsustainable forestry practices result from low compliance with forest management laws and goes on to point out that implementation rather than policies per se is the problem. The merit of Hirakuri's study lies in her emphasis on incentives for compliance that emerge from three distinct approaches: regulatory, market-oriented, and social control/consensus orientation. Further, she puts forth factors that affect compliance. These include what she terms forest culture and government legitimacy.

At the same time, one can point to at least two weaknesses in her study. First, she limits the scope of her institutional inquiry to formal legislation, leaving aside alternative or complementary sources of regulations likely to affect compliance behavior. Second, Hirakuri posits that low compliance produces deforestation when non-compliance could be seen as an aspect of, rather than a cause for, forest degrading behavior (deforestation).

Drawing from both general theories of compliance (Tyler 1990; Heckathorn 1990; Peluso 1993) as well as from the CPR accounts mentioned above,²² one can begin to bring together an all-encompassing theory of compliance for the study of CPR management. While some of the proposed variables can be attributed to individuals (perceived legitimacy), it is difficult to ignore the sociological factors, or contextual factors, affecting how individuals choose to act given a specific decision-making context. Indeed, most variables take the individual in relation to three distinct,

²² To be sure, there are more (e.g., Leach and Lewis (1991) and Villeneuve (1996) for Canada), but the three cases presented here offer the most thorough and explicit analysis of the relationship between rules and compliance behavior.

albeit closely related environments: (a) social (mutual obligations, promise-keeping, reputation, negotiation, communication), (b) ecological (resource scarcity), and (c) legal/institutional (history of joint rules, monitoring, sanctioning, and arbitration). Again, Peluso points to the "embeddedness" of decisions made at the level where CPRs are found, in that international, national, and even regional decisions affect local outcomes.

One is therefore hard-pressed to come up with a theory of compliance that focuses exclusively on the individual, though the latter is the decision-maker whose compliance decisions are most directly observable. This realization, in turn, begs two important substantive questions: (a) what contextual elements more or less affect individual compliance decisions, and (b) how the degree of influence on individual compliance behavior varies from one context to the next. Methodologically, a third question pops up: (c) how does one generalize a context-sensitive theory of compliance?

So, in spite of progress made by the various theorists whose works are discussed here, the major remaining lacuna concern the specific linkages between rules and compliance behavior. At least for scholars interested in natural resource management, only Agrawal (1994) and Hirakuri (2003) actually consider explanatory variables related to particular aspects of rules such as monitoring, enforcement, and legitimacy in trying to account for the lack of fit between rule systems and resource use.

Descriptive Framework

The fundamental question that this research addresses is: what kinds of rules, devised and operated under what conditions, are more or less likely to induce resource-conserving (RCB) vs. resource-degrading behavior (RDB)? To answer this main

question, I also pose a series of sub-questions. First, what particular attributes of the rules induce or discourage compliance? Does legitimacy or the ways in which the rules are enforced matter? Do livelihood strategies and production systems explain resource conservation or degradation outcomes? Second, if and when rules are not effective in preventing, stopping, or taming resource-degrading behavior, what factors explain such ineffectiveness? Is it a matter of social cohesion or lack thereof? Do demographics influence conservation outcomes? What about communities' belief systems?

To determine the conditions under which rules are most likely to produce conservation outcomes, my analytical framework takes into account more than just the presumed causal relationship between rules and conservation behavior. Rather, it frames the relationship between these two variables within the larger context of interactions among actors (resource users), their purposes vis-à-vis the forest (actors' interests), the resources themselves, the rules that actors' interactions produce; resource users' reactions to the rules (legitimacy and compliance), and the conservation behavior that the enforcement of these rules produces (RCB vs. RDB). Figure 2.1. is a graphic representation of this descriptive framework.

In each empirical setting, five sets of variables are considered: (1) state and community actors, of which forest users are sub-sets; (2) forest resources; (3) rules-in-use; (4) compliance; and (5) conservation outcomes. Actors' purposes vis-à-vis the forest (conserve or extract) shape the type of relationships that link them (cooperation, competition, or mutual ignorance), both within their respective sub-categories (community and state) or across these categories. Forest users are those who derive benefits from using the forest, either by extracting products from it (e.g., construction timber) or by benefiting from it as a standing resource (e.g., pasture).

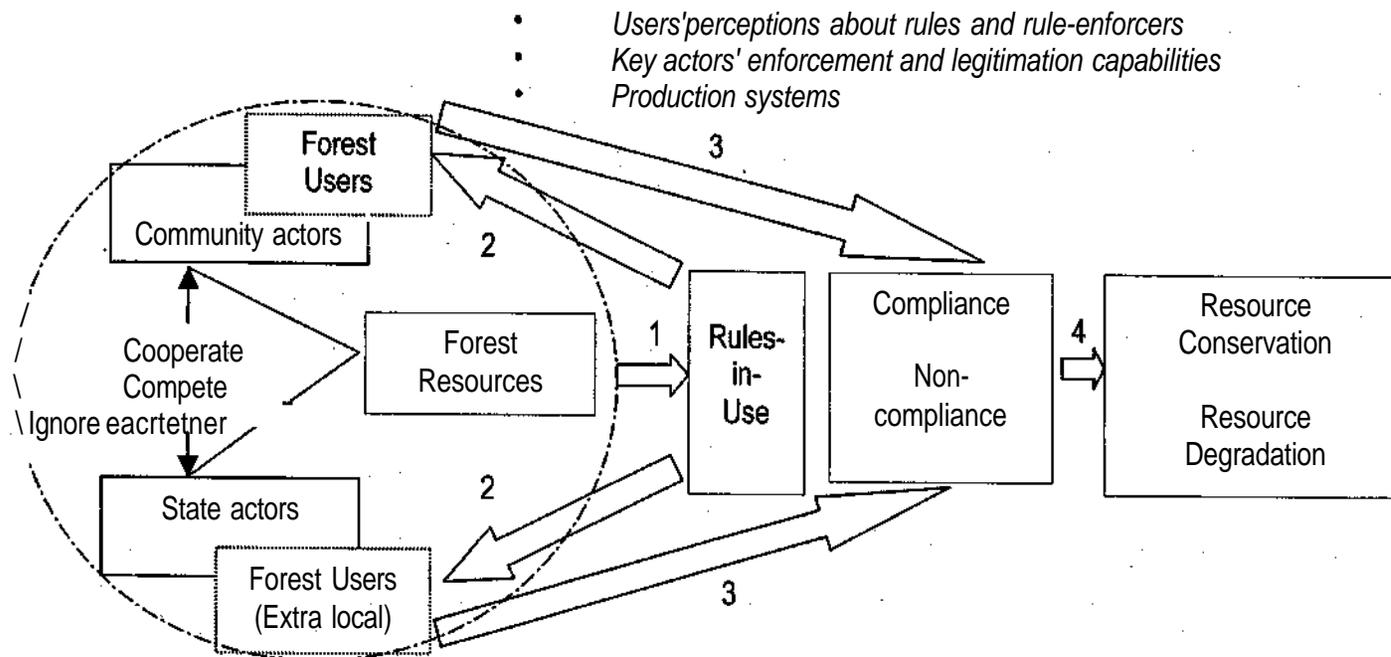


Figure 2.1. Framework for Describing Empirical Settings

Rules-in-use are rules that actually apply at the level of forest users on a daily basis. Particular attributes of rules, rather than the existence of rules per se, influence the ways in which rules are likely to translate into compliance vs. non-compliance and thus, RCB vs. RDB. As discussed earlier, rules-in-use include rules, norms and, sometimes, formal legislation. These attributes include, for instance, whether or not rule regimes balance prescriptions (must), proscriptions (must not), permissions (may) and whether or not sanctions (or else) are commensurate with infractions. Another attribute concerns the consistency and predictability of monitoring and sanctioning. A more thorough, though not exhaustive, list of indicators is found in Table 2.1.

For forest resources, factors such as ease of access, protection status (formal vs. informal), size of resource system, visibility of boundaries, as well as perceived abundance of forest resources need to be taken into account.

For conservation outcomes, there are two possibilities. Proxy indicators for RDB are deforestation and species disappearance. That is, where forest cover has diminished and where certain species have become scarce or non-existent, rules-in-use have produced behavior detrimental to forest conservation (RDB). In the reverse case, rules-in-use have produced behavior that supports conservation (RCB). Table 2.1. is a summary of the variables and some of the indicators considered in this analysis.

Theoretical Propositions

In each particular context, the analysis sought to take into account

- (a) the dependency of forest users on forests for securing their livelihood,
- (b) the forest products that they use,
- (c) the rules that govern forest access and uses of these forest products on a daily basis (what has been referred to as rules-in-use),

Table 2.1. Variables and Indicators Considered for Each Empirical Setting

Variable	Indicators
ACTORS State Community	<ul style="list-style-type: none"> • Ability and willingness to enforce state rules • Incentives to be corrupt and abuse power • Consideration of and respect for communities as decision-makers and resource managers • State actors mutually supportive or mutually undermining (competing interests) <ul style="list-style-type: none"> • Ability and willingness to enforce community rules • Perceived legitimacy of authorities (state vs. community) • Stratifying principles and cohesion (homogeneity vs. heterogeneity) • Dependence on forest resources (for subsistence and cultural identity) • Physical and psychological isolation from administrative centers and markets • Market penetration
FOREST RESOURCES	<ul style="list-style-type: none"> • Spatial extent (resource size, visibility of boundaries, ability to move around given technology in use) • Perceived scarcity vs. abundance of resource/Capacity to regenerate • Protection status (formal—PA vs. informal—sacred forest) • Ease of access and ease of exploration for commercial gain
RULES-IN-USE	<ul style="list-style-type: none"> • Rule fit: balance between must, may, must not and ... or else commensurate with infraction? • Consistent and predictable monitoring and sanctioning • Perceived legitimacy of rules • Compatibility with production systems • Community rules and state rules mutually supportive or contradictory
CONSERVATION OUTCOME	<ul style="list-style-type: none"> • Changes in forest cover and/or in species composition • Changes in resource availability

- (d) rule enforcers' ability and willingness to monitor compliance and sanction non-compliance,
- (e) forest users' reactions to rules in terms of legitimacy of both rules and rule enforcers, the prospect of an open-access situation (*res nullius*), and
- (f) local opportunities for commercialization of forest products and other market opportunities to secure livelihood.
- (g) The research also sought to determine
- (h) which actors have a stake at conserving vs. exploiting the forests and thus
- (i) actors' purposes vis-à-vis the forest.

Using these key actors' purposes vis-à-vis forests as a starting point to explain conservation outcomes, the following propositions are offered and discussed in the empirical chapters.

Scenario 1: Key actors' interests converge

- Proposition 1: When key actors' interests vis-à-vis the forest converge on resource conservation, rules play a critical role in producing resource-conserving behavior (Analavelona Sacred Forest).
- Proposition 2: When key actors' interests vis-à-vis the forest converge on resource exploitation, rules are largely irrelevant, and they cannot prevent resource-degrading behavior (Zombitse National Park).

Scenario 2: Key actors' interests diverge: one party wants to conserve, the other party wants to exploit.

- Proposition 3: Where key actors' enforcement and legitimization capabilities are high, resource conservation is possible (Iarindrano Classified Forest).
- Proposition 4: Where key actors' enforcement and legitimization capabilities are non-existent or weak, rules cannot prevent resource-degradation behavior (Ihera Classified Forest).

In the Chapter 3, the research methods used to collect and analyze data are discussed.

CHAPTER 3

METHODS

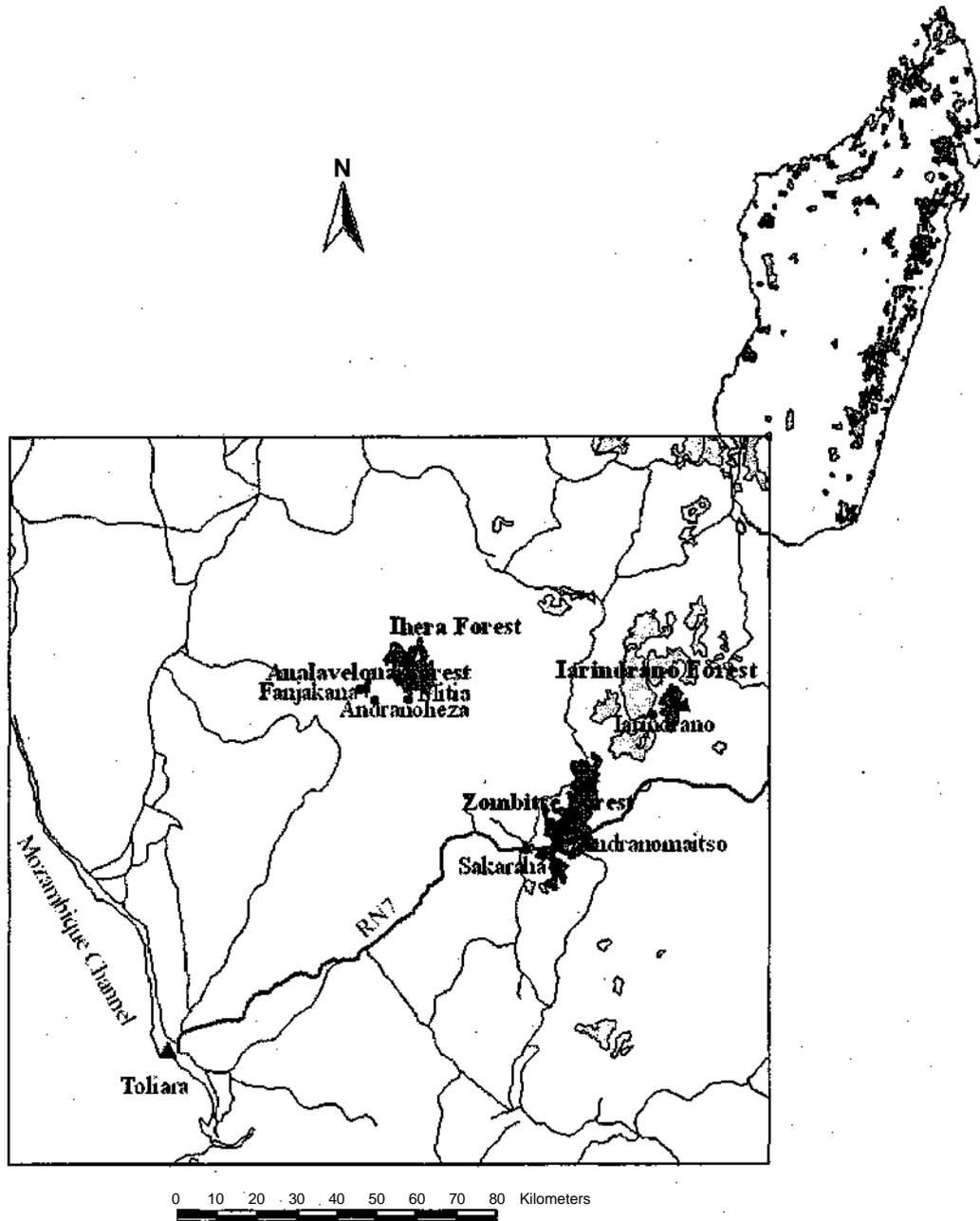
The main question that this research poses is: can rules that govern resource access and use explain conservation outcomes, or does one need to also take into account the particular contexts in which the rules are devised and enforced to account for variations in resource conservation behavior? This chapter presents and discusses the methods that were used to answer this research question.

For this study, a cross-sectional survey design was used to collect data on the dependent variable, i.e., resource conservation, and the independent variables, which consisted of different attributes of the rules that govern resource use and access as well as the particular contexts in which these rules were devised and implemented. The survey relied on several instruments, which included a survey questionnaire, rapid appraisal exercises, semi-structured interviews, and visual analysis of remotely sensed data.

Five forest-dependent communities adjacent to four forests with different protection statuses constitute the empirical base for the study. These village communities are found in Bara country, southwestern Madagascar (see Map 3.1).

Research Design

The research question had three parts. The first asked whether rules constitute sufficient explanation for conserving (vs. degrading) behavior. If this is the case, what types of rules (state-devised vs. community-developed) and what particular aspects of rules help explain whether or not forest users comply with them, thereby affecting resource conservation?



Map 3.1. Study Sites in Bara Country

In this research, rule-related variables were measured in terms of:

- *Rule Fit*: Do rule regimes combine and balance proscriptions, prescriptions, and permissions in ways that encourage compliance with the rules? (Ostrom 1997)
- *Spatial Extent*: Do forest users know the resource boundaries, and is the resource system small enough to manage (Olsen 1971), given the technologies and means of transportation at users' disposal (Ostrom 1997)?
- *Enforcement*: Are rules effectively enforced by way of consistent and predictable monitoring and sanctioning of non-compliance (Agrawal 1994; Banana and Gombya-Ssembajjwe 2000)?
- *Perceived Legitimacy*: How legitimate do forest users consider the rules and those in charge of implementing them to be (Tyler 1990)?
- *Compatibility*: Are rules compatible with local livelihood strategies and production systems? Are rules (state and community) compatible with each other?

The second part of the research question asked whether the particular contexts in which the rules are devised and enforced should complement rule-based explanations. In particular, how do demographic changes, cultural views, communities' accessibility, and economic opportunities affect users' decisions to conserve or exploit forest resources? Contextual variables were measured in terms of:

- Communities' dependence on forest resources for their livelihood and cultural identity;
- Communities' isolation from opportunities to market forest products and to secure their livelihoods via alternative, not forest-dependent, strategies;
- Communities' recourse to state-based mechanisms of dispute resolution (for resource-related conflicts);

- The level of social cohesiveness within each community; and
- The nature of the relationship (cooperation, competition, mutual ignorance) between community actors and non-community actors over access to forest resources.

In terms of conservation outcomes, the dependent variable, resource-degrading behavior vs. resource-conserving behavior was measured by looking at compliance, the intervening variable, and changes in forest cover and species composition over time.

Subjects and Procedures

This research took place at all levels of Madagascar's administration, going from the village community level to the national level. Most of the research took place at the village and Sakaraha levels.²³ My research assistant and I stayed in each village community for three to five weeks. At times, I withdrew from villages to conduct research at higher levels while my assistant concluded the surveys. I then returned to the site to wrap up the village-based research. In between communities we stayed in Sakaraha to get food and other supplies, enter field data into a computer data base, do preliminary data analysis, continue gathering data, and regroup mentally before tackling the next site.

Subjects

At the community level, we tried to conduct at least 30 household surveys of randomly selected individuals (15 men, 15 women) for each site. We did this in Andranoheza and Fanjakana, the two communities adjacent to Analavelona sacred forest. In

²³ Sakaraha is the main administrative town common to all the sites included in this study. It is also the larger market for the various village communities that we visited.

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Iarindrano and Andranomaitso, fewer women and more men were interviewed for reasons of informants' availability. In Andranomaitso and Mitia, we surveyed 44 and 36 people, respectively, because these villages contained more households than the other communities and also because informants were available.

Informants were randomly selected from a list of households that we mapped out upon our arrival in each settlement. A total of 170 households were surveyed during the field phase of the research. This number represents 36 percent of the 472 households in the five village communities (Table 3.1).

At the levels of the *communes*, provincial towns and at the national level, I conducted semi-structured interviews with politicians, E&F personnel, *Domaines* personnel, university professors and students (from the universities of Antananarivo and Toliara), one judge and one prosecutor from a provincial court, international and national NGO representatives, and government officials. For those informants who asked to remain anonymous, I have listed only their institutional affiliation in Appendix 1. The individuals interviewed were selected based on their likely knowledge of the particular village communities, on the one hand, and for their understanding of the general context of environmental conservation in Madagascar, on the other hand.

Table 3. 1. Number of Household Surveys Conducted per Site

Community	Andranoheza	Fanjakana	Andranomaitso	Mitia	Iarindrano	Total
Forest	Analavelona		Zombitse	Ihera	Iarindrano	
Number of settlements/hamlets Visited	10	6	1	2	3	22
Number of households	76	52	148	111	85	472
Women interviewed	15	15	21	18	12	81
Men interviewed	15	15	23	18	18	89
Total interviewed	30	30	44	36	30	170
Number interviewed as percentage of all households	39	58	30	32	35	36

Procedures

The questionnaire contained 33 main questions (some with follow-up questions) organized in four parts:

- Part A: Markets and Administrative Centers (Isolation and Market Opportunities)
- Part B: Livelihood Choices and Forest Products (Forest Dependence and Alternative Economic Opportunities)
- Part C: Local Governance (Leaders' Legitimacy)
- Part D: Rules on Forest Products (Rule Fit and Enforcement) and Rule Compliance.

All surveys were conducted in Malagasy. On average, it took one hour to complete a survey, though the duration varied with each informant, with some willing to talk for less than thirty minutes and others happy to speak to us for two and a half hours. A copy of the Malagasy questionnaire and English translation is in Appendices 2 and 3, respectively.

The survey data were initially entered into a computer database, using Microsoft Access. For most variables, a table was created (some variables were lumped together) that included all informants so as to make preliminary analysis possible. From this database, individual spreadsheets were created, using Microsoft Excel, to measure particular variables and tally results for each community. This made comparisons between genders and across communities particularly easy.

In addition to survey questionnaires, we used key informant and focus-group interviews, as well as rapid appraisal tools were at the different levels to complement the survey data. These additional interviews were also conducted in Malagasy, except with the highest-ranking officials in who mixed French and Malagasy. The data from

these additional interviews were stored in notebooks. Finally, I kept a journal in order to track the research project's progression, based on the realities of the field.

Data Collection on RCB vs. RDB and Compliance

That some questions are easier to ask and get reliable answers to than others is an understatement. In order to gather data on RCB and RDB, I relied on two measurements, one objective, the other subjective.

To get as objective a measure of resource conservation vs. degradation as possible, I utilized quantitative data on forest cover change for all sites and qualitative data on changes in species composition (the latter for Ihera forest). Ned Horning provided his expertise on the subject in order to quantify the extent of deforestation within the areas under investigation.

Methods for Determining Changes in Forest Cover

Changes in forest cover over a 51-year period (1949 to 2000) for each of the study sites were determined comparing topographic maps from 1957, based on 1949 aerial photographs and Landsat Thematic Mapper satellite imagery (path 160, row 76) acquired on April 11 1989, November 3 1994, and August 23, 2000. The 1989 image was orthorectified as part of NASA's Geocover project and the two other TM images were co-registered to the 1989 image. Each of the images had a spatial resolution of 28.5 meters.

For each study area an image subset with a dimension of 342 columns by 335 lines and 6 bands (TM bands 1-5 and 7) was created. These dimensions were determined subjectively by viewing the different study areas and creating a rectangle with dimensions suitable to encompassing the areas of interest.

To determine if there was any apparent change in forest cover between the three dates, color composites (TM bands 4,5,3 represented as red, green, blue) of the images subsets were displayed on a computer screen and visually interpreted. To facilitate the interpretation, two image subsets from the same study area were flickered from one image to the other. Using this flickering process an image from one date is rapidly replaced by an image from another date. This process is useful for highlighting changes in land cover between the two different dates. For example, if an area is forested in one image and cleared in another, the area will appear red in the earlier image and bright grey, white, or black in the more recent image.

If a change in forest cover was noted for a particular study area, then those image subsets were classified using multi-date unsupervised classification methods. In this process the six TM bands for two image dates were combined to create a 12-band image, and then that image was input into the ISODATA classification algorithm. Each sub-image was classified into the following four forest change classes: (1) forest => forest, (2) forest => non-forest, (3) non-forest => non-forest, and (4) non-forest => forest. These forest change classes, visually identified, could not be validated in detail due to a lack of sufficient ground data.

Methods for Determining the Extent of Compliance vs. Non-Compliance

I also gathered information on the ground to get some idea of the extent of conformance and non-conformance with rules at the level of communities. This was no easy task for two reasons. The first is an obvious one: given that non-compliance with rules is construed as a crime, I could not hope that all informants would trust me and open up to discuss freely the motivations behind their choices to conserve or degrade forests.

This awareness did not deter me from asking the question directly, however. In order to ease my informants into talking, I went about asking whether non-compliance occurred through several questions. For instance, the following questions were asked:

D12: Do you feel bound by this particular rule when you harvest product x? Why?

Why not?

D13: Do the people from this settlement tend to follow rules? Why? Why not?

D14: What type of rules do people tend to approve of and comply with?

D15: Do outsiders tend to comply with the rules that apply in this community?

D16: Has anybody from this community ever been caught breaking rules?

D17: If yes, are you among them?

D18: Has anyone from the outside ever punished a community member who broke a rule here?

D19: Has anyone in this community ever punished a community member who broke a rule?

Although question D17 was the core question about individual compliance, the other seven questions were intended to solicit comments from each informant. In the end, only about 17 percent of informants answered D17 in the affirmative, but low as the rate may appear, the comments that accompanied frank answers were invaluable.²⁴ Once informants had confessed to breaking a rule (or several rules), it became easy for them to discuss not only the form and frequency of non-compliance, but also their motivations for not complying. In Mitia (Ihera forest), for instance, one informant said that he and his wife had broken a community rule about harvesting firewood, and that particular confession led to the discussion about how their belief systems had switched from "traditional" (Bara) to Christianity, a decision with which the couple was

²⁴ This statistic does not reflect those who said "no" with their mouths and "yes" with their eyes. We coded these as "no," given that they were not likely to comment on why they broke rules.

comfortable given how the introduction of a state-approved logging company had devastating effects on the community's social cohesion. In Andranoheza (Analavelona forest), where the rates of confession to non-compliance with state rules were highest, informants openly said that they had no need for state regulations given that the community had effectively and successfully preserved its sacred forest.

Given the difficulty of gathering data systematically and reliably from individuals on the dependent variable, RCB vs. RDB and the intervening variable, compliance vs. non-compliance, the five communities, not individual, are the units upon which my analysis is based. However, individual motivations behind RCB and RDB are discussed in the empirical chapters.

Rationale for Combining Instruments of Investigation

As was discussed above, this investigation used a mix of instruments, each of which presented advantages and limitations. Survey questionnaires were used to be able to investigate consistently, asking the same questions, across individuals from different communities, across genders, and across ethnic groups. One of the advantages of the surveys and semi-structured interviews was that they allowed for in-depth discussions about perceptions on the challenges of environmental conservation from perspectives ranging from the village level to the national level. Survey results also allowed for both quantitative and qualitative analysis and offer good potential for follow-up investigations.

At the same time, surveys are not flawless. For one thing, random sampling contains the risk of not achieving the most representative samples, given the small size of the village communities that we surveyed. We were satisfied that we discussed the same issues with a representative enough sample. In addition, follow-up interviews

confirmed the sense that we had captured enough local views to represent entire communities.

The quality of the data is, of course, contingent upon informants' willingness to talk openly and to be honest with us. In order to minimize the risk of running into these problems, we made sure that proper procedures were followed, allowing heads of communities to introduce us and our work to their fellow villagers. In a few cases, informants' resistance to open up remained out of our control.

When talking to individuals at the community level, one can capture local perceptions, but at the same time, one can lose sight of global and regional perspectives (the "bigger picture") that are nonetheless important dimensions of environmental conservation. For this reason, it was important to use instruments that could mitigate the effects of these various limitations. This is why remotely sensed data were also used to measure the dependent variable, i.e., resource-conservation and resource-degradation behavior.

The first advantage that remotely-sensed data present is that they offer objective and relatively precise measures of changes in land cover over a period of time (rather than at the time of research only). By using topographic maps produced in 1957 and based on 1949 aerial photographs and satellite images from 1989 and 2000, it was possible to observe and measure changes in land cover over a fifty-year period.

In addition, the methods used to determine the extent to which land cover had changed allowed statistics on deforestation to be produced, both in terms of area and of rates (Table 3.2). Examples of such statistics for the Andranomaitso area in southern Zombitse are presented in this table (data limited to image to image comparisons).

Using remotely sensed data also allows one to transcend local views and check local trends against regional ones, making comparisons possible. This is a good way correct possible scale distortions embedded in survey data analysis.

At the same time, remotely sensed data also present limitations. First, they do not allow for qualitative data on, say, the various uses of the forests and what people's perceptions are about the rules that govern these uses. Second, analysis based on remotely sensed data requires ground visits to validate results. Their reliability is thus limited. Third, usable data can be difficult to acquire. For instance, if a particular image is taken at a time when clouds cover the area under study, it becomes impossible to use it. Fourth, high-resolution data can be costly, which limits how much an individual researcher can acquire.²⁵ Finally, visual comparisons do not capture all possible changes with forest quality. For instance, changes in species composition can come about as the result of selective tree cutting, as was the case in Ihera forest. We had to hear about the disappearance of certain tree species and sizes to realize that forest quality had changed there. In the meantime, remotely sensed data gave no such indications.

Why Bam Country?

On paper, research plans are neat and tidy. However, the realities of working in the field quickly blur a priori methodological intentions. We wanted to study forest-dependent communities whose resource management systems could be described as "community-based" or "state-influenced." It stood to reason that the latter type could and, in fact, should include protected areas.

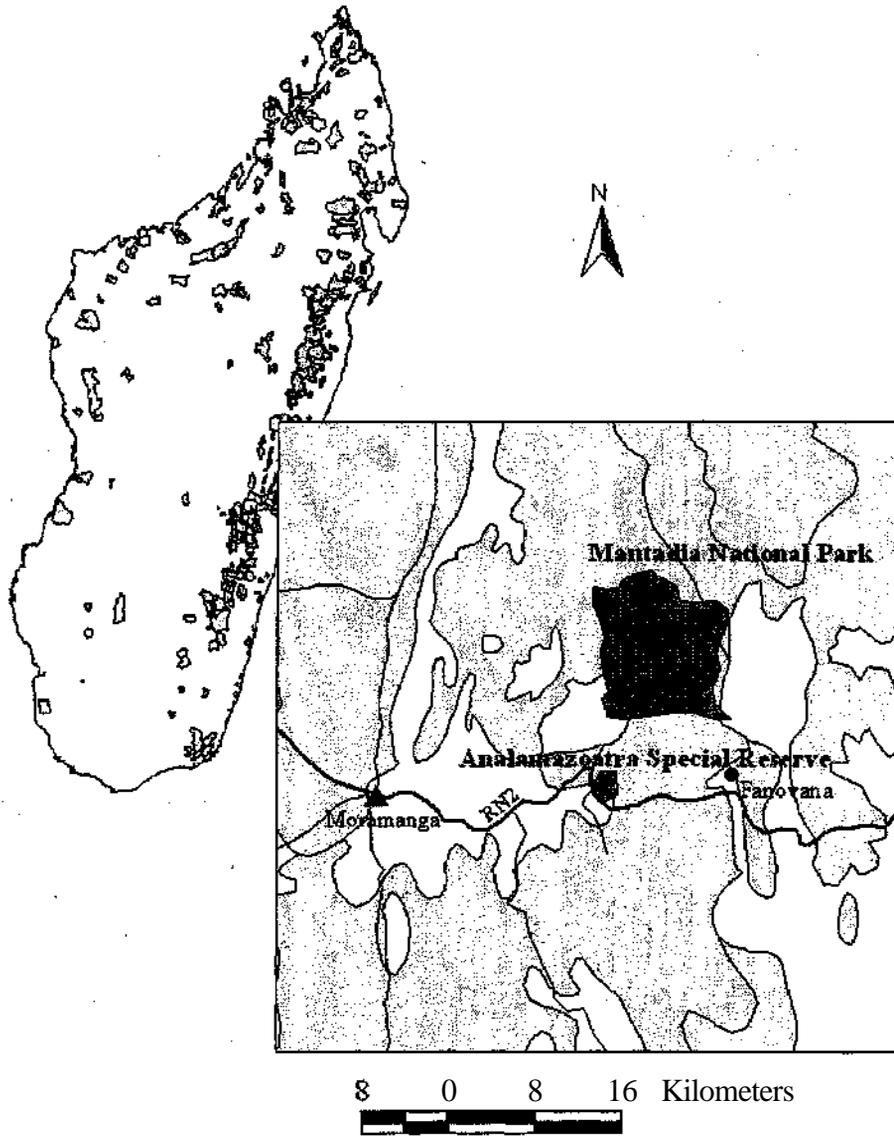
²⁵ This was the case for this research. I purchased some aerial photographs and images, but I had to wait for data to be available free of charge to complement what I had.

Table 3.2. Changes in Land Cover for Andranomaitso, Zombitse Forest

<i>Surface area</i>	<i>1989-1994</i>		<i>1994-2000</i>	
	<i>Hectares</i>	<i>Annual (average)</i>	<i>Hectares</i>	<i>Annual (Average)</i>
Forest to forest	5,233.08	1,046.6 ha	4,825.01	804.2 ha
Forest to non-forest	1,645.94	329.2 ha	488.81	81.5 ha
Non-forest to non-forest	2,346.18	469.2 ha	3,815.06	635.8 ha
Non-forest to forest	80.74	16.2 ha	177.07	29.5 ha
<i>Rates</i>	<i>Percent</i>	<i>Annual (average)</i>	<i>Percent</i>	<i>Annual (average)</i>
Forest to forest	76.07	15.21%	90.80	15.13%
Forest to non-forest	23.93	4.8%	9.20	1.53%

This reasonable assumption introduced the first layer of complications because entering Madagascar's protected areas requires permission to do research within them (our plans were to work around protected areas, not in them). Once the authorities of ANGAP, Madagascar's protected-areas agency, learned that we intended to work around protected areas, my research assistant and I became subject to their availability for meetings and their selection criteria, not ours. In the end, we had to hope that ANGAP's choice of sites would lead us somewhere useful for our research. We wound up first in a village called Fanovana in central-eastern Madagascar, in Betsimisaraka country where slash-and-burn rice culture is the predominant production system. Fanovana is located off of RN2, which links Antananarivo to Toamasina and is closer to Moramanga than either of these main cities. The village is located in the southeastern corner of Mantadia National Park and east of Analamazoatra Special Reserve, two frequently visited protected areas in Madagascar given their ease of access. Because these are high profile forests, one of the implications for our research was that our informants sounded brainwashed about the need to conserve the forest and the fact that it was a crime not to obey forest legislation (see Map 3.2).

The village of Fanovana became the "test site" where we fine-tuned our questionnaire and honed our interviewing skills, talking to many individuals, 24 of whom we surveyed. After three weeks in Fanovana, we were well acquainted with the logistical and intellectual challenges of the field, and we even had figured out how to work well with each other.



Map 3.2. Test Site in Betsimisaraka Country

After this initial experience, however, we remained at a loss as to where we could study these relationships without so much state presence that our informants sounded like brainwashed citizens, as they did in Fanovana. After two months of further investigation, headaches, and frustrating communications, our search finally came to an end. In December 1998, we met with the project director of the Sakaraha-based Zombitse/Vohibasia National Park (Project MG-0048) in the Antananarivo office of the World Wildlife Fund (WWF). Fortunately, this individual took interest in our research project and graciously offered to host us for the duration of our research. This site was particularly promising because Zombitse had become known for its community-based efforts to counter deforestation in the first half of the 1990s. At the same time, the National Assembly had just approved a change in the forest's status to national park. In January 1999, we were on our way to southern Madagascar, in the Sakaraha area where the Bara live.

Among the eighteen ethnic groups of Madagascar, the Bara are among the least known and, thus, least understood. With this fact also came the obvious and yet dreaded reality: there were few secondary research materials that we could use in the capital city of Antananarivo to prepare ourselves. The latter reality was a matter of concern, and it turned out to be a real handicap in terms of approaching the area with some understanding of the Bara context. It, of course, gave us the feeling that we would learn the long and hard way, which is precisely what happened.

Although we entered Bara land with a coherent research proposal and a plan of action for data collection, serendipity ended up being the "rationale" for selecting the area where research was conducted. Once on site, it appeared that our research design was feasible, and we relied on project conservation agents' knowledge of rural communities to guide our choices of communities.

Site Selection

When we presented our research design to the WWF staff to explain what we wanted to study and the type of sites that we wished to investigate, our site selection criteria were:

- a. Communities had to be forest-dependent for livelihood (control variable).
- b. One set of communities had to rely primarily on community-devised rules for their resource management. By contrast, the other set needed to rely on state rules. To get the concepts across we used the terms "*forte présence étatique*" (strong state presence) and "*dominance communautaire*" (community domination)
- c. Communities had to be more or less isolated from RN7, i.e., from market opportunities (isolation variable).
- d. We wanted to study at least four communities.

WWF's project personnel were very attentive to our presentation and immediately debated candidate communities among themselves once we were through with our presentation. By the end of this brainstorming session there was general agreement that obvious candidates were Analavelona (Andranoheza and Mikoboka communities as cases of community-based resource management systems) and Ihera and Vohibasias for state-based systems. Interestingly, Andranomaitso and Iarindrano seemed to straddle between state- and community-based systems.

We decided to start with the consensus cases and chose to go to Analavelona first. For security reasons, the project manager dispatched two of his conservation agents to accompany us to this area. One of them was Venot (I noticed that he had slept through our presentation and soon found out that he had malaria) and the other Bruno, a native of Andranoheza, the village that we ended up visiting first.

Research Team

Doing research in southern Madagascar on institutional reasons for deforestation was no easy task. To carry out the research plan laid out in my research proposal, I hired an assistant, whose help proved to be invaluable. Working with her allowed me to expand my research's scope and depth since she assisted in surveys, other information gathering, and storing the data into a computer database.

For each site that we visited, a WWF agent, sometimes two, accompanied us in order to introduce us to communities properly while doing their own extension and monitoring work for the conservation NGO. Although we were reluctant to visit communities in the company of conservation agents, Bara protocol and suspicion toward strangers made this a requirement. WWF agents also assisted with logistics.

In Iarindrano, we worked with a team of three Malagasy experts from the Madagascar CRC (Collaborative Research Center), using the IFRI (International Forestry Resources and Institutions) Research Program's research tools. While I joined the IFRI team, my assistant conducted household surveys independently, since the survey was part of a separate research project. By working closely with the IFRI team, we were able to get more detailed data (talking to more people, walking greater transects, exchanging information every evening, etc.) and to triangulate information more easily. While I incorporated the results of the IFRI research into my own work, I could provide household information to the CRC team.

Overcoming Suspicions

Our concern for research bias is not hard to imagine, since we could not easily ascertain what the tradeoff was between being "safe" and being told lies about practices in the forest because we were associated with WWF's project. After all, who was going to tell us anything honest knowing that we worked with conservation

agents? As we found out progressively, however, proper introductions are key to getting reliable answers from the Bara. No one but (native) Bruno could successfully do this.

When we worked with the CRC team, it became difficult to dissociate ourselves from the "other" team, and we had to work with differences in approaches and ways to solicit information from farmers. In the end, Bruno and Venot (as well as Chiriac, who accompanied us to Iarindrano and Vohibasias) were instrumental in our research, as they helped with logistics, introductions to communities and identifying informants that would most likely be open to discussing the various aspects of our research with us. Their company was critical to keeping us safe, sane and focused.

Additional Challenges to Data Gathering

In addition to collecting data on compliance and non-compliance with rules, as discussed above, working in different languages can also be a challenge. The research project was conceived in English, as was the questionnaire. I had to translate everything into French in order to communicate my intentions to officials and to my research assistant. This was not a problem. What turned out to be a challenge was to translate certain concepts into Malagasy in order to state our research questions to everyone outside of the capital city.²⁶ For instance, the concept of legitimacy of leaders and rules was central to this investigation. While the adjective *légitime* provided an accurate translation of the term in the French language, no single term could capture the concept in Malagasy. Consequently, two questions were asked, and specific terms were used to codify legitimate vs. illegitimate in Malagasy. These questions were:

²⁶ To add another layer of complications, we had to learn the Bara dialect to communicate most effectively. WWF agents Bruno, Venot, and Chiriac were instrumental in helping us translate certain concepts, although they did not attend interviews.

D24: Are there rules/regulations that you do not care for? Why? We used seven terms to get to the idea of not legitimate. In turn, no single English words could translate most of these terms!

D25: Are there rules/regulations that you do not accept/approve of?

Without both questions and the various terms used to justify informants' answers, it would have been impossible to get to the issue of legitimacy.

Conclusion

The methods of inquiry for this research were both quantitative and qualitative, as is the analysis. Even though quantitative data were obtained on explanatory and dependent variables, it remained challenging to measure, at least reliably, what has been termed compliance and non-compliance with the rules and, indirectly, the resulting resource conservation outcomes (RCB vs. RDB). Even the deforestation proxy is not without limitations, since no single method can give reliable data on the precise extent of changes in forest cover over time, especially in specific village contexts.

These limitations thus preclude regression analysis. Instead, the descriptions and analyses found in the subsequent chapters are based on data given by individuals in one-on-one and group settings, based on the analytical framework presented in Chapter 2.

CHAPTER 4

BARA LAND

Under what conditions, in what particular contexts, are rules likely to have an impact on natural resource management practices? Given that challenges to sustainable natural resource management are universal, this question could presumably be studied in any setting where people need to ensure present and future generations' livelihoods, using natural resources. This puzzle also applies where the protection of biological resources and biological diversity is a pressing goal due to increasing threats to their very existence. Such is the case in Madagascar.

This island, located off the eastern coast of Africa, is known for its urgent need to protect its natural resource base and ensure that its growing population, three-quarters of whom are rural, can find ways to secure its livelihood. Madagascar is biologically rich but economically poor. Poverty alleviation, rural livelihoods security and biodiversity protection are thus policy priorities there.

Madagascar is also culturally rich and, even today, the Malagasy veneration for their ancestors continues to affect everyday life. Traditions, broadly defined as the ways of the ancestors, have effect through the ways that the Malagasy interact with one another, as well as with nature. This is particularly true of rural areas, where the ways of the ancestors continue to be evoked in community affairs. In this sense, the Bara are representative of many rural communities of Madagascar: they live in relative isolation from the "modern" world, sometimes out of choice, sometimes not, and they have had to find ways to rely on their own local institutions to manage community affairs and resources, including natural resources. In addition, they rely heavily on agriculture for their livelihood.

Assessing the extent to which rules affect NRM requires learning about rules in different governance settings. In practical terms, this means studying situations where community governance systems exist and where community rules have binding power, on the one hand, and where state/formal systems dominate over community ones, on the other hand.

The research whose results are presented in this study took place in Bara land, in the south central/south western part of the island. My research assistant and I spent eight months in this largely unknown and equally fascinating area of Madagascar. This chapter provides a general context for this study. It describes Bara country and offers background information on the study sites, how they were selected, where they are located, who lives in the various communities, and how the people living in them organize themselves.

Ibara

The Land

Ibara, or Bara country, is located in south-central Madagascar, in the Toliara province. It covers an area of about 60,000 square kilometers surrounded by four other ethnic territories: Sakalava (North West), Antanosy (South West), Antaisaka (South East/East), and Betsileo (North) (Elli 1993).

Ibara is divided into four sub-areas, which were formerly Bara kingdoms: Bara latsatsa (East), Bara Be (Center), Bara Vinda (Southeast) and Bara Imamono (West). This study took place in the latter region, in an area located between the administrative towns of Sakaraha (*on Route Nationale 7*) and Ankazoabo (north of RN7).

Not only do its bio-geographical limits make Ibara particularly favorable for pastoralism, but the sandy soil types encountered there, as well as annual precipitations, also, render the area agriculturally challenging (Saint Sauveur 1998, p.

38).²⁷ The landscape is dominated by savannah vegetation, though three main forest formations also exist. They are the Zombitse-Vohibasia complex (Zombitse, Vohibasia, Isoky, Iarindrano and Mangona), Mount Analavelona, and Ihera. As far as climate is concerned, with eight months of dry weather per year, this area has a characteristic semi-arid climate. The Fiherenana River is the main hydrographic source for the study area. Human settlements are concentrated along the main watercourses that flow from this main river. In some communities, the local conditions are favorable for irrigated paddy cultivation (Iarindrano). In most cases, however, siltation and loss of topsoil due to torrential rains of the rainy season (November to March) make it difficult to cultivate rice without significant investments to restore soil nutrients. This may explain, at least in part, why the Bara have maintained pastoralism as their main production system.

The People

The people of this area are called the Bara, a people whose African origins have been documented, albeit not without controversy (Michel 1957; Kent 1968). In the early 1990s, Elli estimated that there were about 300,000 and no more than 500,000 Bara in Madagascar. This represented less than 5 percent of the total population then. Later that same decade, Saint Sauveur (1998) noted Bara demographic exceptionalism: although the Toliara region was noted for its remarkable population growth, going from 46,000 inhabitants to 100,038 between 1975 and 1989 for the town of Toliara, Bara demographic growth appears to have stagnated (Saint Sauveur cites UNDP 1991 figures) with low population density (6 and 5 per km² for Sakaraha and Ankazoabo, respectively, compared with 8.1 for Toliara province); fecundity is also reputed to be low, and infant and juvenile mortality rates are high; finally women's health is

²⁷According to Hoerner (1986), rainfall averages 721 to 733 mm.

precarious (p. 65). According to UNDP studies, it is plausible that the number of Bara people decreased between the 1950s and the 1990s.

The term Bara connotes might, violence and pride, partly due to fierce Bara resistance to outside invasions at different points in history when the Merina, and subsequently the French, tried to impose their rule beginning in the eighteenth century. In the 1880s, British missionaries noted that the Bara were "not only an unknown people, but also a feared race."²⁸ In 1993, Elli noted that Europeans and other Malagasy continued to consider the Bara with the utmost disdain (p. 25). In 1999, when we arrived in our first Bara village, the chief welcomed us with these words: "We hate strangers. What can we do for you?" Clearly, the Bara are direct, which may be why they are seen as aggressive and unpolished.

Bara History

Unfortunately, the history of the Bara people is sketchy. Some European scholars and missionaries paid attention to the the Bara in the 1800s, but it was not until 1938 that the Reverend William Ellis actually mentioned them in his writings. Based on his interest in studying Afro-Malagasy connections, R. K. Kent (1968) took issue with existing theories linking the Bara to mainland Africa and Asia, insisting that the African origins of the Bara needed to be studied and Malagasy history revised. Interestingly, Kent suggested that "contrary to previous belief, there was an early Bara state. It formed sometime in the second half of the sixteenth century [not in the eighteenth century] and lasted until about 1650" (p. 407).

²⁸ G. A Shaw cited by Elli (1993).

²⁹ Among these scholars, Guillaume and Alfred Grandidier, Tastevin, Le Barbier, Hubert Deschamps, Gabriel Ferrand, Faublée, R. Verneau and Louis Michel wrote about the Bara, mostly in the early to mid-1900s.

Later on, Ottino (1974), Vénin (1980) and Hoemer (1987) theorized that the original settlers of southwestern Madagascar came from Bantu Africa around the ninth century. These original settlers became subject to domination from groups located in the east and central parts of the south. By the eighteenth century, Sakalava, Masikoro and Mahafaly kingdoms were established. According to Mahatsanga (1977), the Bara clan itself was formed as the result of migrations, underpressure from the Betsileo and Antesaka of the East, to the safer west where they fought the Masikoro and Mahafaly and eventually accepted the authority of the Zafimañely, an offshoot of a Mahafaly dynasty, the Maroserana (Brown 1995). By the end of the nineteenth century, the Bara were those who readily accepted Zafimañely rule on a territory favorable for pastoralism. In spite of their occupation of Mahafaly and Masikoro lands, they acquired the status of *tompon-tany*, or landlords.

The oral histories that we gathered in Bara villages pay little attention to the period preceding the late eighteenth century, the era when the Bara kingdom expanded northward (from Mahafaly and Masikoro countries), and the Zafimañely clan established itself as the ruling clan in Bara country. King Poinimerina is a prominent figure in villagers' collective memory. According to villagers, he ruled over their territory when most settlements were forming. He is the one who granted land to migrants in search of good pastures in exchange for their loyalty. To some, King Poinimerina was a typical tyrant; to others, he was benevolent and allowed their ancestors to settle down and prosper in this area.

Bara Culture

The Bara are a pastoral people whom Elli (1993) refers to as a cattle civilization (*une civilisation du boeuf*). This is because zebras occupy a prominent place in Bara life. In cultural terms, zebras represent a medium between humans and the ancestors as well as

the supreme being (*Zañahary*). In economic terms, zebus are Bara people's bank accounts, as the Bara jokingly explain to outsiders. In social terms, zebu ownership yields prestige and power within and even beyond one's community. Finally, activities relating to raising cattle dictate land tenure arrangements among the Bara.

If one looks at Bara village territories, it becomes obvious that pastoralism dictates the terms of spatial organization. This is to say that spatial units are organized around cattle's needs. Within each village (*tanàna* or *tanà*), there are designated areas for parking zebus overnight (*vaia*). Outside the (imaginary) circle of human settlements, and past agricultural fields (*tanimboly*), vast areas of savannahs (*monto*), forests (*ala*), rivers (where zebus drink and get washed) and gallery forests (*sakasaka*) and hilltops together constitute the pasture space, or pasture unit.

The savannah zone immediately outside the village (about one mile out) is usually designated as collective pasture. Beyond this collective pasture zone, each lineage has a designated area where it takes its members' cattle. Some of these are found inside forests. The *toets 'aomby*, which are temporary camps where members of a lineage watch the family cattle, are located between village settlements and forests. Although this is not explicitly said, these camps serve as monitoring posts to keep track of traffic on the village territory and into the forest.

The physical organization of pasture areas is intricately linked to social organization, whereby each lineage contains its herds and controls the space on which respective herds graze. The village territory can thus be represented as a collection of lineal, clan, or ethnic zones in which each lineal space is organized in a predictable manner: there are specific areas where zebus are parked (*vaia*), where they are gathered (*kija*), where they eat, drink, get washed and rest. Finally, there are specific paths where they circulate, are inspected and counted (*kizo*). Overall, these spaces are carefully defined and tightly controlled (Saint Sauveur 1998, p. 91).

One aspect of Bara culture directly relevant to this study (in terms of site selection) revolves around family ties, a concept that is paradoxically far from straightforward in Bara culture. The generic term that the Bara use to refer to their relatives is *mpilongo*. This may or may not refer to blood ties and, because of the potential for confusion, it is useful to think of *mpilongo* as allies bound by rights and obligations rather than as relatives in a Western sense. For this reason, the term transcends the boundaries of individual villages.

In Bara land, it is useful, though often difficult, to distinguish the ethnic group (the Bara) from the clan (Ndrevola, Zafimitovo, Marolava, Zafimañely, etc.) from the lineage (descendants of a common relative). Though clans and lineages are distinct terms, the distinction is not easily made, at least practically, in Bara culture. According to Elli (1993) and Saint Sauveur (1998), the clan plays an ideological/identity role, whereas the lineage plays a practical role in social organization. Individuals of a clan share a name, a sign or symbol used to mark cattle's ears (to identify their owners), taboos (*fady*, or *faly*) and oral histories. Clan members are bound by rules of reciprocity whereby mutual support, protection and hospitality are expected. The line between *mpilongo* and clan members is thus blurry.

Although the Bara identify with their respective clans, social organization follows the lines of lineages, especially when social cohesion is challenged: when members of a community experience disagreements, tensions or even conflict, heads of lineages relocate their descendants so as to create some autonomy and to avoid constant interaction. Even though the Bara will not easily admit to fragmentation within their communities, it seems clear that members of distinct lineages concentrate in one area and that they are under the leadership of male lineage heads. As will be discussed in subsequent chapters, this is the case in Andranoheza, Fanjakana and

Mitia. In Iarindrano and especially in Andranomaitso, the dividing line is not so much lineage as it is ethnicity (Bara vs. others).

For the choice of settlements where surveys were conducted, the operational term that guided our site selection was *mpiiongo* and their shared rights to each forest under study. This explains why, in some cases, sampled settlements are geographically scattered. For instance, we did not limit our investigation to the various hamlets of Andranoheza village but, rather, included informants from another four out of nine possible eastern Analavelona settlements (details below).

Bara Socio-Political Organization

The Fokonolona as Unit of Social Organization

Villagers distinguish administrative leaders from traditional leaders. Though four main terms for traditional leaders are used interchangeably, *mpisoro* and *mpitakazomanga* are a sub-set of *Ray aman-dreny* (parents, literally) or *olobe* (elders). *Mpitakazomanga* are heads of clans, leaders at the level of their respective settlements (hamlets) within the larger community called the *fokonolona*.

A *mpisoro*, who is also a *Ray aman-dreny* or *olobe*, is a leader by virtue of his age, and the title reflects to whom he was born. He is considered to be an intermediary between humans and the spiritual world. His main role is to perform ceremonies and, as *olobe*, resolve conflicts from the household to the community level, and to reprimand, sometimes sanction, those who display behavior not considered socially acceptable. He does this in conjunction with the family heads, *mpitakazomanga*, of each settlement. He is a well-respected figure whose words are the words that community members go by. There is one *mpisoro* in each Bara community. The traditional organizational structure of Bara communities is represented in Figure 4.1.

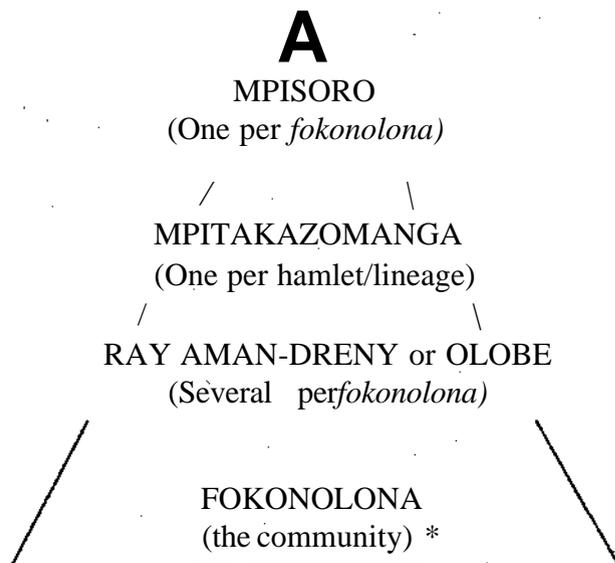


Figure 4.1. Organizational Structure of Bara Communities

The Fokontany as Unit of Socio-Political Organization

Another important figure in the community is the *komity*, the local term (a misnomer, in fact) used for *Président du Comité Local de Sécurité*, the official state representative at the level of the community. The community usually designates the *komity*, based on the individual's ability to demonstrate trustworthiness, reasonable behavior, and wisdom vis-à-vis his peers. His role is to convey state messages, carry out state orders, and inform community members of state regulations. He also supervises the execution of state orders for tasks that range from collective road maintenance to registration of villagers' cattle. For effective diffusion of information, the *komity* relies on the various *mpitakazomanga* who inform the members of their respective settlements. The *komity* is also responsible for hosting stranger guests and state representatives who occasionally pass by or visit.

The fokontany, Madagascar's lowest administrative unit, was created under the Second Republic (1975-1992) when the Malagasy state embarked on major

administrative restructuring following the so-called Socialist Revolution led by Didier Ratsiraka in 1975. The *fokontany* (locality) was the smallest unit of organization under this administrative scheme. It could encompass one settlement/village or several. The *firaisana* (sub-district) was the next unit up. This encompassed several *fokontany*, ranging from dozens to hundreds of village settlements or neighborhoods (*quartiers*) in urban areas. Beyond the *firaisana* was the *fivondronana* (district), whose headquarters was most often a small town.

The forests of this study fall under the jurisdiction of two such *fivondronana*, Ankazoabo (north) and Sakaraha (south, on RN7), though all informants with whom we dealt reported to Sakaraha. The *faritany* (province) encompass *sdfivondronana*. There are six in Madagascar (with former names): Antananarivo (Tananarive), Toamasina (Tamatave), Fianarantsoa, Mahajanga (Majunga), Toliara (Tuléar) and Antseranana (Diégo Suarez). Changing the French names into Malagasy ones was part of a nationalistic movement that started in 1972 when protests against neo-colonial rule under the leadership of Philibert Tsiranana erupted. Under the subsequent transitional government of General Gabriel Ramanantsoa, nationalism was heralded and a movement of "*malgachisation*" began.

To this day, these terms continue to be used, even though new terms were created under the new decentralization plan that came into effect in the latter part of the 1990s. Under this plan, the administrative units used under French rule were essentially recycled (*commune, maire, sous-prefet*), but terms created under the Second Republic (1975-1992) were also adopted (*fokontany, firaisana, fivondronana, faritany*). As for the term *fokonolona*, which predates colonization, it has continued to refer to the lowest level of social organization, referring to communities (Razafintsalama 1981). To the chagrin of the uninitiated, the old and new terms are

now used interchangeably, which can be confusing (Madagascar Tribune, April 15 2004).

Figure 4.1 shows how the terms have evolved and presents study sites according to the various administrative categories. In this figure, the top row shows the names given to the administrative units, in ascending order going from left to right, during the Second Republic. The second row shows the terms adopted for the same administrative units under the Third Republic's decentralization plan. The third row gives the names of the political positions for each of the decentralized units. At the level of the community (fokonolona), it is not uncommon to see a "traditional" leader given administrative responsibilities (hence the overlap between the boxes).

Five Communities, Four Forests, Three Cases

The three empirical chapters in this dissertation cover four forests and five communities living around them. What follows is a description of each of the four forest sites, with data on location, settlements, land use and livelihood strategies, ethnic composition, and changes in forest cover. This information provides background for the subsequent empirical chapters, which focus more on analysis than description.

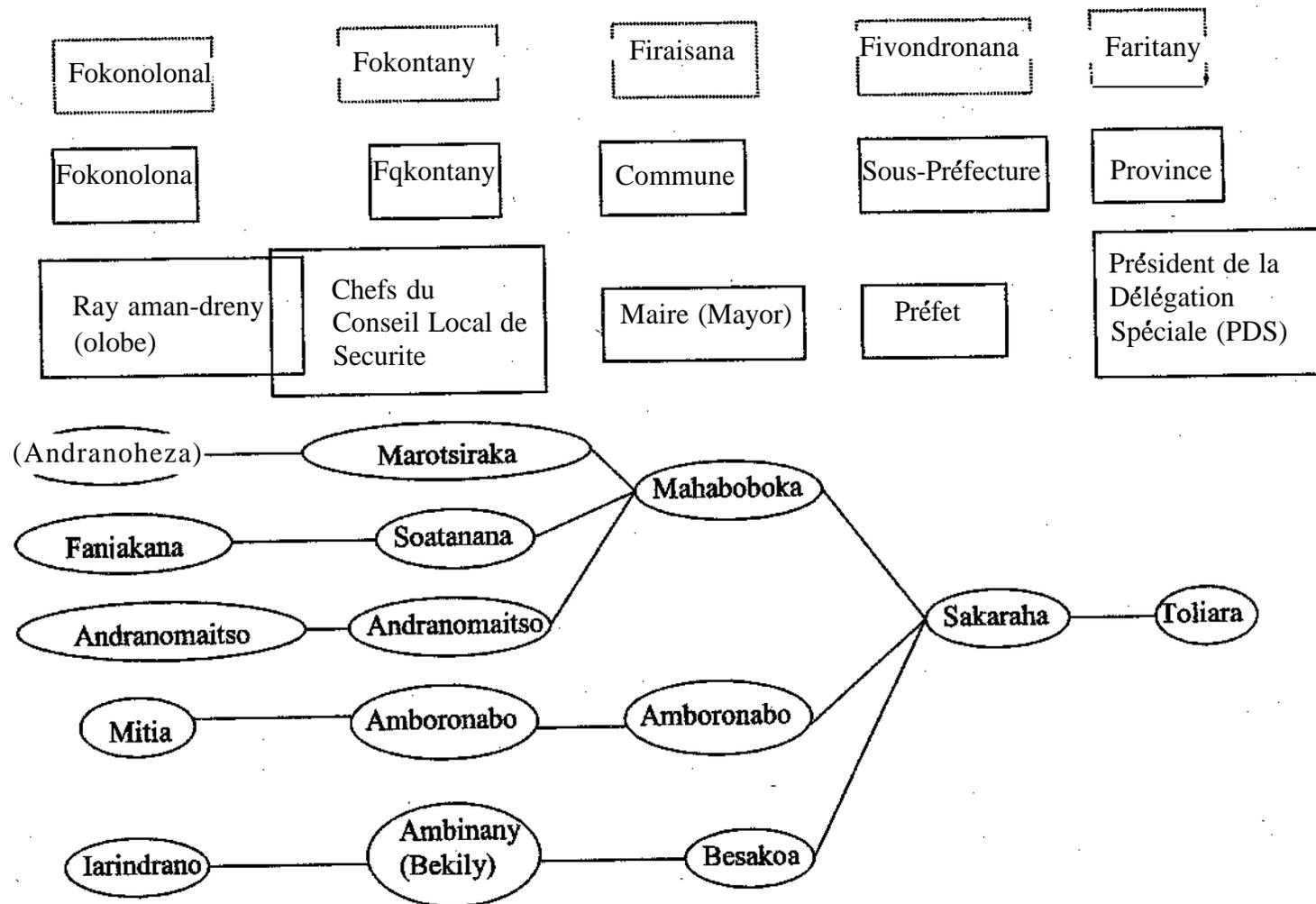


Figure 4.2. Communities' Administrative Jurisdiction

Analavelona Sacred Forest

Location

Mount Analavelona, the site of Analavelona sacred forest, lies between latitude 22°36.5'south and 22°43.5'south and longitude 44°7.9'east and 44°12.7'east. It is located north of the portion of Route Nationale (RN) 7 that links Toliara to Sakaraha, some 25 kilometers (as the crow flies) northwest of the communal town of Mahaboboka. The area falls under the jurisdiction of Sakaraha district, in the province of Toliara. The two sites presented in this chapter are located southeast (Andranoheza area) and southwest (Fanjakana community, Mikoboka area) of Analavelona sacred forest, as shown on Map 4.1.

Settlements

Andranoheza Bara

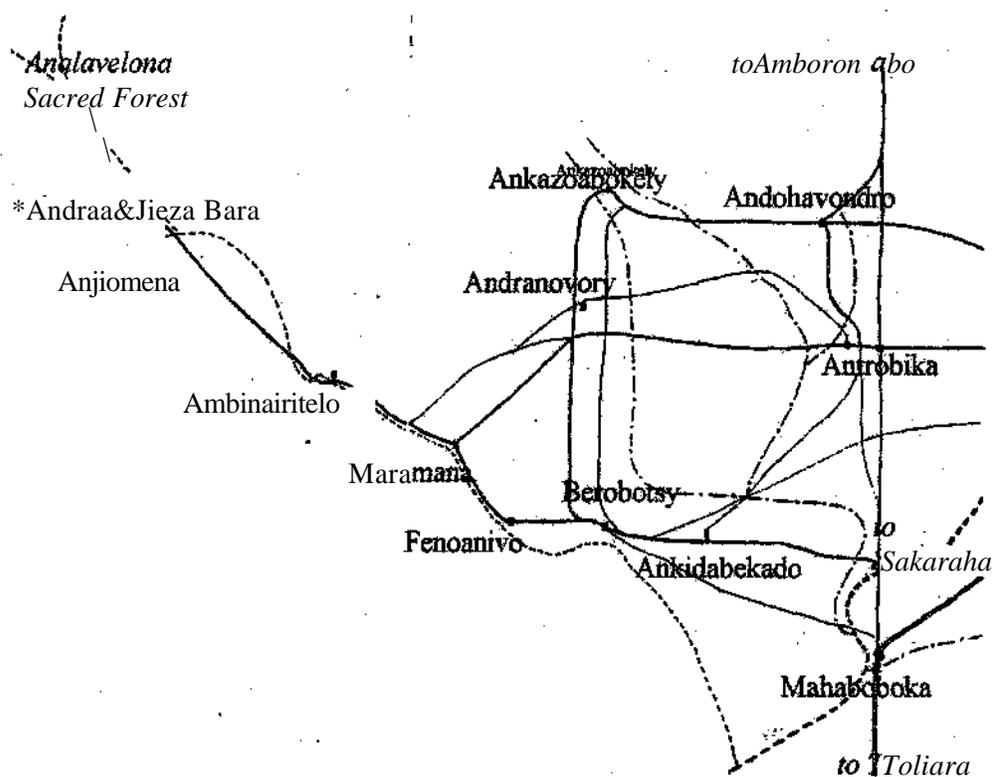
The area surveyed belongs to the relatively large rural *fokontany* of Marotsiraka Betsileo. This *fokontany* comprises 10 main settlements covering, approximately, 100 square kilometers or 1,000 hectares.³⁰ Within this area, we surveyed four principal settlements: Andranoheza Bara (which includes Anjiomena), Ankazoabokely, Andohavondro, and Antrobika/Ambinanitelo (see Map 4.2). Our choice of Andranoheza Bara was motivated by its proximity to Analavelona (it is the closest village to the sacred forest) and by our background knowledge that its inhabitants were the primary users of this forest.

³⁰ The communities are: Andranovory, Ankazoabokely, Andranoheza Bara, Anjiomena (Morarano), Fenoanivo, Andohavondro, Ankoboka, Marotsiraka Betsileo, Berobontsy, and Ankidabekado.



Source: FTM. 1957. Mikoboka (F-56) and Maromiandry (G-56) Topographic Maps.
Scale: 1:100,000.

Map 4.1. Analavelona Communities (Fanjakana and Andranoheza)



Map 4.2. Marotsiraka Betsileo *Fokontany* Communities (Eastern Analavelona)

Andranoheza Bara is comprised of the main settlement of Anjio mena (30 households) and five hamlets located east of this main village and commonly referred to as Andranoheza Bara. The hamlets are (from North to South, with approximate number of households indicated in parentheses): Andombiry Avaratra (6), Tsinjorano (7), Andombiry (14), Ambondrolava (12), and Belemokafo (7). Having no data on the other three Analavelona settlements (other than the fact that their inhabitants also used Analavelona as their main source of forest products), we limited ourselves to 25 percent of our household surveys in Andranoheza, which turned out to represent 15

percent of all households in this settlement. Based on the household survey we conducted, the average household size was 5.1.

Villagers' presentation of their territory to us was surprisingly simple. Three rivers surround Andranoheza Bara's village territory. These rivers are the Manasay, Manadabo, and Ranoheza.³¹ The main settlement, Anjiomena, is located about thirteen kilometers southeast of Analavelona, right below the point where Manadabo and Manasay Rivers meet and above the point where Manadabo and Ranoheza Rivers join. This village is separated from Analavelona by abundant gallery forests, which follow the course of the 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. Far North of this settlement lie the Besavoa Mountains, which are located north of Ihera forest, another forest about 24 kilometers north of Andranoheza.

Rakotonirina's description of the territory is more precise than the villagers' (Rakotonirina 1999, pp. 79-82). Though Rakotonirina characterizes Andranoheza's territory as "disorganized," it is easy to discern land use patterns. Pasture areas, which largely dominate the landscape, cover close to two-thirds of the territory's total surface area; then there are agricultural fields for (by decreasing order of surface area) rice, manioc, and yams; finally there are settlements. Clearly marked paths connect the five hamlets. Two principal irrigation canals link the main rivers of Ranoheza and Manadabo to two of the three main rice fields. The grazing areas surround the village, and they extend north toward Analavelona. A large cattle camp called Analabenday

³¹ What Andranoheza villagers currently call the Andranoheza River is called the Analanbinday River on the 1957 topographic map.

separates Andranoheza from Analavelona. Though mentioned by neither Rakotonirina nor villagers explicitly, gallery forests are also part of the landscape around Andranoheza.

At the risk of oversimplifying, one can say that the village territories of Ankazoabokely and Andohavondro/Antrobika are similar in terms of land use patterns. Clearly, the village territories share characteristics. Most importantly, and in all three cases, Analavelona is considered part of the territory in spite of the fact that it lies at a distance. Second, the crops are similar, rice, manioc, and yams are cultivated in all three villages. Finally, all villages are located near main watercourses. While Ankazoabokely is made up of one concentrated cluster of houses, Andohavondro/Antrobika is rather dispersed, as is Andranoheza.

Ankazoabokely is located east of Andranoheza, about three hours away by foot. Andohavondro is another hour and-a-half east of Ankazoabokely, and Antrobika is south of Andohavondro, less than an hour away. Strangely enough, Ambinanitelo, a cattle camp/hamlet attached to Antrobika is located west of Antrobika some three hours or so away, on the way to Andranoheza. This hamlet is closest to Andranoheza, as it is located about 8 km (an hour and-a-half's walk) from Andranoheza. This cluster of village communities, users and "owners" of Analavelona forms a loop that includes five other villages that are not considered Analavelona communities. These five villages are: Ankidabekado, Berobotsy, Andranovory, Fenoanivo, and Maromanana.

Andranoheza inhabitants are predominantly Bara. From the sample surveyed, 93 percent of men and 73 percent of women were Bara. The other ethnicities represented in the various settlements were Tanosy, Betsileo, Masikoro (women) and Tandroy-Sihanamena (one man). Once married to a Bara man, however, women are expected to adopt Bara customs.

For subsistence, the main activities are harvesting various products from the forest (97% of informants said so), paddy rice cultivation (80%), and cultivating various crops that complement rice (97%).³² In addition, 97 percent of informants own zebus. Fifty three percent of informants said that they were self-sufficient year round.

Fanjakana (Mikoboka Area)

The region west of Analavelona is called Mikoboka, whose name means "sunken," and it is notorious for its isolation and inaccessibility. In this area, the Manandana River runs parallel to the forest, at a distance of about four kilometers (as the crow flies). There are a few settlements alongside Manandana River, mostly on the lower portion, southwest of the forest. The largest ones are Fanjakana and Soatanana where the *fokontany* offices are located. Fanjakana is a cluster of village settlements located north of Soatanana. The village settlements included in Fanjakana are Mahavatsy (the main village), Betsingily, Mahabo and Antanimora. Among these, only Betsingily is located west of Manandana River.

Mahavatsy (19 households) itself is divided into two hamlets, as is Betsingily (also 19 households). The largest and most recent settlement is Antanimora, with 21 households. This settlement is closest to Analavelona. Mahabo sits between Antanimora and Mahavatsy, with 10 households. The main features of this village territory are water courses along which rice and other fields are found; paths that link the various hamlets; pasture areas that comprise both savannah and parts of Analavelona forest; and, finally, Analavelona forest.³³ Gallery forest and savanna separate the settlements from Analavelona.

³² Forest products are discussed in detail in Chapter 5.

³³ Village sketch maps indicate that the hamlets specifically using Analavelona forest for pasture are eastern Mahavatsy, Antanimora, Ambilany and possibly southern Betsingily. Others take their cattle to hills west and north of the settlements.

Compared to Andranoheza, on the eastern side, the sacred forest is easier to access, not only because of the shorter distance separating the settlements from the forest, but also because the terrain is less steep. Another big difference between the two sides is the existence and availability of alternative forests (other than gallery forests) that are used to meet villagers' needs. The main ones are Analafanja, near the village of Mitsinjo, which is located some three and a half hours southwest of Fanjakana, and Antsirozy, which is located in the northern part of the Mikoboka area near a village called Ambilany.

Both village territories are remote from the closest market and administrative centers that villagers use. The weekly market of Mahaboboka attracts surrounding populations, including residents of Andranoheza and Fanjakana. From Andranoheza, it takes a little over two-and-a-half hours to get to the market, using a combination of cattle cart (to transport produce forth and merchandise back, women and children) and going on foot (especially when buying and selling cattle). Most Andranoheza respondents (59%) consider the market to be "far away." And yet they are comparatively better off than Fanjakana residents who need to travel for 12.3 hours, on average, with an overnight stopover, to reach Mahaboboka market, the main market that villagers go to about twice a month (again, on average).³⁴ It is necessary for the vast majority of households to go to the market because it is the only place where they can sell their produce and purchase household goods such as fabric, batteries to operate their radio sets, and small food items such as salt, sugar, coffee, cooking oil, etc.³⁵

³⁴ Six months per year, they produce enough produce to sell at the market, in which case some go to Mahaboboka once a week. For the rest of the year, the frequency of trips to the market drops to once a month for most villagers.

³⁵ Small village shops carry these items, but their cost is high compared to market prices and so, they are used for emergency purchases only.

To take care of their administrative papers (birth and death certificates, cattle registration, elections, etc.), however, Fanjakana residents need not go to Mahaboboka but to the *fokontany* office in Soatanana. It takes them less than two hours to reach Soatanana. For both communities, a trip to the town of Sakaraha imposes itself when someone becomes very ill or when individuals need to go to court or to the Eaux et Forêts (E&F) office to request a cutting or burning permit. Trips to Sakaraha add close to two hours of travel to trips to Mahaboboka, but they are not frequently required.

The inhabitants of the Fanjakana area are ethnically homogenous in that all people surveyed said that they were Bara. Only membership to a particular clan distinguishes inhabitants of the different hamlets. Two clans dominate, however. They are the Bara Zafindravola and the Bara Ndivola (or Andriavola).

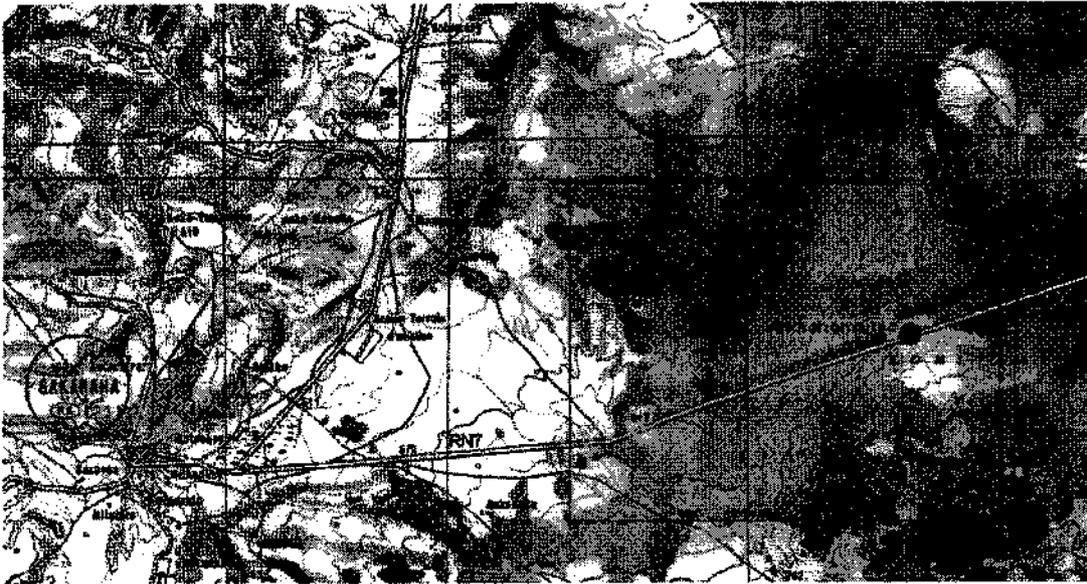
For livelihood strategies, rice and complementary crops cultivation dominate with 94 percent and 100 percent of surveyed people engaged in both activities, respectively. Almost everyone harvests products from the forest (94%), while 80 percent and 97 percent of informants own zebus and poultry, respectively. Overall, some 94 percent of people surveyed considered themselves self-sufficient year round.

Zombitse National Park

Location

Zombitse forest is located between latitude 22°45' south and 22°49' south and longitude 44°37' east and 44°45' east. Andranomaitso is located in Bara country, some thirteen kilometers east of Sakaraha on RN7, which cuts through the village (see Map 4.3). Most buildings are located north of this paved highway. In 1994, 436 people lived in Andranomaitso (Randriatavy 1994). In 1997, 650 people occupied the village (WWF 1998). In 1999, we counted 148 households with an average size of 5.45 people per household, based on the 44 we surveyed, which indicates an approximate

total number of more than 800 people. Though no updated population statistics were available at the time of research, it seems reasonable to assume that the number of Andranomaitso dwellers has increased steadily since the creation of this settlement.



Source: FTM. 1957. Sakaraha Topographic Map F-57. Scale: 1:100,000.

Map 4.3. Andranomaitso and Zombitse Forest³⁶

Unlike the other three sites included in this study, Andranomaitso inhabitants have easy access to the town of Sakaraha and even to Toliara, given that these towns are also located on RN7. Andranomaitso residents go to Sakaraha for the weekly

³⁶ Andranomaitso community did not exist at the time this map was produced. The site was added to the original map ex post-facto.

market and to take care of administrative matters when the need arises. Most survey respondents (95%) stated that they go the Sakaraha market to sell produce and buy produce and purchase small food items and necessities (salt, sugar, coffee, soap, batteries, etc.). On average, it takes them less than two hours to reach Sakaraha, traveling by car or bus and sometimes part way by foot (the distance to cover is about 13 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 or at the level of Sakaraha (*fivondronana*), trials take place in Toliara's court, which is where most cases opposing E&F or WWF to Andranomaitso residents are heard.

Settlement

At the time of research, there were 148 households occupying an open area surrounded by Zombitse forest to the north and east and by Hazoroa forest to the south. The buildings are clustered along RN7, and particular sections regroup families of the same ethnic origin. Eleven ethnic groups are present in Andranomaitso, though some groups (Antandroy, Mahafaly, and Betsileo) are more numerous than others (Masikoro, Antesaka, Tanala, Vezo, Bara, Tanosy, and Tanalalana, Merina). Of all sites included in this study, this is the only community where the Bara are not an ethnic majority in Bara land. The historical reasons for this are discussed in Chapter 6. Suffice it to say, for the time being, that Andranomaitso started off as a Bara zebu camp, but that the construction of RN7 and the arrival of a logging company dramatically changed land use practices and the distribution of ethnic groups that eventually comprised the settlement of Andranomaitso.

Unlike the other villages included in the study, Andranomaitso hosts a primary school (a product of villagers' cooperation with WWF's project) and two Christian

churches, which are located in the middle of the village. Besides houses and community buildings (the primary school and the two churches), the forests of Zombitse (north and east) and Hazoroa (south) dominate the landscape, as do agricultural fields, pasture areas, the paved RN7, paths that lead into Zombitse (left over from logging activities) and a well. Maize is the predominant crop in the village, with maize fields surround houses. There are also some fields scattered about inside Zombitse, north of the settlement (Randriatavy 1994, 36).

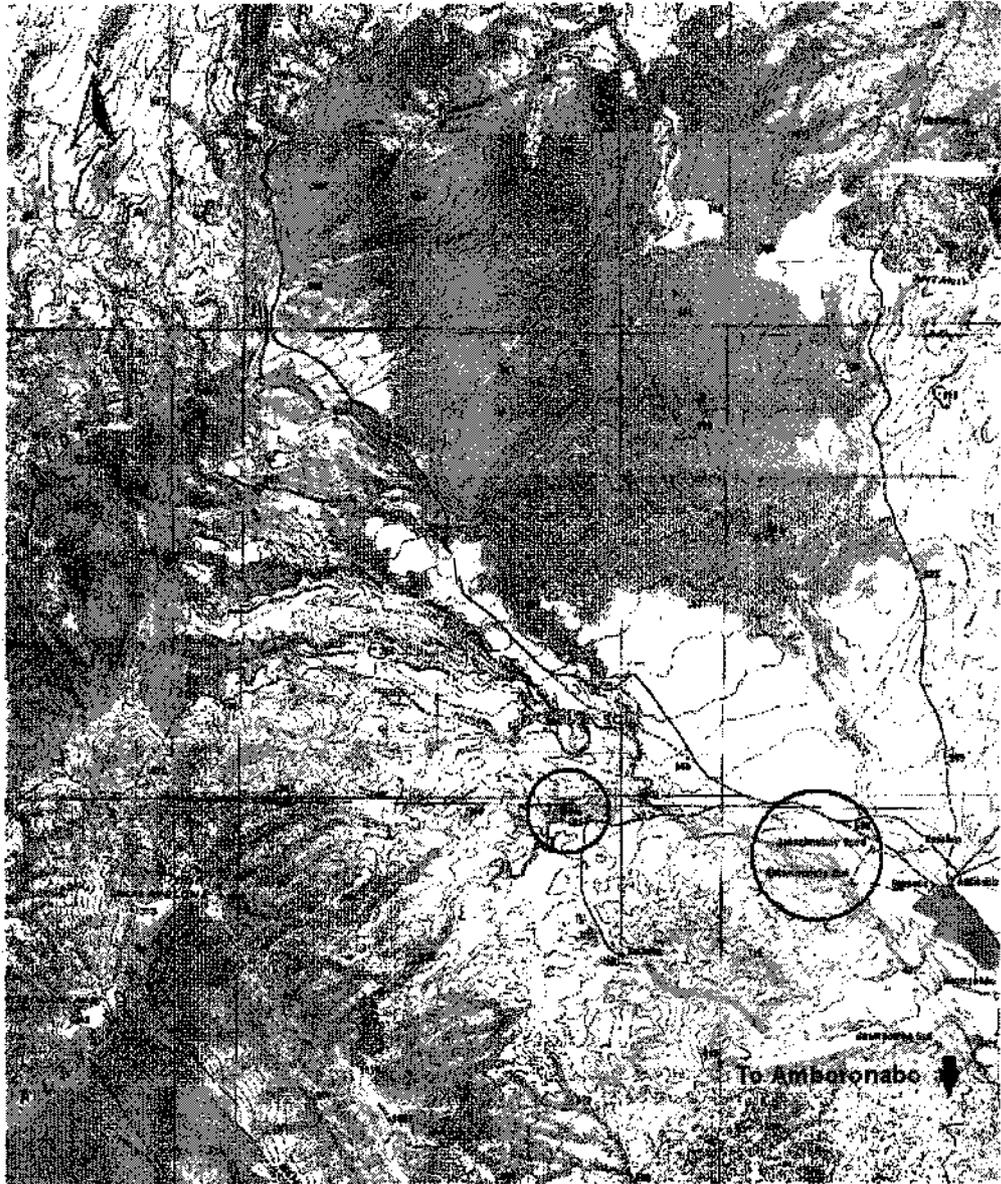
Ihera Classified Forest

Location

Ihera forest is located between latitude 22°26' south and 22°33' south and longitude 44°12' east and 44°19' east, about 7 km northeast of Mount Analavelona (see Map 3.1).

Settlements

Had we arrived in Mitia two weeks before we did, this site's description would have been simple and straightforward. The two cluster settlements that we visited are called Mitia and Antanimainty (see Map 4.4). While both settlements are located south of Ihera forest and northeast of Mount Analavelona, Antanimainty is located less than two hours (on foot) east of Mitia on the way to the Amboronabo market. The area under investigation is roughly 3,000 hectares.



Source: FTM 1957 Besavoia Topographic Map E-56. Scale: 1:100,000.

Map 4.4. Mitia and Diera Forest

* Diera is spelled Herea on the 1957 map.

Antanimainty is made up of four hamlets called Sapana (7 households), Bekinana Ouest (9), Bekinana (25), and Kiliabo (16), all located within half an hour of each other. The inhabitants of Antanimainty and Mitia are relatives (*mpilongo*).

Mitia used to be one village. Mitia Aiiivo (center) used to be part of this single village until April 1998 when some internal and inter-generational conflict emerged. This village acquired the status of *fokontany* in May 1999. The name of *Utàs fokontany* is Mitia Est II. It is comprised of Mitia Centre (Añivo), a portion (about 25% of households) of Mitia Est and a portion of Mitia Ouest (Andrefana) (3 out of 46, or 6.5%, of households). Before the major administrative split was formalized in May 1999, the village of Mitia was made up of three sections Mitia Ouest (46 households), Mitia Centre (42), and Mitia Est (70). When the administrative split became effective, however, the village was divided into two parts, each part constituting a *fokontany*, with the administrative line slicing through the sub-section of Mitia Est. The latter's households separated into two groups: 21 of the 70 households joined Mitia Ouest and Mitia Centre to form the *fokontany* of Mitia Est II, whereas one family, organized into 49 households, became the *fokontany* of Mitia Est. The reasons for this split are discussed in Chapter 7. Even though the new *fokontany* of Mitia Est and Mitia Est II had formed at the time interviews were conducted, almost all informants reported going to the *Ambovonsiho fokontany* office for administrative matters.

According to villagers' descriptions, the landscape is dominated by a few prominent features. Ihera forest, which is located north and less than an hour by foot, is the primary source for forest products. These include pasture areas, which constitute a second feature of the landscape. The main ones are located on the fringes of the forest and in-between the forest and human settlements. Three main watercourses, Betavolo, Lona, and Kalefiky, flow from Ihera forest and irrigate the rice and other

fields.³⁷ Antanimainty is located northwest of where Kalefiky and Lona Rivers meet, whereas the Mitia cluster is situated west of Lona, between Sevalava (north) and Mitia (south) rivers. The two clusters are linked by a dirt road suitable for vehicles most of the year (that is, when Fiherenana River is not too high).

To reach the Amboronabo market, one passes through Besavoa, a village that features expansive rice fields. Past Amboronabo, one travels south, on the same dirt road, to reach RN7. The average travel time to the Amboronabo market is just under three hours, Mitia residents having to travel one hour longer than Antanimainty inhabitants. Most informants (64%) considered the market to be far away. Over half of informants travel by foot exclusively, whereas a quarter of them also use a zebu cart (*sarety*) to reach their destination. Buying and selling produce and buying small household items are the main reasons for going to the market and seldom do people go weekly; one third of informants go bi-weekly, the others go less often with frequencies ranging from once a week to once a year.

The population of these two settlements are Bara originally from Mahafaly, Masikoro, and Betsileo countries, which would characterize the community as ethnically homogeneous. But Mitia settlement is otherwise administratively, socially, religiously, and economically split up, as discussed in detail in Chapter 7. The average household size in the southern Hiera is 4.5, with figures for number of household members ranging from 1 to 14.

Just as in the communities introduced above, livelihood in Mitia rests on paddy rice and complementary crops cultivation (50% and 100%, respectively, of informants cited these activities); poultry (64%) and cattle (53%); 94% of informants said that they depended on extracting products from the forest. Unlike other communities, 40

³⁷ The 1957 topographic map lists slightly different names for the latter two: Hona and Talefoka. On this map, the forest is called Herea.

percent of informants derived their livelihood from "other activities," which include illegal logging, as discussed in Chapter 7 also. Overall, 81 percent of informants claim to be self-sufficient year round.

larindrano Classified Forest

Location

larindrano forest is located between latitude 22°33' south and 22°38' south and longitude 44°52' east and 44°56' east, southeast of Vohibasia National Park and north of Isoky Vohimena, a sacred forest and burial site for the Bara Zafimanely (see Map 4.5). In relation to RN7, larindrano is located about 62 km north east of the town of Sakaraha.

Settlements

Whether the village of larindrano is composed of the three settlements of larindrano (which includes the hamlets of Antenina and Bevoalavo), Ampio and Ambatomainty or just that of larindrano is arguable. Judging from the sources of forest products, it is clear that the inhabitants of larindrano depend on larindrano forest, while Ampio and Ambatomainty harvest in Vohibasia forest. Nevertheless, the history of these three settlements, as well as their agricultural activities and the land tenure arrangements that link the three settlements, entitle one to integrate the three settlements into a larger community commonly referred to as larindrano. In this study the choice was thus to treat the three settlements as part of a single community, larindrano, that relies on two separate forests for subsistence. The total area for the territory under investigation is roughly 1,700 hectares.



Source: FTM 1957 Maromiandry Topographic Map G-56. Scale: 1:100,000.

Map 4.5. Larindrano and Larindrano Forest

In terms of house numbers, the largest settlement is larindrano, a settlement with some 30 houses, possibly more, distributed between the main village (which had 21 houses at the time of research) and two, arguably three, hamlets north of this main village. The hamlets of Antenina and Bevoalavo are located just outside of larindrano forest, north of the central village. On the other side of Fiherenana River lies Ampio, which is located just outside of Vohibasias forest and north west of the river. At the time of research, there were 24 houses in Ampio. South of there, and still west of the river, one finds the settlement of Ambatomainty, with 23 houses.

The closest market to larindrano is in the communal town of Besakoa, which most informants consider to be far away, as it can take four hours, if not five, to reach Besakoa from Ampio. From larindrano and Ambatomainty, the average travel time is three hours by foot. The weekly market is held on Fridays, and most adults go there every week to buy small household goods (100%), or to buy and sell produce (47% and 90%, respectively), and also to socialize. Besakoa is located south of larindrano, about two-thirds of the way to RN7. From Besakoa, one can reach RN7 by car or bus on a ten-kilometer dirt road. Since Besakoa is the commune center, this is also where larindrano residents take care of administrative matters such as registering cattle, getting birth and death certificates, etc. On average, it takes four hours, three hours and fifteen minutes and two-and-a-half hours to reach the Besakoa market from Ampio, Ambatomainty and larindrano, respectively. Most villagers (73%) consider the market to be far away.

Although the Bara (47% of informants) dominate the ethnic landscape in larindrano, other ethnic groups are represented: Antefasy (16%), Tanala (13%), Antanosy (10%), Antesaka and Mahafaly (7% each). In addition, a Betsileo married into the prominent Bara Zaflmanely family. There is no clear concentration of single

ethnic groups in each of the settlements visited, but there appear to be few, if any, Bara households in Ambatomainty.

If one considers the three settlements as separate units, then the striking commonalities of their respective territories are the settlements' proximity to a forest, the concentration of houses in one central location, the presence of irrigated rice fields (*tanim-bary*) alongside the Fiherenana River in close proximity to the settlements, the existence of pasture areas (*fidadàna*) inside the forests, and, finally, savanna surrounding the various settlements linked by small paths. These shared characteristics fit with land use practices to the extent that 97 percent of the people surveyed reported that they grow paddy rice; 90 percent grow or hunt complementary foods such as manioc and tenrecs; 60 percent own zebras; and 100 percent use the forest. Seventy three percent of larindrano informants claimed to be self-sufficient year round.

Comparing Study Sites

Table 4.1 summarizes basic facts about the demographics and isolation of the communities we surveyed around Analavelona, Zombitse, larindrano and Ihera forests. By most standards, these are small in terms of population size, which ranges from about 250 to 815 in Fanjakana and Andranomaitso, respectively. This is not to suggest that inhabitants of these settlements do not feel demographic pressure, since all of them claim to have seen their numbers increase steadily since independence (1960). However, these communities have reorganized their territories in various ways to accommodate a larger number of resource users and the social conflicts that have ensued. For instance, some communities have increased the number of hamlets without necessarily splitting up as a community (Andranoheza). Others have expanded

or reorganized pasture areas (larindrano). In Mitia, they have divided up the original communities along new administrative lines.

With the exception of Andranomaitso, these communities are also physically isolated from markets for forest products such as lumber, charcoal, honey, and game. Given available infrastructure, seasonal variations (rainy season), terrain and the cost of transportation, these communities have had to rely on smaller markets to sell and buy produce as well as buy small household items such as sugar, salt, matches, oil, fabric, etc.

With the exception of Andranopheza, these communities have easy access to the forest, which most can reach in less than an hour on foot. This is no coincidence, given the histories of these communities that originally sought to settle in a place where they could pasture and shelter their zebus, i.e., around and inside a forest. In the case of Analavelona communities, and as is discussed in Chapter 5, isolation from the "outside" (i.e., what is alien to Bara communities of relatives) has been a deliberate strategy. At best, Analavelona communities are suspicious of outsiders. Most would describe them as xenophobic, i.e., living in fear of strangers. The forest, it will be seen, has served as a refuge at times of outsiders' undesired visits.

Table 4.1. Characteristics of Surveyed Communities: Demographics and Isolation

Community (Population) ³⁸	Forest	Settlements/ Hamlets Surveyed	# HH ³⁹	HH Size*	Time to Market* (hours)	Time to Forest (walk)*
Andranoheza (357)	Analavelona Sacred Forest	Anjiomena Ambondrolava Tsinjorano Andohavondro Antrobika Ambignanitelo Andombiro(2) Belemokafo Ankazoabokely	76	5.1	2.5	3.5 hours
Fanjakana (249)		Mahavatsy East Mahavatsy West Antanimora Betsingily North Betsingily South Mahabo	52	4.8	12.3	1 hour
Andranomaitso (814)	Zombitse National Park	Andranomaitso	148	5.5		20 minutes
Mitia (422)	Hiera Classified Forest	Mitia West Mitia East Mitia Center Antanimainty	Iff	47"	7	<1 hour
Iarindrano (298)	Iarindrano Classified Forest	Iarindrano Ambatomainty Ampio	"85"		3.5	<1 hour

³⁸ ^ Population figures are approximate for the year 1999.

³⁹ HH designates households,

* indicates an average figure.

The similarities among the communities that we visited go beyond small population sizes and isolation from major markets. Table 4.2 shows how these communities' economies are subsistence economies that rely heavily on forest resources and rice and other crops to cover their basic needs. One exception is Andranomaitso, where residents do not grow rice for self-consumption, as others do, but grow maize as a cash crop. In one way or another, all communities depend heavily on the forest for their livelihoods, as indicated by the high percentages of informants who claimed using the forest as a source of subsistence. Paddy rice, complementary crops, and poultry are also main activities. The two main variants are cattle ownership and activities other than paddy and complementary crops cultivation. Cattle ownership is highest in Andranoheza and Mikoboka, the two Analavelona communities. It is lowest in Andranomaitso, which can be attributed to the fact that the concentration of Bara is lowest there.

With the exception of Andranomaitso, the number of informants who responded that they had basic literacy and numeracy skills was low, as is true of Bara country in general where 1 out of 5 has such skills, the lowest figures for the entire country. Andranomaitso is also different in terms of ethnic composition. While in the other communities the Bara dominate in number, Andranomaitso is a veritable ethnic melting pot.

Finally, in terms of self-sufficiency, in all cases, more than half of informants who answered the question claim to be self-sufficient year round. The figure is lowest in Andranoheza, where we actually witnessed the time when people go with less each year. It is no coincidence that this is also the community with the highest rate of cattle ownership since the Bara are known for not tapping into their herds, which they consider their savings, even in times of emergency.

Table 4.2. Data for Surveyed Communities: Livelihoods and Education

Community	Livelihood Strategies	Percentage with Year-Round Self-Sufficiency	Ethnic Composition	Literacy and Numeracy
Andranoheza	Forest products 97% Paddy rice 80% Complementary crops 97% Cattle 97%	53%	Bara (88%) Antandroy (3%) Antanosy (3%) Masikoro (3%) Betsileo (3%)	21%
Fanjakana (Mikoboka Area)	Forest products 94% Paddy rice 94% Complementary crops 100% Poultry 97% Cattle 80%	94%	Bara (97%) Masikoro (3%)	20%
Andranomaitso	Forest products 84% Maize 100% Poultry 73% Cattle 36% "Other" 41%	65%	Antandroy (18%) Mahafaly(16%) Bara (14%) Betsileo (14%) Vezo (9%) Tanosy (9%) Masikoro (7%) Merina (7%) Antesaka (2%) Tanala(2%) Tanalana(2%)	59%
Mitia	Forest products 94% Paddy rice 50% Complementary crops 100% Poultry 64% Cattle 53% "Other" 40%	81%	Bara (78%) Betsileo (7%) Masikoro (7%) Mahafaly(8%)	33%
Iarindrano	Forest products 100% Paddy rice 97% Complementary crops 87% Cattle 60%	73%	Bara (47%) Antefasy(17%) Tanala(13%) Antanosy (10%) Antesaka (7%) Mahafaly(7%)	23%

It is evident, thus, that Andranomaitso stands out along different lines from the other cases. It is included in this study, however, because it presents a case of deforestation in spite of institutional innovation.

Changes in Forest Cover

Analavelona

A quick look at the evolution of forest cover for the two areas for the period of 1949-1989, using visual comparisons of 1949 aerial photographs and 1989 satellite images reveals how exceptionally conserved Analavelona sacred forest is.⁴⁰ For the eastern side (Andranoheza area), 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; however, in fifty years this patch of about 12.5 acres has not expanded.

On the western side (Mikoboka area), changes in forest cover are practically undetectable. The most obvious evidence of clearing appears in the southern tip of Analavelona where burning for pasture also occurs and where a passage linking Andranoheza and Mikoboka areas was established over time. The visual aids show that an area of approximately 5 to 7 acres has been cleared between 1949 and 1989 (Figure 4.3, left and right picture, respectively).

⁴⁰ Unfortunately, this method does not allow the detection of changes in forest structure and species composition.

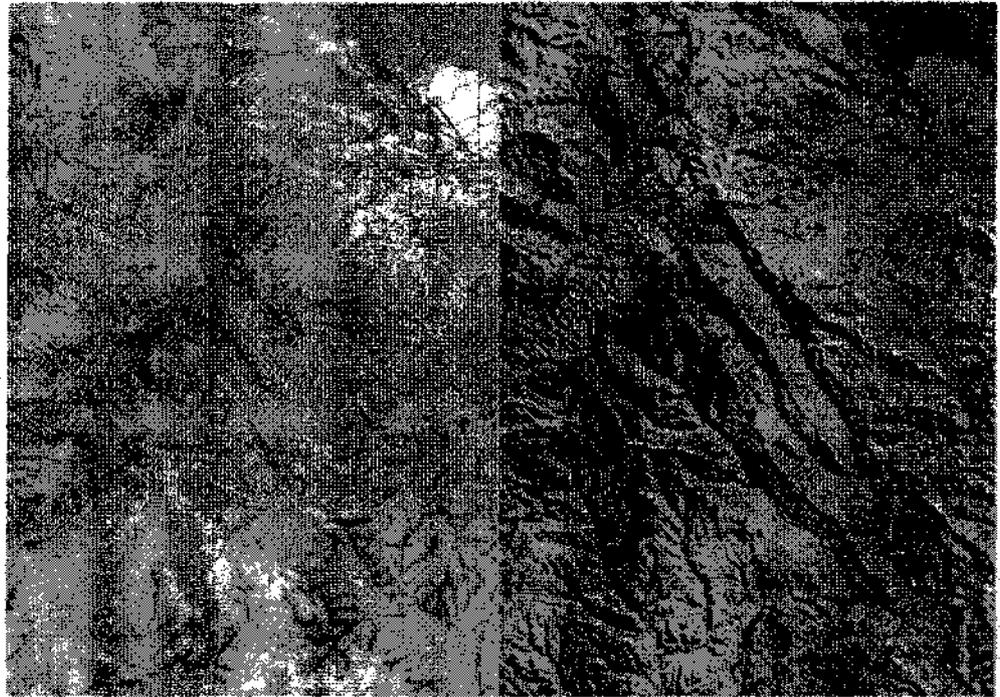


Figure 4.3. Analavelona Sacred Forest 1949-1989

So, although some degradation, most likely due to fires for grazing, is observable on the southeastern and southern edges of the forest, the changes are negligible, especially compared to surrounding forests, not to mention the rest of the country's forests. A comparison of 1989 and 2000 satellite images confirms the trends observed for the preceding fifty years (Figure 4.4). The 2000 image clearly shows burning scars around the sacred forest, at a distance safe enough to protect the sacred forest from burning (N. Homing 2004, personal communication).

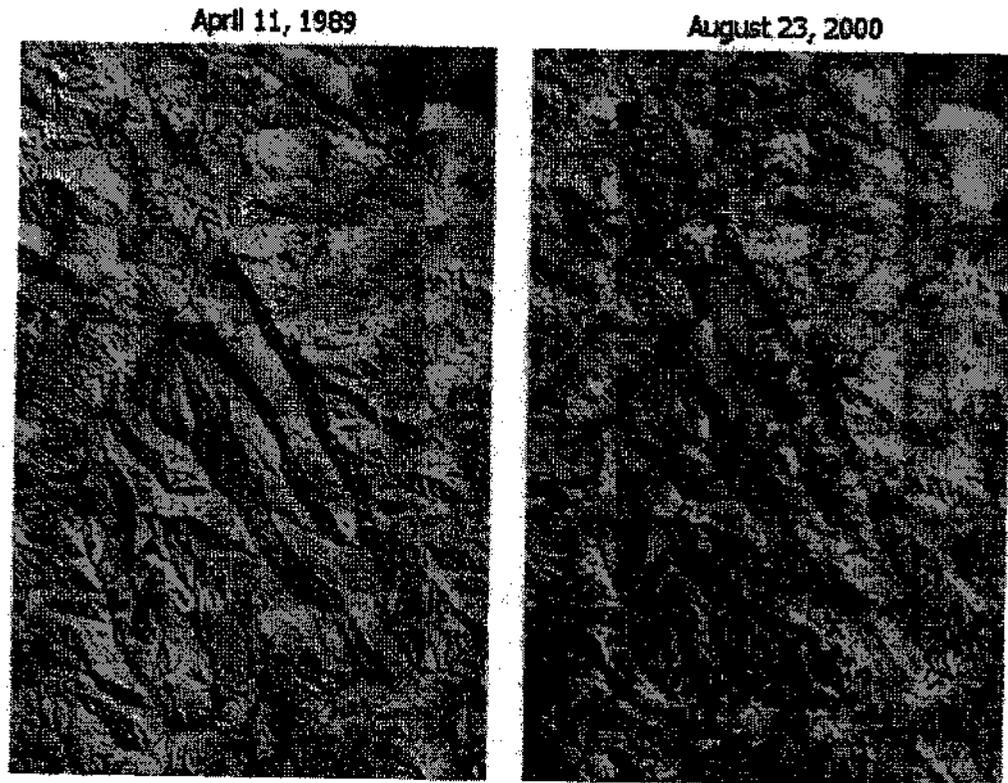


Figure 4.4. Analavelona Sacred Forest 1989-2000

Zombitse

The settlement of Andranomaitso appeared in 1973. Topographic maps and aerial photographs reveal that between 1949 and 1989, some 1,800 hectares of forests were cleared, leaving a big hole in the middle of the northern portion of Zombitse forest (N. Homing 2003, personal communication). This clearing took place in less than 20 years (Figure 4.5).⁴¹ Numerous testimonies indicate that rates of deforestation peaked around 1991.

⁴¹ In Figures 4.5 and 4.6 the dot in the cleared area, along RN7, marks the location of Andranomaitso.

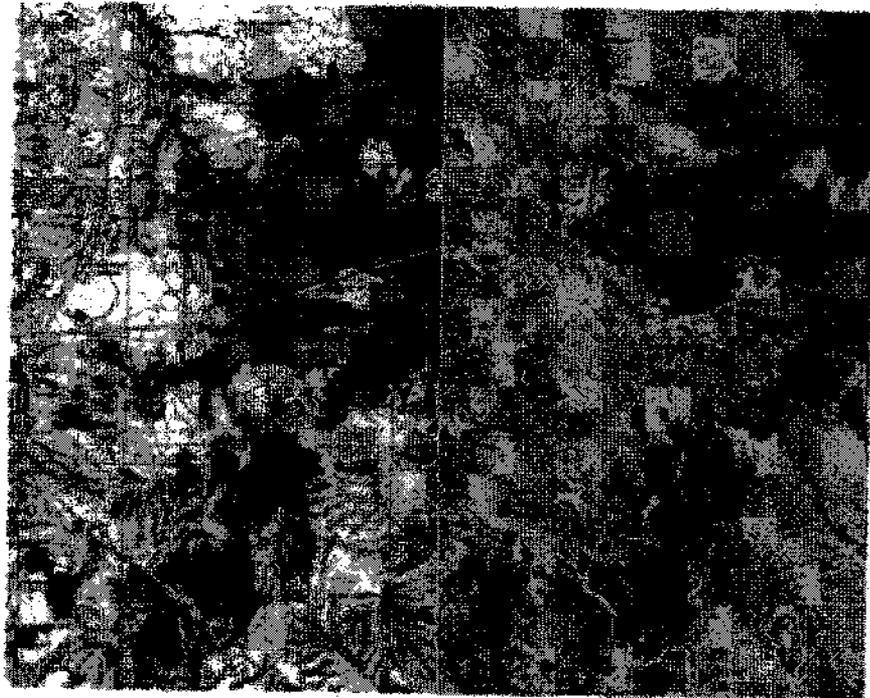


Figure 4.5. Zombitse Forest 1949-1989

Eventually, clearing tapered off, though deforestation had yet to be controlled in 2000. According to the most recent set of satellite images publicly available, deforestation around Zombitse has continued, albeit at a reduced rate, with approximately 9 percent loss, between 1994 and 2000 (N. Horning 2004, personal communication) (Figure 4.6).

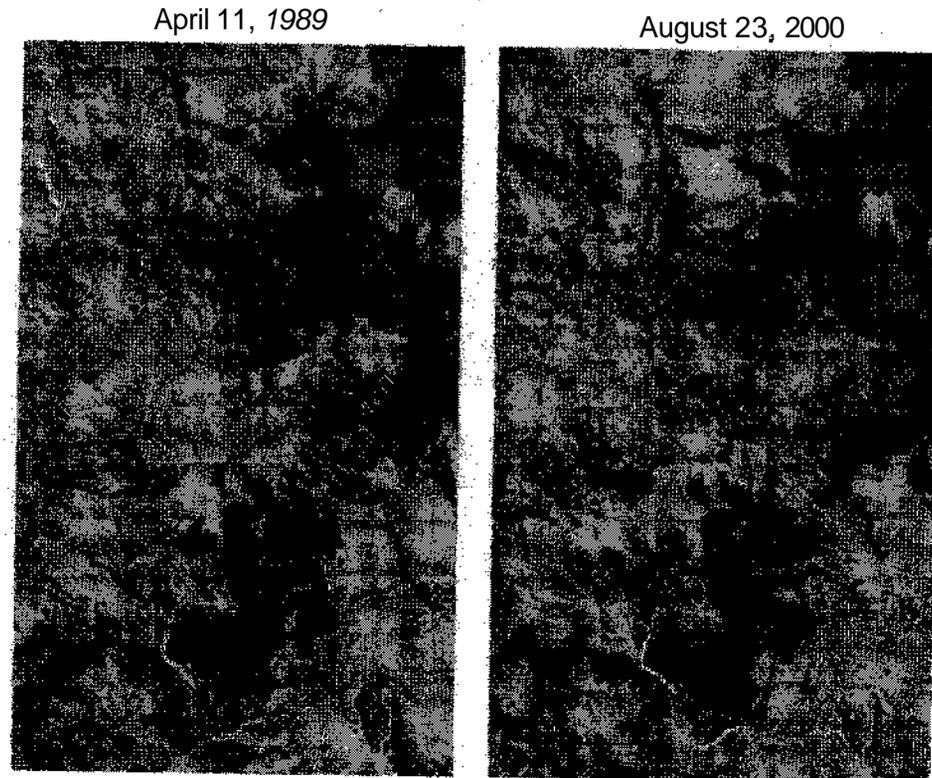


Figure 4.6. Zombitse Forest 1989-2000

Ihera

Based on visual interpretation of satellite images, no changes in forest cover could be *detected* from 1989 to 2000. This does not mean, however, that no changes occurred in the forest. According to Mitia villagers, the most obvious change has had to do with the disappearance of specific tree species and size traditionally used to make occasional coffins reserved for Bara burials. In this case, thus, tree species and tree size are the measures of change. As is discussed in the history of this community, in Chapter 7, it took a mere ten years of selective logging for the trees in question to be

impossible to find in fliera (N. Homing 2003, personal communication). Table 4.3 gives a brief overview of deforestation rates for each of the forests under study.⁴²

Iarindrano

For the area under study, satellite images show two distinct periods. From 1989 to 1989, deforestation occurred, albeit at rates far lower than for Zombitse. During this first period, roughly 4 hectares of forest were cleared in this particular southern portion of Ihera forest. From 1989 to 2000, clearing dropped by 50 percent, bringing the deforestation figure to 2 hectares (N. Homing 2004, personal communication).

Table 4.3 presents the data obtained from visually comparing the remotely sensed data on the extent of forest cover loss, comparing surface areas and rates of change the 1989-1994 and 1994-2000 time periods.

Based on the statistics of Table 4.3 and observations on the ground, Figure 4.7 presents the communities included in this study along the spectrum of forest degradation.

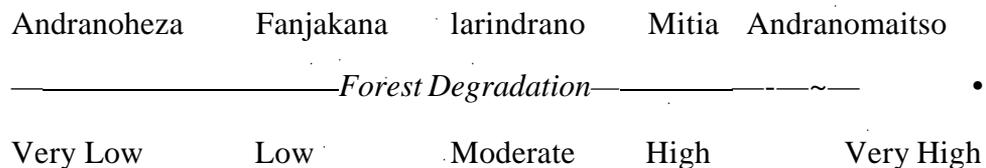


Figure 4.7. Communities along the Forest Degradation Spectrum

⁴² It is important to note that the statistics are not for the whole forest but, rather, for the area surrounding the communities discussed in the analysis.

Table 4.3. Extent of Deforestation Around Southern Forests

		Deforestation (Forest to Non-Forest Cover)			
<i>Community</i>	<i>Forest</i>	1989-1994		1994-2000	
		<i>Percent</i>	<i>Hectares</i>	<i>Percent</i>	<i>Hectares</i>
Andranoheza	Analavelona Sacred Forest	None detectable	None detectable	None detectable	None detectable
Fanjakana					
Andranomaitso	Zombitse National Park	24	1,646	9	489
Mitia	Hiera Classified Forest	.13	4	.07	2
Iarindrano	Iarindrano Classified Forest	None detectable	None detectable	None detectable	None detectable

What stands out from the deforestation figures is that, first, Zombitse is, by far, the worst case of deforestation, although the rates of deforestation decreased drastically from the first period to the next there. Chapter 6 discusses what accounts for such rapid deforestation and subsequent deceleration of the process. Were rules implemented? If so, what kinds of rules? Did the context in which deforestation was taking place change from one period to the next? Given possible changes, why did deforestation continue, albeit at a slower pace?

Second, Ihera is also a case of deforestation, but Ihera's deforestation is not as severe as Zombitse's. Here, too, deforestation slowed down from one period to the next. How come? What happened to Ihera forest is discussed in Chapter 7.

Third, Analavelona and Iarindrano appear to be cases of resource conservation, in stark contrast to the other two cases. What about Analavelona forest's "sacredness" might explain such exceptional conservation results? Has the general context for rule making and rule enforcement remained constant since the 1940s? Reasons for conservation in Analavelona are explored in the chapter that follows this one. As for Iarindrano, given that it has the same legal protection status as Ihera (both forests are "Classified Forests"), what accounts for differences in conservation outcomes between these two sites? This is discussed in Chapter 7, in which the two cases of Ihera (Mitia community) and Iarindrano (Iarindrano community) are combined to better highlight similarities and differences between them.

CHAPTERS

WHO NEEDS A STATE? THE SACRED FOREST OF ANALAVELONA

Analavelona forest evokes awe and projects mystery. Biologists refer to it as a "mist oasis" because, although the massif is in a semi-arid region, the plants and animals occurring toward the summit of this massif have greater affinity to more mesic areas of the east. Surrounding Bara communities believe that Analavelona forest is home to the spirits (*iolo*) of their ancestors. These communities cultivate a certain mystery about the forest of which they are proud and even jealous.

Community-devised rules exist *p* ensure that the forest remains a clean and tranquil place so as to keep these spirits contented. In fact, villagers feel that state rules restricting access to and uses of the sacred forest are hardly needed since they, as communities of forest users and owners, have long managed to preserve this sanctuary. The result has been exceptional forest conservation. In this chapter, *it* will be shown that, using the concept of "sacred forest," key players from communities surrounding Mount Analavelona are, in practice, fierce guardians of not just their spiritual values but also of their social, cultural and, most importantly, their economic interests.

How Are Analavelona Communities Defined?

If, as originally assumed, Analavelona communities were settled in a physically coherent space close to the forest, it would make sense to say that communities that claim ownership of Analavelona forest are geographically defined. The preceding description of village territories (Chapter 4) that include main settlements, hamlets, and cattle camps and that are geographically scattered strongly suggests that owner-

communities are defined according to a different set of parameters. According to what criteria might owner-communities define themselves?

One possibility is along the lines of clan membership. All communities surrounding Mount Analavelona belong to a single ethnic group, the Bara, though the first settlers came from Mahafaly and Antandroy country (south of Madagascar). Locally, "converted" Bara are referred to as *Bara Tsienimhalala*, but they are nonetheless considered Bara. Under this general ethnic grouping, different clans formed in the process of settling in the area. For instance, the Bara Mitiria clan was the original clan on the east and the Bara Ndrevola (or Bara Andriavola) and Bara Zafindravola have occupied the western side for more than a century. The leaders of these clans like to remind all that they were the original owners of the sacred forest.

The trouble with defining communities along clan lines is that clans other than the founding clans are represented in what villagers consider *the fokonolona* or, loosely defined, community. For instance, in Fanjakana, Bara Tehala live in three out of the six settlements where surveys were conducted. As members of *the fokonolona*, non-founding clans also claim ownership rights in the sacred forest.

Another problem with defining communities along clan lines is illustrated on the eastern side where, as shown in Figure 5.1, below, marriages between individuals from the various settlements of the *fokontany* of Marotsiraka Betsileo establish (Bara) *mpilongo* (family) ties.⁴³ In Figure 5.1, Bara clans from the various settlements are italicized and each clan's ethnic origin is in parentheses.⁴⁴ The arrows indicate marriages into particular communities.

⁴³ In Bara culture, *mpilongo* are relatives in a very broad sense.

⁴⁴ As of March 1999.

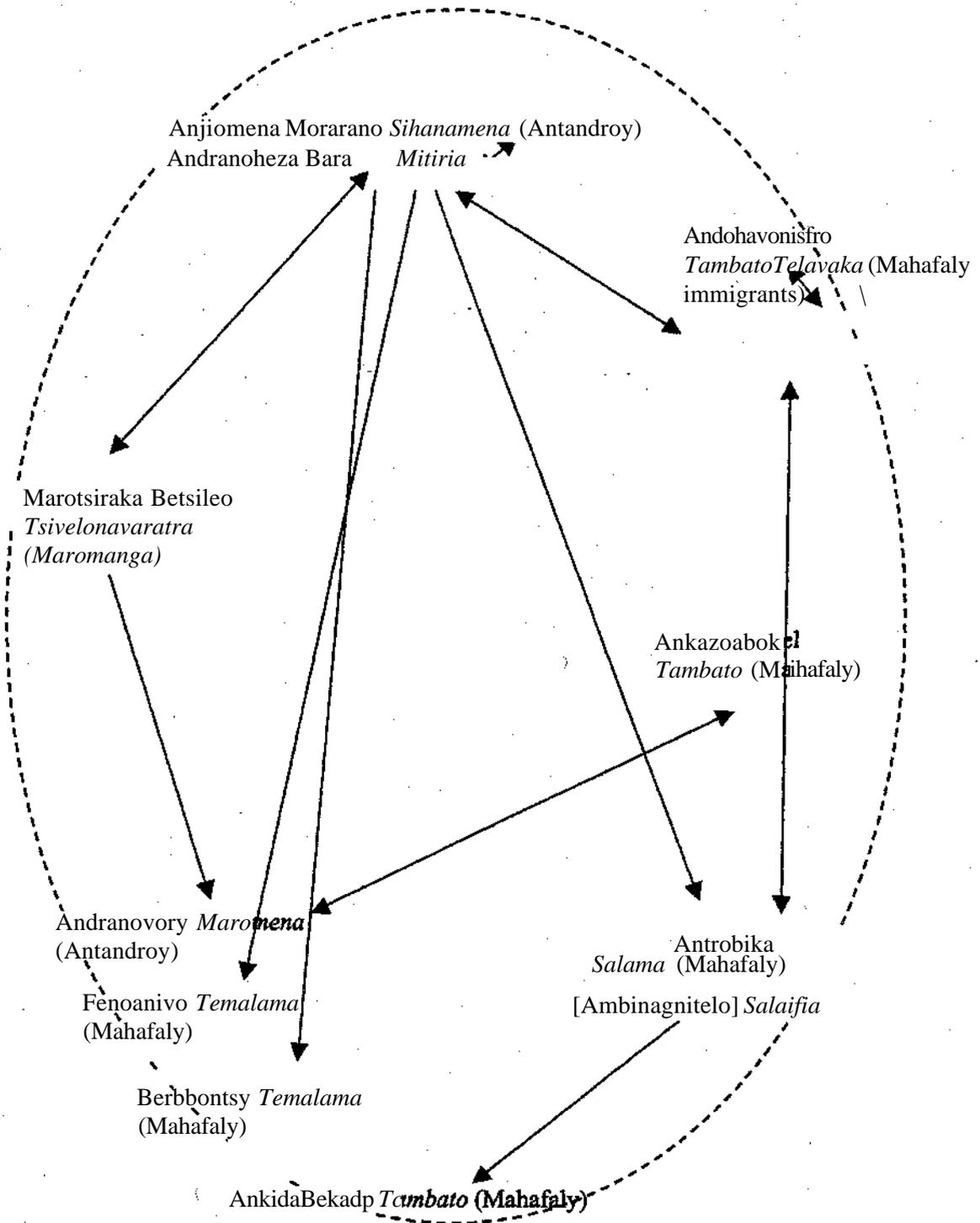


Figure 5.1. *Mpilongo* ties among Marotsiraka Betsileo Communities

Logically, all *mpilongo* could claim rights to the sacred forest by virtue of the fact that they are somehow related to members of the founding clans. Yet, by their own account and from what we could observe in the field, not all *mpilongo* consider themselves legitimate owners of the sacred forest.

How, then, do respondents *delineate fokonolona* membership? This unit is construed either as a social one or as an administrative entity. In Andranoheza, more people think of *the fokonolona* in "traditional" terms (i.e., the community is made up of the inhabitants of the descendants of a common ancestor) than in administrative terms (i.e., the community is formed by the inhabitants of *the fokontany* comprised of, say, five villages each made up of one or several settlements). Respectively, 65 percent and 35 percent of respondents used the former and latter definition in Andranoheza. In Fanjakana, 75 percent of respondents in our survey considered *fokonolona* the group of people living in the various villages associated with Mahavatsy, the main settlement in Fanjakana *fokontany*. Twenty-five percent of those who answered the question defined the community as a group of people living in the village (*tanàna*) who share ancestry (*raza*), clans (*foko*), or who belong to one large family (*fianakaviana*). Though survey results are useful in delineating administrative/physical vs. traditional/cultural local conceptions of what "the community" means, they obscure existing divisions that largely influence the way people perceive power at the community level.

Leaders' Legitimacy

To assess the legitimacy of leaders, we posed the following question to our respondents: "What type of leader do you feel most comfortable with?" On both sides on Mount Analavelona, the replies were almost identical and indicate that villagers are most comfortable with local state representatives that they (as a *fokonolona*) designate

and whom they know. Eighty-eight percent of both Andranoheza and Fanjakana respondents who addressed the question said that they liked leaders designated by the *fokonolona*. In addition, and again very similarly, a few male respondents said that they also liked a their local representatives of the state to be able to impose limits on what *fokonolona* members can do while at the same time showing flexibility in their decisions. Strangely, in each village one female respondent said that she preferred the state to designate local representatives of the state. This could mean that some women feel that the state has superior means to control individuals, but it could also be that these two female respondents felt obligated to praise the state when talking to strangers. Though expressed in different ways, the main idea remains that villagers are most likely to approve of local leaders whose personality and leadership capabilities are known to them; who could show both flexibility and rigor in their decisions; and who could represent the interests of *their fokonolona*.

One way to measure the authority of designated local representatives of the state is to assess in what type of collective tasks villagers tend to engage in. On both sides of Mount Analavelona, there is a clear separation *between fokonolona* affairs and *fokontany* affairs. *Fokonolona* affairs tend to foster *flhavanana* (family ties or, more generally, friendly relations) around the observance of Bara customs related to spirituality (death and illness) and livelihood (agricultural tasks). In this case, participation in collective action is completely voluntary and it is motivated by individuals' desire to help each other, to be together, to have fun, and to eat well (most organizers offer rice and meat in exchange for labor). Repeatedly, informants mentioned that they gladly participate *in fokonolona* collective tasks because their desire to participate "comes from the heart" (*sitrapo*), because it concerns livelihood, or simply because it is "fun."

By contrast, participation in *fokontany* tasks, which is required of men only, is motivated by the fact that participants feel forced (*terena*) to obey for fear of having to deal with the state (some mentioned the possibility of jail time) in case of non-participation. These tasks are almost always mandated to ensure that existing infrastructures (such as paths, roads, bridges, schools) are maintained. In spite of clear differences in motivation, 57 percent of Andranoheza respondents who answered the question on what type of orders (community or state) got the participation of the community said that *fokonolona* collective tasks attracted more participation, while 88 percent of respondents who answered the same question in Fanjakana said that state-ordered tasks attracted as many people as *fokonoiona* collective tasks.

Community socio-political organization is often a powerful indicator of how leadership is designed to keep a delicate balance between legitimate power, on the one hand, and protection of economic or other interests, on the other. Nowhere is this clearer than in Andranoheza Bara. As mentioned earlier, power rests in the hands of "traditional" and state leaders at the local level. So-called "traditional" leaders constitute a group called *Ray aman-dReny* or, interchangeably, *olobe*, who are representatives, or *mpitakazomanga*, of the various clans represented in the community. These tend to be the oldest males of each clan. Among the *olobe*, only one man is *mpisoro* for the whole community. In principle, the *mpisoro* is the oldest male of the founding clan.

Because in Andranoheza the Mitiria were the founders, the *mpisoro* should be the oldest male of the Mitiria clan. This, however, is not the case. Instead, Andranoheza's *mpisoro* is an influential migrant of Antandroy descent married to a local Bara woman. It is not clear how this Antandroy became Andranoheza's *mpisoro*, since there are other older Mitiria males, but it is clear that the role that he plays as intermediary between fellow humans and the ancestors places Analavelona forest

within his power and authority to defend.⁴⁵ This man is illiterate, but he and his wife are one of two families whose sons have attended secondary school and obtained their *baccalauréat* (the two educated young men even attended the University of Toliara). Their only son, in fact, was Mahaboboka's Mayor at the time of our research. The other "literate" community member belongs to *ihsfokontany* president's family and was an employee of WWF at the time of our research. Both families are influential cattle owners.

Generally speaking, so-called traditional leaders and community-appointed state representatives (*komity*) are considered legitimate power holders and decision-makers whose authority is respected so long as these leaders show integrity, wisdom, fairness, and honesty. The settlements' isolation from alternative dispute resolution mechanisms offered by state courts partly explains why so-called traditional leaders have retained their authority and power in these communities. By implication, the values that they protect and the rules that they enforce are readily accepted, or at least rarely questioned.

Forest Products

Even though Table 4.2 in the preceding chapter showed comparable rates of forest product use in both Analavelona communities (97% of Andranoheza informants said that they used forest products and 94% did the same in Fanjakana), Table 5.1 shows a stark difference between percentages of informants mentioning specific forest products in the same two communities. The rate of informants who mentioned fuel wood as a forest product in Fanjakana is about half of Andranoheza's because only one man mentioned this product in Fanjakana and only three did not in Andranoheza.

⁴⁵ Andranoheza's *Komity* is a Bara Mitiria, which probably gives the Mitiria the sense that they are not without power, marginal as this power may be.

Since it is a woman's job to collect firewood, it is not clear why so many Andranoheza men mentioned this product. The same discrepancy occurred with construction wood, which is typically a male product. For this product, no women mentioned it in Fanjakana, whereas nine did in Andranoheza. The differences in rates are thus due to differences in reporting rather than dependence on the forest per se.

At any rate, fuel wood, construction timber and supplementary food are equally important forest products in Fanjakana and Andranoheza, as indicated by comparable rates of informants mentioning supplementary food in the same Table 5.1. For all products, the sacred forest itself and the gallery forests surrounding it are the main source. For coffins and some of the pasture, only the sacred forest can accommodate users' needs.

Table 5.1. Forest Products for Analavelona (Andranoheza and Fanjakana)

Forest Products	Percentage of informants who mentioned product (N=30)	
	Andranoheza	Fanjakana
Fuel Wood	90	50
Construction Timber	61	47
Food (tenrecs and honey)	47	43
Pasture	13	0
Coffins (<i>tamango</i>)	3	3
Place of worship	3	0

Rules Pertaining to the Sacred Forest

General Community Rules about Analavelona

Village communities express 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 that rules about Analavelona sacred forest are predominantly expressed as being community-based, passed down from generation to generation.

When people from one side of Mount Analavelona talk about the other side, they tell you that they share ownership of Analavelona because they are related (*mpilongo*). As mentioned in the previous chapter, the term *mpilongo* loosely refers to relationships that tie individuals, families or clans, to one another. The Bara Mitiria clan lives on the eastern side, and the Andriavola and Zafindravola clans occupy Fanjakana. To the extent that immigrants from Mahafaly (Mitiria), Antandroy (Zafindravola) and Masikoro (Andriavola) regions founded these clans, these Bara are labeled *Tsienimbalala*, as distinguished from Bara royal clans such as *Zafimañely*. Once established as Bara, however, these clans honored Bara customs and values, most of which evolve around sanctifying nature, which is *Zañahary's* gift.⁴⁶

It is important, when discussing rules pertaining to the forest, to distinguish between the sacred forest located on Mount Analavelona and the surrounding gallery forests whose structure and legal status differ. In the local jargon, *ala* refers to Mount Analavelona; *monto* refers to surrounding savanna; and *sakasaka* refers to gallery forests found alongside of rivers just outside of the forest.

Rakotonirina (1999, pp. 42-43) compiled a list of rules pertaining to the sacred forest during his four-month stay on the eastern side of Analavelona. His listing shows that community rules are mainly prohibitive in nature ("one must not... or else") and prescriptive ("one must... or else"). One useful contribution that Rakotonirina makes is the distinction between light and serious offenses. It is worth noting that the worst possible offense has to do with deforesting Analavelona. Table 5.2 presents the community rules that generally apply to the forest.

⁴⁶ *Zañahary* is the supreme being in Bara spirituality.

Table 5.2. Summary of Community Rules for Analavelona Forest (Eastern Side)

<i>Rule</i>	<i>Sanction</i>
LIGHT OFFENSES	
1. One must not call someone by their name in the forest	... or else one will get lost from a few hours to a few days.
2. One must not wear gold or silver jewelry in the forest	... or else one will lose one's jewelry (to the spirits).
3. One must bring rum (<i>toaka mend</i>), incense (<i>ramy</i>) and ask for the blessing of the ancestors upon entering the forest with new visitors	... or else one will get lost and may run into a series of annoying events.
SERIOUS OFFENSES	
1. One must respect cleanliness, especially in sacred spots	... or else serious illness, possibly leading to death, awaits one.
2. One may not introduce pork meat into the forest	<i>Idem</i>
3. One must not have sexual relations in the forest ⁴⁷	<i>Idem</i>
4. One must not cut down trees, especially large ones, in the forest	... or else serious illness, death, and curse on descendants await one.

Source: Rakotonirina (1999).

A closer examination of the rules governing the access and utilization of Analavelona gives a more balanced picture in terms of proscriptions, prescriptions and permissions. Additional community and state rules apply to both gallery forests surrounding the sacred forest and the sacred forest itself (i.e., the Massif). Though the Analavelona Massif itself has no legal "protected area" status, this forest, as any forest in Madagascar, falls under the jurisdiction of the department of E&F. Specific requirements on species and size of construction wood and wood for coffins cause users to look to Analavelona forest, where the largest trees (up to 80 cm DBH) and valued species (*Dalbergia trichocarpa* locally known as *manary*; *hazo malany*,

⁴⁷ 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.

karabo) are found. Because these species belong to categories (*première* and *deuxième*) protected by Madagascar's forest legislation, state rules apply to the Analavelona Massif.

Our survey revealed that some actions are forbidden, others are permitted, and yet others are obligatory. Survey results from Andranoheza are summarized as follows (Table 5.3).

Table 5.3. Rules Pertaining to Analavelona Forest, Andranoheza Community (East)

<i>Proscriptions</i>	<i>Percentage of respondents surveyed who mentioned particular rules (N=10)</i>
1. Killing birds inside the forest	90%
2. Doing "dirty" or "bad" things	60%
3. Taking pork, sheep and goat meat into the forest	30%
4. Taking women into the forest	30%
5. Selling products from the forest	20%
6. Killing animals (especially lemurs)	10%
<i>Permissions</i>	
1. Hunting <i>tenrecs</i> and harvesting honey (for self-consumption only)	70%
2. Hunt lemurs and other animals	10%
3. Selling products from the forest	10%
4. Harvesting large trees to make coffins	10%
<i>Prescriptions</i>	
1. Observe Bara customs and rituals (rum, honey, incense, money, tobacco, zebu)	70%
2. Get a cutting permit from <i>E&F</i> prior to cutting trees inside the forest	30%
3. If an outsider, get permission from the <i>fokonolona</i> (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 *fady*.⁴⁸ Third, state-imposed restrictions on time and location of fires to improve the quality of pasture were not once mentioned, though 13 percent of Andranoheza respondents specifically said that pasture is a forest product. This could indicate either that villagers are not aware of this particular rule, or that they are aware of it but do not acknowledge it because they deem it illegitimate (this would be tacit rejection of the rule).

Similarly, community rules tend to dominate on the western side of Analavelona, where all three types of rules are also represented. Since forest products are similar in Andranoheza and Fanjakana, it is possible to present the rules for the three main forest products in a comparative manner. The rules discussed here pertain to forest products, whether they are harvested in Analavelona sacred forest or surrounding gallery forests.

The most obvious observation to make is that community rules dominate for fuel wood and food, whereas state rules apply more heavily than community rules for construction lumber. For the latter product, community rules apply in conjunction with state rules because Fanjakana residents harvest construction wood in the sacred forest.

Rules Governing Harvesting Fuel Wood

Rules regulating fuel wood collection are community-based, and they are similar (though not identical) on both sides of Mount Analavelona. For instance, proscriptions on selling fuel wood, using *Mampisaraka* sp., and harvesting *in fady* sites are shared

⁴⁸ 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 *fady*).

rules. In addition, permissions and prescriptions as rules per se are practically non-existent. With regard to selling firewood, it is difficult to delineate whether it is proscribed or simply not done. This explains why Andranoheza respondents are divided on this product.

Table 5.4a. Rules Pertaining to Fuel Wood Collection for Analavelona Communities⁴⁹

	Andranoheza (%)	Fanjakana (%)
<i>Proscriptions</i>		
Sell firewood	48	100
Use <i>Mampisaraka</i> sp.	68	- 80
Harvest from <i>fady</i> places	52	40
<i>Permissions</i>		
Sell firewood	52	0
Use dead/dry wood	62	0
<i>Prescriptions</i>		
None	88	100

This leaves two capital rules for firewood collection: (1) one must not collect in sacred places, and (2) one must not collect *Mampisaraka* sp. or else the ancestors will punish transgressors with separation from spouse, illness and even death. Given ample supplies for this particular product, community rules do not reflect a need to limit consumption as much as they define, in cultural terms, acceptable behavior. Forbidding cutting of *Mampisaraka* sp. and establishing sacred spots as off-limits is a

⁴⁹ Numbers are percentage of respondents who answered the question. A more complete list of these rules can be found in Table 5.4a (see Appendix 4).

way of reminding guests and newcomers that, on Bara territory, Bara customs must be observed. It is no coincidence that these rules apply to a product whose harvesters are likely to be outsiders to the clan and possibly a different ethnic group; and that they apply to a product frequently harvested (for repetition). I refer to these rules as definitional rules because they define people's membership to a Bara community.

Rules for Harvesting Lumber for Construction (Building Posts)

For construction wood, state rules dominate, though they overlap with community rules in Fanjakana because Analavelona forest is the main source for this product there.

Knowledge of state rules is variable from one side to the other. For instance, twice as many Fanjakana informants mentioned that it is forbidden to sell construction wood and to use particular species for building. Because Analavelona forest is not the main source of construction wood on the eastern side (closer gallery forests are), more informants in Andranoheza think that it is acceptable to sell timber (41%) than do those on the western side (7%) of Mount Analavelona.

The two most frequently cited rules are expressed in the form of a proscription (93% of those who answered the question in Fanjakana said that selling harvested lumber is forbidden) and a prescription (91% of Andranoheza respondents who answered the question said that one must obtain a cutting permit from E&F prior to harvesting lumber for construction). Interestingly, respecting specified tree size does not appear among prescriptions even though timing, tree species, and tree size are all specified in E&F permits.

Table 5.5a. Rules Pertaining to Lumber Harvesting for Analavelona Communities⁵⁰

	Andranoheza (%)	Fanjakana(%)
<i>Proscriptions</i>		
Sell timber	46	93
Cut down large trees	41	0
Use specific species	32	79
<i>Permissions</i>		
Cut/use smaller trees	45	0
Sell timber	41	7
Use specific species	18	100
<i>Prescriptions</i>		
Obtain a cutting permit (E&F)	91	71
Respect permit's deadline	22	36
Get spirits' blessing	0	14

Rules Pertaining to Harvesting Food from the Sacred Forest

Rules pertaining to supplementary food harvested in the sacred forest are the most telling of differences between the two sides. Since Analavelona sacred forest is the sole source of honey and tenrecs on both sides, only community rules were mentioned even though E&F regulations also seek to restrict the harvesting of tenrecs.

Here, community rules differ in number and, more importantly, in content. For instance, Andranoheza informants mentioned seven proscriptions while Fanjakana respondents did four. As far as content is concerned, it is evident that each community has its own set of traditional rules about the sacred forest. Table 5.6b (Appendix 4) shows that community rules mentioned by the respondents of one community were not

⁵⁰ A more complete table of these rules can be found in Table 5.5b (see Appendix 4).

once mentioned by the other community. This is evident for both proscriptions and prescriptions.

It is most plausible that zebus have to do with the crucial difference between the communities on either side of Mount Analavelona. When we arrived in Fanjakana, we followed customs and introduced our work to the local *olobe*. On this occasion, and since this was the final site of our study, instead of making the same presentation as we had in other sites, we decided to be conversational and more inclusive in the thought process going into understanding what was happening to forests in Bara land. The head of this village responded well to our invitation to "brainstorm" and, as a result, offered a crucial piece of information. "You know," he said, "we used to have many zebus around here [Mikoboka area]. But it has become too expensive to own cattle. People steal them, or they get sick and we cannot afford to take care of them." Since no such changes in the desirability of owning cattle was expressed in Andranoheza, in all likelihood, this explains why rules are tighter on the eastern side than they are on the other side.

However, respondents agree when it comes to selling tenrecs or honey. In fact, this is true of all Bara communities that we studied. Just as it is the case that people are not to harvest *Mampisaraka* sp. for fuel wood, no one is to sell honey and tenrecs within the community. Selling products offered by *Zañahary*, the supreme being, is considered shameful in Bara culture mainly because it is a public admission of one's poverty and is thus shunned and concealed if not avoided. In reality, therefore, this is not so much a proscription as much as a social norm. This is reflected in the fact that the rule is expressed more frequently as "it is okay to harvest honey and tenrecs for self-consumption only" (70%) than as "one may not sell honey and tenrecs" (20%) in Andranoheza.

Equal portions of Fanjakana respondents consider it acceptable (vs. forbidden) to sell forest products such as honey, whereas no Andranoheza respondents mentioned that it was acceptable. This is not so much a discrepancy as it is a reflection of the fact that Fanjakana respondents do not consider "being shunned" a form of sanction in the way that being cursed by the ancestors or being fined by state authorities is. This could indicate that social pressure is weaker in Fanjakana than it is in Andranoheza. Honey in general, but especially Analavelona honey, which is very sweet and cold, is a praised commodity in surrounding communities and markets. In the area, honey is valued for its sweetness (it is considered a delicacy) but most importantly for its medicinal properties. It could very well be that Fanjakana residents are more sensitive to or interested in meeting market demands than are Andranoheza residents.

The most striking observation is that Andranoheza residents are stricter about accessing Analavelona. The first indicator of this is that 39 percent of respondents who answered the question in Fanjakana mentioned that nothing in particular is forbidden in Analavelona forest when it comes to harvesting honey and tenrecs. No one said this in Andranoheza. Also and in general, more respondents cited community rules governing harvesting foods from the forest on the eastern side than on the western side (percentages vary from 10% to 90% in Andranoheza whereas they are at 8% in Fanjakana).

The permissions that were mentioned reinforce the impression that Fanjakana is more lenient than Andranoheza about Analavelona forest users, with an equal number of informants mentioning that it is acceptable (vs. forbidden) to sell honey. Interestingly among permissions mentioned in Andranoheza, the most frequently cited rule (70% of informants who answered the question mentioned it) specifies that food harvested in Analavelona is for self-consumption only. No one mentioned this in Fanjakana. Again, rules are used to signal to forest users that restrictions apply in

Andranoheza. This is most likely because there are more than spirits to protect in the forest. The additional forest dwellers are zebus, most probably stolen ones.

Prescriptions expressed about food are no different than those expressed for other products specifically harvested in Analavelona forest. This explains why almost 70 percent of respondents who answered the question in Fanjakana said that no particular prescriptions apply for harvesting food in the forest. The rule that one must observe various rituals prior to and after entering the forest is a general community rule pertaining to Mount Analavelona.

Prescriptions are another form of definitional rule to the extent that they distinguish local users from outsiders when it comes to entering the sacred forest. When those considered part of the large community of Analavelona owners want to enter, they must ask for the spirits' blessing. The process of asking permission comes with various rituals, most of them affordable by all. Once in the forest, they must respect customs at the risk of getting lost or even dying. When outsiders want to enter Analavelona sacred forest, they must first obtain the community's permission and then secure spirits' blessing and also observe customs once in the forest.

A close examination of proscriptions in this community rule system allows one to see how traditional rules about the sacred forest define communities of users along cultural lines. Researchers who studied this area invariably note that Bara clans share attributes that distinguish them from one another while allowing them to share characteristics. Among these identification attributes are a name, oral histories, and *fady* regarding the forest (Moizo 1997; Saint Sauveur 1998, p. 77).

Table 5.6a. Rules Pertaining to Harvesting Food from Analavelona Forest⁵¹

	Andranoheza (%)	Fanjakana (%)
<i>Proscriptions</i>		
Sell honey and/or <i>tenrecs</i>	20	31
<i>Permissions</i>		
Harvest honey and <i>tenrecs</i> for consumption only	70	0
Sell honey	0	31
<i>Prescriptions</i>		
Observe various rituals	70	15
None	20	69

How Forest Users Learn about Rules

In general, forest users consider it easy to become familiar with rules. In fact, fuel wood, construction lumber and food users unanimously (100% of those who answered the question on how easy or difficult it is to find out about the various rules in Fanjakana) consider it "easy" to acquire knowledge about rules. Though the rates are slightly lower in Andranoheza (they are 96%, 83%, and 83%, respectively), they still indicate that most users have no problems acquiring the knowledge needed to make decisions about harvesting forest products.

For community rules that apply to the collection of fuel wood outside of the sacred forest and supplementary foods inside the sacred forest, village *Ray aman-dReny* spell out what is permitted and what not, and they advise newcomers and guests to respect local rules. Additionally, anecdotes are freely shared while collecting firewood or simply during casual conversation. These two channels of communication

⁵¹A more complete table of these rules can be found in Table 5.6b (see Appendix 4).

are effective, as indicated by the rates of those who consider it easy to find out about community rules.

For state rules that apply to harvesting construction lumber outside of the sacred forest (Andranoheza) and inside the sacred forest (Fanjakana), knowledge acquisition is also considered easy. Villagers tend to regroup state actors into a category called *fanjakana* or state/government. In Fanjakana, the state's representatives and spokespersons are mainly the *gendarmes*, or rural police force, and the mayor who lives in Soatanana, a village that sits about two hours away by foot.⁵²

The state's representatives are more diverse in Andranoheza. They include: the *garde forêt* (the *garde forestier*, or forest guard, being the old colonial figure who has been replaced by the *Chef de Cantonnement Forestier*), the *komity*, the *gendarmes*, the mayor of Mahaboboka, and WWF's agents (who are empowered to represent Sakaraha's *Chef de Cantonnement*). Since the *Chef de Cantonnement* himself admitted to never having set foot in either Andranoheza or Fanjakana, the different names given to state authorities indicate two significant facts: one is that local people do not make a clear distinction between the various state authorities whose administrative responsibilities are, in principle, distinct. The second fact explains the first: Sakaraha's *Chef de Cantonnement* relies on a host of agents to inform villagers of the rules that he is responsible for diffusing and enforcing. This impressive diversity of state actors creates confusion through what one might call an institutional haze that inhibits effective rule implementation.

⁵² It is actually unlikely that the Soatanana mayor informs Fanjakana residents of state rules, though it is possible that he collects permit fees.

Interactions Between State Authorities and Communities

There is, however, a clear and distinct feeling of distrust vis-à-vis strangers (outsiders) whom villagers group into a *vazaha* category, be they foreign or Malagasy. How do villagers make their "we-they" distinction? In general, anyone who does not act like a Bara is a *vazaha*, and that includes anybody educated, who has seen the city and has embraced, even just partially, the ways of the outside world in the way they dress, in the way they speak, and in the way they reason.⁵³ State authorities are the quintessential *vazaha* in the eyes of local Bara who think that "messengers" of the state are not to be trusted and are to be avoided. Why is that?

Local histories of interactions with the outside world help understand why villagers segregate outsiders. One needs to keep in mind the history of settlement in Andranoheza and Fanjakana. Migrants from other parts of southern Madagascar in search of open fields to graze approached local residents (in the west) and *mpanjaka* (in the east) during the mid- to late 1800s to secure the right to settle and make a living in the area. They had already established themselves when colonial administrators began collecting taxes in the first half of the twentieth century. Tax collectors routinely found temporarily abandoned villages because locals had elaborated a plan to alert each other of tax collectors' arrival and flee to the forest to avoid taxation.

When the country became independent in 1960, Malagasy civil servants replaced colonial administrators, and villagers progressively witnessed the erosion of public service provision (such services included agricultural extension and health care, on which they had learned to count). By mid to late 1970s, civil servants' visits had

⁵³ Locals who have gone out of the territory in pursuit of opportunities (educational, professional, social, etc.), even if bound by the same rules *or fady*, are labeled *vazaha* upon re-entering the village territory.

become rare, and when they took place, it was often to extract bribes from local villagers arbitrarily accused of stealing cattle or breaking forest service rules. Though some villagers bemoan the fact that they are isolated and "in the dark," it is not unreasonable to suspect that this isolation is partly self-imposed for the simple purpose of containing outsiders who have been, and are likely to remain, regarded with a great deal of suspicion.

It is interesting to note in Andranoheza, however, that locals have edged toward "state" power in their control by selectively educating a few of their young males who, at the time of the research, occupied key positions as Mayor of Mahaboboka and WWF agent. Clearly, for people who pride themselves in resisting outsiders' ways (including literacy), this reflects a strategy, to some extent successful, for containing the intrusive behavior of outside authorities.

It so happens that these two families are the richest in terms of herd size. It is significant that the Mayor's father is Andranoheza's *mpisoro*, the community's spiritual leader, in spite of the fact that he is Antandroy, not Bara. By marrying into a Bara family, he has been able to prosper locally. Taking advantage of the fact that the legitimate *mpisoro*, who lives in the community, has shown little interest in leadership (he is known for being mentally challenged), this Antandroy man has seized the opportunity to assume the role of guardian of the forest in order to protect his wealth, using community rules to contain intrusions.

Local Reactions to Rules

Perceived Legitimacy of Rules

One is compelled to ask if the differential effectiveness of state vs. community rules has to do with the way local people assess the legitimacy of rules. In Andranoheza, over half of respondents who answered questions about how they felt about rules

expressed dissatisfaction with state rules. Though this rate is lower in Fanjakana (18%), it is fair to say that villagers do not understand why state rules even exist, given that any intrusion into Analavelona by outsiders is controlled by the *fokonohna* (emphasized in Andranoheza) and by spirits inhabiting the forest (the latter is emphasized in Fanjakana).

For those who actually gave reasons for disliking or not accepting state rules, the main reason is that these rules either are not fair (*tsy ara-drariny*) or they just do not make sense (*tsy mitombina*). Indeed, the community reserves the right to prevent access to the forest, whether or not visitors actually hold a permit from the state in their hands. The general attitude is best expressed in the words of two Andranoheza men: "Even if the state did not protect the forest, our community would do so effectively." The other informant added: "Anyone wishing to go into the forest, if not stopped by the state, would still be prevented by the community from doing so."

Unequivocally, villagers dislike the E&F requirement to get a cutting permit prior to harvesting trees for construction, especially because it costs them money to comply with this rule. Most respondents in Andranoheza said that they did not mind the permit requirement itself. Rather, they have problems with paying a fee for the permit. The fact that they did not complain about the permit requirement for coffin timber, which E&F representatives deliver free of charge, supports this claim.⁵⁴

More than other transaction costs (such as the effort it takes to make a trip to the Mayor's office or Sakaraha to see the *Chef de Cantonnement*, where the closest E&F office is), permit fees bother informants the most. Thirty-seven percent of those who discussed their feelings about formal rules mentioned this in Andranoheza. On average, households spend Fmg 2,500 in Andranoheza and Fmg 1,500 in Fanjakana

⁵⁴ Consumption of this particular resource is occasional, hence E&F's leniency.

every five to six years for a tree-cutting permit.⁵⁵ The amount of the fee that E&F charges depends on the number of trees needed to complete construction or repair. For instance, the fee for building or repairing a roof made of about twenty small trees covered with savanna grass is Fmg 500. For a large house, the fee is Fmg 5,000. Given that Bara people save most of their cash to purchase cattle (some cash is spent for the purchase of household items and occasional groceries), cash for other items is scarce and such expenditure is resented. Consequently, buying a cutting permit from E&F, inexpensive as it may seem to an outsider, taps into their precious savings, thereby curtailing their efforts to enhance their local status. Hence, villagers resent the cost of obeying the law.

Suffice it to say, therefore, that most, though not all, villagers would be happier if E&F let Analavelona communities be the sole manager of *their* forest because with state control, unnecessary restrictions and costs for timber harvesting are imposed on them. As far as villagers are concerned, Analavelona is self-protecting. Sometimes the community needs to intervene in its protection; when outsiders seek to harvest inside the forest, community delegates are there to stop them or to control volumes harvested. If only outsiders were concerned, state rules would complement and enforce community ones, which could make them useful. But since state rules do not discriminate between outsiders and Analavelona communities of forest users, the latter end up having to deal with costly restrictions on how much they harvest when they deem their consumption to be under control, i.e., not causing major forest degradation.

How Binding Are the Rules ?

Strangely enough, state rules regulating the uses of Analavelona appear more binding than community rules pertaining to fuel wood and food extraction in both

⁵⁵ At the time of research, \$1 ~ Fmg 6,000.

Andranoheza and Fanjakana. Survey results point to two interesting facts. The first is that Fanjakana respondents claim to be more bound by rules in general than Andranoheza residents. The second fact is that, for those who answered the question on whether or not they felt bound by the rules, state rules are supposedly more binding than community rules (97% of respondents claim to be tightly bound by state rules; the rate is 87% for community rules). Among Andranoheza respondents, most feel "somewhat" (rather than tightly vs. not) bound by rules. Here again, though, state rules are reportedly more binding than community ones (76% vs. 59% of respondents claim to be somewhat bound by state vs. community rules, respectively).

It is puzzling that respondents generally claim to be more bound by state (vs. community) rules when reported rule infractions pertain more to state rules than community rules. The most obvious explanation for such discrepancy has to do with how respondents understood the question we asked them, namely: "Do you feel free or inhibited when using [the] forest products [you have mentioned]?" When answering "free" (*malalaka*) vs. "inhibited" (*voatery mihitsy*) or "somewhat inhibited" (*voatery ihany*), it is likely that respondents thought about the degree to which they felt threatened by state rules (i.e., sanctions) *while speaking to strangers* (us). The heightened awareness of state rules that our question provoked could easily have overshadowed, relatively speaking, respondents' awareness of community rules which, in many cases, are imbedded in local beliefs about the forest and, thus, may be part of their consciousness at any given moment anyway (hence their avoidance of trouble).

It could also be, of course, that our respondents are simply risk-takers, which does not seem, however, likely given how intent the Bara are about staying away from outsiders. Ultimately, what our survey results indicate is that forest users are aware that they can extract freely from the forest at their own risk. This shows resource users

as individual choice makers who are aware of their limitations, but who choose to act according to some risk calculation that they explicitly or implicitly make.

Local Perspectives on Open-Access

That locals find state rules problematic does not mean that they wish for access to Analavelona to be open, quite the contrary. In fact, 87 percent of men and 47 percent of women in Andranoheza anticipate negative environmental and social consequences if the rules protecting Analavelona and surrounding forests were nullified. In Fanjakana, these rates are 58 percent and 20 percent, respectively. Overall, exactly half of respondents expect negative social and environmental consequences in the absence of rules, whether state- or community-devised. Their biggest concern has to do with uncontrolled cutting caused by irresponsible individuals. Such deforestation would result in the disappearance of resources necessary for housing and especially funerals. As one informant from Fanjakana said, everyone, dead or alive, needs that forest (*samy mila an 'io [ala io] na ny maty na ny velona*).

The people of Fanjakana are particularly concerned about outsiders coming in and clearing the forest. Out of nineteen respondents who openly discussed their concerns with nullifying rules, ten (that is, 53%) explicitly mentioned that the worst thing that could happen to Analavelona is uncontrolled clearing ("*manetika*") of large trees. Unsurprisingly, 21 percent of respondents said that they were in favor of the state's rule that one must obtain a cutting permit prior to cutting trees for construction and for making coffins. While some feel that state rules are needed to support community rules, others believe that they are needed because either community rules or the power of the forest's spirits are no longer sufficient to protect the forest. This may indicate a weakening faith in the spirits' power (by way of community rules) to protect their supply of large trees.

Yet local logic has it that between community regulations and ancestors' spiritual powers, the forest is well protected. This is the claim of both communities. Strangely enough, and compared to Andranoheza residents, the people of Fanjakana seem to have deeper faith in the forest's ability to protect itself. This probably explains why 44 percent of respondents from that community expect no changes in forest conditions if state rules were nullified. After all, in the words of an informant from Fanjakana, forest spirits are its real protectors (*ny angatr 'aia no tena miaro io ala io*). State rules should therefore not matter. This is particularly true for people who have isolated their territory from outside forces as a strategy to achieve local autonomy.

Overall, villagers' comments indicate that there is no open-access situation in Analavelona because of three layers of regulatory restrictions. Not only are there community regulations, but state rules also apply (though their effectiveness is, at best, questionable); and ultimately, spiritual powers protect the forest against transgressors.

About Modifying the Rules

Andranoheza respondents are the second most numerous (out of five communities studied in the region) to claim that they wish to see modifications in state rules. Fifty-three percent of men and 27 percent of women in Andranoheza answered to the affirmative when asked if they wished to see changes in formal rules (the rates are lower in Fanjakana). There are several aspects of formal rules that users consider objectionable.

The first problem, as discussed above, has to do with paying a fee for cutting permits. The second aspect has to do with the heavy and harsh sanctions: hefty fines and incarceration hardly seem commensurate with infractions. 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, sanctions are perceived to be ill distributed and, therefore, unfair.

Someone in Fanjakana indicated that he did not approve of state rules because of a faulty enforcement system; for example, as a result of inconsistent monitoring, the military, abusing their power as state agents, end up exploiting villagers' blurred understanding of state rules by checking on construction or burning permits and then fining anyone found at fault regardless of whether or not they did indeed break state rules.⁵⁶

In short, Analavelona communities find fault with state rules and perceive them as nuisances rather than effective tools of resource management. This does not mean that forest users are in favor of rejecting rules altogether, but given the state's poor enforcement record, users can only wonder if the rules should not be modified to suit their needs for securing livelihood.

Compliance

State Rules

Informants acknowledge that there are state rules pertaining to cutting large trees for construction wood and coffins. They are aware that prior to cutting large trees, they must obtain a cutting permit from E&F, or else they are subject to sanctions that range from hefty fines to incarceration. Furthermore, they believe that there are no graduated sanctions: if caught, the penalty is immediate and heavy. However, they also know that money can buy one's way out of serious sanctions.

When asked if anyone from the community had ever been caught breaking a state rule, most of those who answered in the affirmative in Andranoheza reported

⁵⁶ Malagasy law allows for *gendarmes* to monitor infractions if asked to do so by E&F (*Decret n°61-078 fixant les modalités d'application de l'ordonnance n° 60-128 du 3 octobre 1960*).

breaking formal (rather than community) rules. Cutting trees without a permit appears to be a common offense, and setting bush fires comes next. As far as cutting trees for construction is concerned, there are three forms of non-compliance: either the person cuts without a permit; or the person gets a cutting permit after cutting down trees; or the person gets a cutting permit but ignores E&F regulations about tree species, tree size and expiration date. It is important to note that this is true for gallery forests at the edge rather than inside Analavelona forest in Andranoheza. However, in Fanjakana, the rule applies to products harvested inside the sacred forest because this is their primary source of them. There, four men admitted taking construction lumber out of Analavelona forest without first getting a permit from E&F.

For those who admitted getting caught for breaking state rules, entire hamlets were collectively fined (this happened to the hamlet of Belemokafo in Andranoheza for a bush fire). The same thing happened to individuals who were caught cutting trees without a legal permit. They were heavily fined. In Fanjakana, the most commonly cited offenses were setting fire for pasture in or near Analavelona and harvesting trees without a permit. There too, some offenders were heavily fined while others were incarcerated for five years.

Community Rules

For the most part, community rules are not questioned, and rarely are they challenged in Andranoheza. Our survey for Andranoheza area shows that only a small portion of informants (2 out of 30) reported breaking community rules. In one case, someone broke *afady* in Analavelona and, supposedly, got lost in the forest temporarily. A particular *angatsy*, or mean spirit, did not forgive him until he sacrificed a zebu (probably a *aomby mazava loha*, the most valued kind in Bara country) 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 (*oiobe*) and, subsequently, became chronically ill. Eventually, one of his children died, and the rule breaker became without descendants. Although most villagers did not witness these events themselves (*efa ela*, i.e., a long time ago, a phrase that commonly follows reports of infractions), they sincerely believe what they have heard from people of the past.

In Fanjakana, attitude toward community rules is slightly different in that some respondents suggested that sanctions may be just tales. But there, too, when people broke *&fady*, offenders became ill and did not get better until a zebu was sacrificed or until a *ombiasa* performed rituals, for a fee, to remove the curse imposed on rule-breakers. For those who did not respect specific rules about Analavelona, offenders got lost in the forest, some say permanently, others say temporarily.

Compliance with Community Rules is Higher than Compliance with State Rules

Table 5.7 shows that community rules are better complied with than state rules in both Andranoheza and Fanjakana. For both sides, the lowest rate of compliance concerns construction lumber whose harvesting is, in principle, regulated by E&F rules. For Andranoheza and Fanjakana, the reported incidence of compliance is 78 percent and 40 percent, respectively. Where community rules apply (for fuel wood and supplementary food), reported rates of compliance range between 80 percent and 91 percent.

Table 5.7. Rates of Compliance with State and Community Rules around Analavelona

Forest Product	Source of Rule	Andranoheza (% ⁵⁷)	Fanjakana (%)
Fuel Wood	Community	90	85
Construction Lumber	State	78	40
Food	Community	91	80

Rates of Compliance are Higher in Andranoheza than in Fanjakana

Table 5.7 also shows that for the three main forest products, rates of compliance are generally higher in Andranoheza compared to Fanjakana. One obvious explanation for this has to do with Fanjakana communities' geographic isolation, which has some serious implications for rule enforcement. Our own efforts to reach Fanjakana should illustrate this point: it took us a total of over eleven hours to get there, going on foot from Mitia, a village located northeast of Analavelona and reachable only by four-wheel drive vehicle, to get to Fanjakana. By the time we reached Fanjakana, after two failures to reach the area by car and after hiking in for over ten hours, we were convinced that there was some truth to the claim or legend that Mikoboka people are shielded by a protective spell that guards them against outsiders (this amused our hosts, of course). In addition, our survey shows that the average travel time to Mahaboboka (on RN 7) is 12.3 hours from Fanjakana (vs. 2.3 hours from Andranoheza).

In reality, Fanjakana people deplore their isolation because, as they put it, it keeps them in the dark, i.e., away from educational and market opportunities. Very few outsiders come to Mikoboka, and that includes E&F agents. Occasionally, the military patrol the area, but too often they come in search of bribes. The current Sakaraha *Chef de Cantonnement*, who has been based in Sakaraha since 1991, has

⁵⁷ Rates are percentage of respondents who answered "always" to the question of whether community members comply with specific rules.

never been to either Andranoheza or Fanjakana, mainly because he does not have the material and physical means to reach such remote areas (though he has been able to use WWF agents to monitor compliance in Andranoheza occasionally). He has no all-terrain vehicle at his disposal, and to use his own words, he is "troubled by the size of [Ms] big belly." His lack of physical fitness does not allow him to hike around the area much. Monitoring conformance with and enforcing state rules is weak as the result of Fanjakana's isolation.

Reasons for Compliance

Two types of rules apply for forest products in Andranoheza and Fanjakana. State rules dominate when it comes to harvesting construction lumber and burning grazing areas. These rules apply to all forests, regardless of their legal status, that is, gallery forests are not distinguished from the forest of the Analavelona Massif. State rules require that villagers request a permit prior to burning or cutting trees for a fee and that they respect what is specified in the permits in terms of tree size, tree species, timing of harvesting or burning, and containing fires. Community rules apply and dominate when it comes to harvesting any product (trees, honey, tenrecs) from the sacred forest and picking up firewood outside of the forest.

State rules and community rules overlap in the specific case of construction lumber and lumber for coffins (*tamango*) because size and species requirements for these products are such that E&F legislation applies alongside community rules since trees needed for these particular purposes are found in Analavelona sacred forest only (construction lumber for Fanjakana and coffins lumber for both Andranoheza and Fanjakana).

One of the findings in this area is that community rules are better complied with than are state rules. This does not mean, of course, that state rules are always

broken and community rules always followed. Rather, the incidence of broken state rules is higher than the incidence of broken community rules. This section addresses why this is.

A general observation that applies to rules in general (regardless of their source) is that people learn from others' unfortunate experiences and that they comply with rules because they fear the consequences of breaking rules. The data from Andranoheza and Fanjakana show that fear of being fined, jailed, becoming ill and, worst of all, dying appear to be powerful motivators of compliance. Information, whether accurate or not, about what has happened to rule-breakers in the past is readily available through informal channels of communications (such as gossip and casual conversation) and more formal ones (*Mpitakazomanga* communicate rules to their respective lineages, and local representatives of the state remind villagers of state regulations once a year at the same time). These channels of communication are particularly effective given the small size of the population and the concentration of settlements, whether villages or hamlets. Beyond this universal fear of repression, however, compliance is the result of different motivators and circumstances.

Why Villagers Comply with State Rules

Given that the current *Chef de Cantonnement Forestier* has not once visited these two remote areas since 1991 and that monitoring and enforcement activities have been sporadic and scarce, it is puzzling that villagers should claim that they fear repression by the state.⁵⁸

In reality, other state authorities occasionally circulate in the area. On both sides of Mount Analavelona, we were told repeatedly about abuses inflicted on

⁵⁸ According to some informants, a forestry agent came to Andranoheza in 1990, which is the year before the current *Chef de Cantonnement* arrived in Sakaraha.

villagers whenever the *gendarmes* or the military tour the area. The *gendarmes* and military come to their villages mainly for two purposes: to look for and detain zebu rustlers, and to monitor conformance with E&F regulations regarding bush fires and building material permits.

More often than not, *gendarmes' visits* result in arbitrary arrests, bribe extractions, verbal abuse, and even some physical torture. As far as E&F regulations are concerned, *gendarmes* assist the *Chef de Cantonnement* (*who*, under Malagasy law, grants them the power to sanction rule-breakers) in rather simple and preempting ways because their monitoring duties require a mere glance at houses and surrounding fields. Constructions in process or new constructions are easy to detect, as are burned or burning areas amid acres of open savanna. In Fanjakana, several respondents commented that people comply with the rule on cutting permits (obtainable at the Mayor's office) simply to protect themselves from the *gendarmes* and from military abuses because these "guardians" are not guarded. This implication is that compliance is motivated by self-protection rather than concerns for environmental degradation.

If villagers' bad experiences with the armed forces largely contribute to a collective fear of repression, there are nonetheless respondents who stated that state rules were "good" and "necessary" because they reinforce community rules. Twenty-one percent of respondents who answered the question about what they thought of state rules in Fanjakana said that they were in favor of them. This could be indicative of villagers' weakening confidence that community rules are sufficient to protect the forest. I discuss this possibility below. What is also possible is that villagers do not mind state rules to the extent that they do not clash with their need for the standing forest to sustain their production system and, by extension, their Bara cultural identity.

What Deters Compliance with State Rules

Research results indicate that men, not women, are the usual breakers of rules, but one has to point out that this is so because activities to which state rules apply are predominantly men's responsibilities: women do not cut lumber for construction, they are not in charge of grazing cattle, and they are not expected (nor are they invited) to participate in making coffins.

As noted already, residents of Fanjakana and Andranoheza especially consider state rules to be a nuisance that is uncalled for since communities deem their forest protection measures adequate and effective enough. Besides, in their view, the forest belongs to the community, so therefore the state should not be in charge of its protection.

State rules are costly to follow. Not only do they take time, but they also tap into cash savings that Bara men would rather spend on purchasing household items and cattle. From the way some men justify their decisions to break a state rule, one can infer that the problem has to do more with the costs of compliance than any rejection of the rules' validity or utility. First, one has to travel far to obtain a permit. If one reaches the office of the *Chef de Cantonnement* in Sakaraha, there is no guarantee that the latter will be around, or that he will make himself available to them. Second, when abiding by the rule, by the time the paper work gets done, builders may have passed the best opportunity to harvest in Analavelona and to build when their agricultural activities are not demanding.

Moreover, state rules are expressed as absolute prohibitions and as proscriptions regardless of the fact that quantities extracted are small and extraction infrequent. Building posts, for instance, are usually required every five to six years for structural repairs on houses. The need for coffin trees is only occasional since deaths do not occur frequently given the small size of the concerned communities.

As far as the cost of breaking state rules is concerned, since monitoring activities are erratic, villagers' perception is that the likelihood of being detected is low. Although this perception is not as strong in Andranoheza where surveillance is more frequent than in Fanjakana, villagers are aware that there is a way out of harsh punishment if the *gendarmes* or the military catch their infractions. When they find themselves in the wrong, villagers feel relieved rather than burdened by the payment that they are required to make to state authorities to avoid punishment.

Finally, there is a deeper reason for breaking state rules, and it has to do with these communities' aversion to *vazaha* (the generic local term for anyone alien to the community/whether educated, city dwellers, or foreigners). To use Andranoheza as an example, the history of this community of five (arguably six) hamlets is indicative of inhabitants' relationships with *vazaha*. 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 of Andranoheza is their perpetual efforts to contain outsiders' intrusion into their territory and their fundamental 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).⁵⁹ Today, the line is blurry between inherent pride and the mere desire to

⁵⁹ Villagers' historical accounts omit this dark part of their past. Our guide, who is from the village, was the one who informed us of this passage because his own interest in the community's history led him to this discovery, which he kindly shared with us.

be autonomous and independent from outside authority. It is no surprise therefore, that this community feels that it has protected Anaiavelona on its own and that its members are capable of containing intrusions into the forest by outsiders without state assistance and intervention.

The history of relationships between rural resource users and state authorities (colonial and post-colonial) and the impact of negative interactions on how state rules are perceived and complied with bears striking resemblance from one area to another in Madagascar (e.g., north and east), making it a common theme that allows generalizations about the dysfunctions of resource management in Madagascar.

Why Villagers Comply with Community Rules

Although one of the study's hypotheses posited that rule regimes that combine and balance permissions, prohibitions, and prescriptions were more likely to induce compliance with the rules, it seems, in the case of Analavelona communities, that legitimacy of rules and local leaders, monitoring and enforcement mechanisms, and incentives created by production systems are more influential in terms of compliance outcomes.

Community rules about the sacred forest are no less harsh than state rules. Even though there is some flexibility in terms of what is acceptable rather than what is unacceptable (judging from the number of permissions that respondents mentioned about collecting fuel wood, honey and *tenrecs*), between the communities on the east and on the west sides of the forest, the most frequently cited rules were prohibitions or prescriptions for these three principal products.⁶⁰ What is more, sanctions reserved for rule-breakers range from having to sacrifice a *aomby mazava loha* (the most valued

⁶⁰ There is one outstanding exception: for firewood collection, 88% and 100% of respondents who answered the question in Andranoheza and Fanjakana, respectively, said that nothing in particular was obligatory (see Table 5.4).

and, therefore, the most expensive kind of zebu) to facing death with no descendants left behind.

One reason why community rules are readily complied with is because the size of the resource system subject to community protection is relatively modest, and access to the sacred forest is easily monitored, even though there are relatively few settlements around this forest. This is especially true on the eastern side, where the terrain is particularly steep. However, there are well-established paths into the forest on the southeastern side, and on the western side, anyone entering or exiting the forest (on foot, as there are no roads for vehicles) is highly visible given the proximity of settlements (hamlets) and the fact that savannas surround the forest. In terms of the actual "monitoring agents," herders walking their cattle (*mpiarakandro*) and occupants of cattle camps (*toets 'aomby*) at the edge of the forest are well trained to detect human and zebu traffic into and out of the forest. This, and the local belief that the spirits are watching, keeps the probability of detection high, which in turn has a deterrent effect on potential transgressors.

Should anyone be tempted to break a community rule about the forest, they know that their chances of getting caught are high because monitoring of rule compliance is tight in Analavelona. If visiting, one has to ask for the community's permission prior to entering the forest, which is the community's way of finding out what visitors' purposes are. To access the forest from the eastern side, one has to travel through Anjiomena territory. Beyond this settlement, and as one gets closer to the edge of the forest, one inevitably has to pass the growing *toest 'aomby* of Analabenday where herder families take turns to camp out for a prolonged period of time throughout the year. Once inside the forest, the *mpiarakandro*, usually young men or even boys who watch the family's herd, informally but effectively serve as monitors of passages.

The local belief that the spirits (*lolo* or *angatsy*) of their ancestors watch over anyone entering the forest seems to have a clear effect on forest users' decision to comply with community rules. There are widely held spiritual beliefs about the powers of the forest spirits on villagers' daily life, and forest users choose to be safe rather than sorry. In fact, one incident reported by others (rather than one's personal experience) seems to suffice as evidence that the spirits will strike in case of non-compliance. This sketchy, unsubstantiated evidence seems to provide sufficient motivation for complying with community rules, the majority of which were passed down within the Bara clan from generation to generation. By and large, the legitimacy of community rules is not questioned.

On both sides of Mount Analavelona, at least two-thirds of respondents claim to own cattle, and cattle are kept in the forest for reasons ranging from pasture and shade to tax evasion and hiding stolen cattle. Customary rules are therefore devised to control entry into the forest because the Bara keep their most precious (and sometimes illegal) possessions there. In addition, irrigated rice culture is practiced and supplementary crops that require no destruction of the forest are grown by almost all on both sides. Likewise, the vast majority of people depend on forest products for their livelihood. Finally, the local culture relies heavily on harvesting large trees of particular species to observe funerals and other rituals. Customary rules are therefore backed by collective concern for economic, social, and cultural survival. To this extent, they make sense, they are legitimate, and so they are followed.

Why Villagers Comply More with Community Rules than State Rules

At this juncture, one can consider reasons why community rules are better complied with than state rules. First, it is less costly to observe community rules than it is to observe state rules. For instance, the transaction costs of getting a cutting or burning permit from E&F (not only is there a fee, but it also costs travel time and

accommodations) far exceed the costs of observing community rules which usually require consideration of what one is wearing, who one is traveling with into the forest, a short prayer to the spirits, some honey, some rum, and some small change.

Second, the cost of breaking community rules often 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 *afady*. Likewise, though incarceration by the state is viewed as highly undesirable, chronic illnesses and the loss of loved ones are permanent conditions and, therefore, worse punishments imposed by the spirits.

Finally, it is more feasible to get out of sanctions for breaking state rules than *it* is with community rules. In the case of formal rules, a fine is imposed in order to avoid incarceration, or a bribe can be paid to get state authorities to overlook the infraction. Rule-breakers are thereby given an option. When a community rule is broken, negotiations with the spirits are unpractical, and harsh sanctions are imminent.⁶¹ One can therefore conclude that the balance of incentives and disincentives for complying with community rules is stronger than that for complying with state rules.

Concluding Remarks

The Function of Community-Devised Rules

Analavelona forest is one of those places that everyone finds mysterious. It is, indeed, a biological and institutional wonder. Much as outsiders and even locals are intrigued by the awesome and mysterious powers of this sacred forest, however, I became curious to find out about the practical underpinning of supposed aura that has

⁶¹ It is true that sacrificing a zebu may appease an angry spirit, but this option is not automatically available.

protected this sacred forest for at least a century and a half. The research indicates that community-devised rules serve several purposes ranging from cultural and community membership to restricting access to this valued resource and also maintaining power locally. The spatial evidence cited previously confirms that the community-based rule regime is effective.

Definitional rules delineate membership in a community. The most striking example of this is a rule that applies to outsiders wishing to join the rest of community through marriage, i.e., women. Upon marrying, a woman leaves her home village to join her husband's. Women are in charge of food preparation, which requires the use of firewood that is harvested, most of the time, on foot, every day, and by the women themselves. The capital rule regarding fuel wood collection strictly forbids women from using *Mampisaraka* sp. If they break this rule, they are warned, they will be separated from their loved ones by sickness, divorce, or by death.⁶² All women know this rule.

Definitional rules also distinguish insiders, or community members, from outsiders. Prior to entering the forest, some prescriptions apply to both community members and outsiders/visitors. These prescriptions require that local customs be respected by asking for the blessing of the ancestors prior to entering the forest and observing various rituals once inside the forest. Outsiders are also expected to ask for the community's permission prior to entering the forest, which community members do not have to do. If outsiders do not observe this, they are likely to get lost in the forest indefinitely. In fact, to avoid such a tragedy, community members strongly recommend visitors to let someone from the community accompany them. This leads to yet another function of local rules.

⁶² In Malagasy, *misaraka* means to separate and *mampisaraka* "that separates."

It is clear that keeping intruders out of the forest is the most important purpose of community rules. The question is: what are they protecting? Although villagers will tell you (and some genuinely believe it) that the purpose of rules is to protect the tranquility of the spirits that rest in the various sacred spots of the forest, it is highly probable that the real reason is to keep outsiders from getting to know the forest (its paths, landmarks, passages) and also from seeing what locals often and humorously refer to as their "bank accounts," namely their cattle. Andranoheza and Fanjakana residents use Analavelona forest to keep their cattle hidden away to evade taxation and incarceration given that some locals actively participate in zebu rustling and trafficking as part, once again, of their social, cultural, and economic pursuits.

It is no coincidence, therefore, that the worst possible offense is deforesting Analavelona. This concern was often brought up in Fanjakana whose residents became suspicious of Andranoheza communities' purposes vis-à-vis the forest ever since the latter authorized WWF researchers (including *vazaha mena sofy* or Caucasians) to spend time inside the forest. Invariably, in fact, respondents asked me if I was the *vazaha* who was going to buy the forest from Andranoheza. Fanjakana residents also talked a lot about their fear that farmers practicing shifting cultivation might deforest Analavelona. This did not make sense until we found out that residents of Andohavondro and Ankazoabokely had heard of *hatsaka* (slash-and-burn cultivation) in the past, judging from their reporting that it was forbidden to do so; additionally, Rakotonirina found that some Andranoheza residents had begun experimenting with *hatsaka* in a gallery forest on the eastern side (p. 60).

To the extent that they are formulated to protect Madagascar's forest, state rules support community rules, and vice-versa, in and around Analavelona. The communities protect the forest. The forest protects ancestors' spirits and people's cattle. Cattle protect and enhance local economic, social, political and even spiritual

power. Once one establishes these connections, the sacredness of the forest paradoxically because functional, and the persistence of the sacred forest ceases to be a mystery.

Signs of Change

Much as villagers would like outsiders to believe that they are institutionally self-sufficient, they need to face the reality that local practices and values are shifting, if not weakening, and that local institutions run the risk of being overstressed and inoperative. That societies change and evolve is not, in and of itself, cause for concern, but in the case of Analavelona communities, some noted changes present a serious threat to the viability of Mount Analavelona.

Rakotonirina's analysis (1999) of the situation in southeastern Analavelona is useful in distinguishing natural from anthropogenic changes. According to Rakotonirina, natural threats range from erosion, the expansion of riverbeds into agricultural fields, more frequent and prolonged dry spells caused by erratic rainfall patterns, as well as occasional flooding and cricket invasions. All these natural factors, whether occasional or permanent, are forcing villagers to move their agricultural fields in the direction of Mount Analavelona.

Likewise, anthropogenic forces are also putting pressure on villagers to change their agricultural and even cultural practices. The results of this research support Rakotonirina's concern that the attraction of cattle rustlers to Analavelona as an ideal hiding and trafficking place (because cattle tracks are impossible to follow within the forest), population pressures, and even increased communication with communities of the region who practice shifting cultivation to grow crops other than rice, all contribute to make fields closer to Mount Analavelona attractive, open areas. The most obvious manifestation of this trend in the direction of the forest is the status of

Analabenday, which started off as a small cattle camp and increasingly looks like yet another hamlet of Anjiomena.

Changes are also manifest in the way local perceptions are shifting regarding the sanctity of forest and the powers of the spirits that it shelters. Again, this research corroborates Rakotonirina's conclusions that ancestral rituals no longer are observed regularly and that infractions to customary rules are more and more frequent. Not only are infractions on the rise, but some remain unpunished, which inevitably leads community members to question the validity of their beliefs about the sacred forest and the spirits. This is particularly evident in Fanjakana where some respondents openly said: "It is hard to tell reality from legend."

The most striking example of a change in attitudes vis-à-vis cultural values has to do with the non-observance of a crucial ceremony at the sacred site of Ankokoka inside the sacred forest. Traditionally, a *aomby mazava loha* was sacrificed at this particular place in order to ask the ancestors for rain to grow abundant crops. This ceremony was performed every year at the same time. With diminishing herd size due to many reasons, including increased cattle rustling activities by the *malaso* (cattle thieves), a drop in the quality and extent of pasture areas, higher costs of living, and more and more animal diseases (with practically non-existing veterinarian services), the Bara have become unwilling to sacrifice animals for collective purposes. The last sacrifice that villagers made at Ankokoka dates back to 1995. In 1998, another ceremony was performed there, but this was done by a group of WWF researchers who wanted to spend time working in the forest. Only 53 percent of respondents said that they produced enough food to last them through the year. Most villagers attribute the sharp drop in agricultural productivity to decreases in rainfall. This, a few speculate, is because they have not sacrificed a zebu in Analavelona for some time.

We also observed changes in local beliefs about spirits and health. The Bara believe that disease is a manifestation of an angry Bara spirit who enters a body to express his or her discontent. One has to call upon a special spiritual healer and mediator, or *omhiasa*, to seek help and recovery. The wife of the local *mpitakazomanga*, or spiritual leader, informed us that the phenomenon of *tromba* (loosely translated as possession by a spirit), which was until recently alien to Bara spirituality, has surfaced in Bara territory. The last incident that she was aware of, she told us, is of a Betsimisaraka (an ethnic group of the eastern part of Madagascar) *tromba* that entered the body of an old woman. The local *ombiasa's* intervention was not sufficient to cure the older woman, and all the healer could do was to transfer the *tromba* from mother to daughter. Such public admission of shifts in spiritual value system is indicative of local leaders' concern that they no longer can control what happens at the level of their community spiritually, socially, and physically.

Social organization is indeed undergoing noticeable changes. Though villagers of the eastern side specifically mentioned that this was not the result of internal conflicts, hamlets sprouted once local leaders deemed it appropriate for each *hazomanga*, or clan leader, to establish his family members in a distinct though proximate settlement. Today, the growing cattle camp of Analabenday is an offshoot of Anjiomena, whose population is growing and whose agricultural fields are shrinking. Unlike other community leaders, the current *mpitakazomanga* of Anjiomena is a de facto one, since the Bara Mitiria who should legitimately hold this position has shown no interest in doing so and is, in fact, deemed unfit for the task by his village peers. The Anjiomena *mpitakazomanga* does not belong to the Bara Mitiria clan. Though he is originally Antandroy, he has managed to establish himself as a prominent figure by being economically and socially successful: over time, he has acquired cattle and sent his son, who is now the Mayor of the Mahaboboka commune,

to college. As mentioned above, only two adult males have a college education in this community.

The clearest indication of fundamental changes came up during a conversation we had with a *mpisoro* from Fanjakana. This man told us that, in his opinion, pastoralism has become a burden rather than a source of pride. In the face of constant abuses on the part of the military or gendarmes touring the area, this Bara man has come to realize that the fact that villagers cannot read or write has put them in a vulnerable position and subjects them to significant financial losses.

The fact that villagers are sending signals that they are considering other production systems, moving from pastoralism to rice and other crop culture, even shifting cultivation, that they are witnessing the intrusion of non-Bara souls into their spiritual world, and that they have let a non-Bara become successful to the point of becoming spiritually, socially, economically and even politically prominent should be taken as indicators that the Bara of Andranoheza and Fanjakana may no longer be able or willing to maintain Bara values, beliefs and norms as determinants of people's behavior regarding protecting the sacred forest.

CHAPTER 6

WHO NEEDS RULES? ZOMBITSE NATIONAL PARK

Andranomaitso community has long been considered a rebel community by Madagascar's forestry department (E&F). Some twenty years ago, the current Sakaraha *Chef de Cantonnement Forestier*, who then had the reputation of a strict agent, was called to the region to "tame" this community and stop its inhabitants' aggression against Zombitse forest. Andranomaitso progressively wore out this E&F agent whom it tamed instead. Hopes of conserving Zombitse forest resurfaced in the early 1990s, when the World Wildlife Fund experimented with a community-based approach to conservation in an effort to assist E&F. In December 1997, Zombitse became part of the Zombitse-Vohibasia National Park complex. Deforestation did not end then, although it had slowed down beginning in 1991.

The argument made in this chapter is that persisting deforestation around Zombitse forest has to do with the manner in which rules-in-use were designed and implemented. The effort to broaden the scope of people responsible for designing and implementing rule has not produced better conservation outcomes because those who have had a stake in the forest have had conflicting purposes. In this case, three main groups of actors were involved. The first was WWF, whose mission and purpose were clear: support E&F and conserve Zombitse. The second was E&F whose purpose was, at least officially, to conserve Zombitse, but whose actions indicated some interest in exploiting. The final group was the community of Andranomaitso whose key actors manipulated WWF against E&F to further their own economic agendas. Ultimately, a plethora of actors simply created an "institutional haze" that encouraged the spread of predatory behavior, which did little to put an end to RDB.

Andranomaitso: From Invisible to Infamous

What Happened to Zombitse Forest?

According to a topographic map published in 1957, no settlements existed in or in the close proximity of Zombitse forest in 1949 (FTM 1957). However, 1990 satellite images show that a large settlement had developed south of the forest of Zombitse and north of Hazoroa forests (Homing 2003, personal communication). This settlement is Andranomaitso, and it came into being in 1973.

Andranomaitso started off as a zebu camp in 1973, with four huts located inside the forest just north of RN7. Eight Bara herders from Sakaraha occupied this territory and pastured their cattle there. Less than two years later, E&F granted an influential Antandroy politician from Toliara a permit to harvest in the northern section of Zombitse. This logging project was known as *Coopérative A VOTRA*, and it operated from 1974 to 1980. The logging business brought migrant loggers and relatives of various ethnic origins to Andranomaitso during a period that stretched from 1976 to 1989.

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

A final wave of migrants came to settle in Andranomaitso in the early 1990s as the result of two phenomena. First, migrants left behind by the logging company and the road project began to practice *hatsaka*, or slash-and-bum maize culture, first away from Andranomaitso and then progressively closer to the settlement and into Zombitse forest. They were successful at producing abundant maize, which was, and continues to be, a lucrative crop in the area. Since their fields were visible from the main road, passers-by could easily appreciate their prosperity, which had the effect of encouraging in-migration. Second, the period between 1990 and 1993 was a time of

famine is southern Madagascar. A place like Andranomaitso, which was more and more known for its agricultural potentials, became a point of attraction, especially since it was relatively close by and since various ethnic groups were already represented there. During these days of extreme hardship, Andranomaitso settlers welcomed their Bara, Betsileo, Mahafaly, Masikoro, Merina, Tanala, Tanalana, Tandroy and Tanosy relatives.

As more and more migrants settled in Andranomaitso, the original Bara occupants were progressively forced to move south of RN7. Eventually, they retracted and went back to Sakaraha. To some, this withdrawal symbolizes the victory of migrant agriculturalists over Bara pastoralists on Bara territory.

With a swelling number of people practicing slash-and-burn maize culture, the village fell victim to uncontrolled fires which caused major damage, first in 1988, then in 1993 (some 80 houses burned down), and finally in 1998 (30 houses burned down).⁶³

By 1991, rates of deforestation caused by *hatsaka* 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. With his arrival appeared the notorious *dinan 'ny mpanao hatsaka* (discussed in detail below), an agreement binding concerned parties to contain deforestation caused by the practice of *hatsaka*. In 1994, the World Wide Fund for Nature (WWF) came to support E&F's conservation efforts with Project MG 0048 Zombitse/Vohibasia, with funding from the Norwegian government, WWF-Norway, and the Malagasy government.

⁶³ This is one version of the story. Some suspect that angry and frustrated Bara pastoralists may have set the fires, which is plausible.

Livelihood Choices and Forest Dependence

Andranomaitso residents' livelihood strategies are intricately linked with the settlement's history and with its geographic location on a major highway that serves at least three major markets: Toliara, Fianarantsoa and Antananarivo. The first occupants, who were Bara herders, needed the forest as a standing forest in order to allow their cattle to thrive. The AVOTRA logging project transformed the relationship between Andranomaitso dwellers and the forest by introducing tree cutting for the purpose of commercializing lumber. Once in the area, migrant loggers introduced slash-and-burn agriculture for their subsistence. Maize production, however lucrative, nonetheless proved unreliable at times due to changes in local climatic conditions and also because of the decreasing soil fertility in *hatsaka* fields burned two or three years in a row. Such uncertainties induced farmers to explore other ways of profiting from the forest, which led them to produce charcoal and fuel wood for local and regional markets. In addition, once its license expired, the AVOTRA logging company left behind loggers who continued to log Zombitse forest using rudimentary logging tools but still destructive methods (Association Hevitra Maro 1994).

All of the 44 respondents included in the survey said that they grow maize (some farmers also grow sweet potatoes and peanuts)⁶⁴; 80 percent claim to use the forest; 70 percent said that they raise poultry; and as many as 40 percent rely on non-agricultural activities such as sapphire mining (since late 1998), small commerce, administrative work, and mechanics to make a living. Finally, 40 percent of male and female respondents (70% of interviewed men, which is probably a better indicator given the patriarchal system of cattle ownership in the area) claim to own cattle.

⁶⁴ A study conducted by Association Hevitra Maro (1994) estimates that maize cultivation constitutes 64.5% of agricultural activities in Andranomaitso (p. 41).

Overall, the majority of people surveyed (65%) considered their production to be sufficient to feed their families year round, which leaves one-third food-deficient.

Forest Products

Andranomaitso residents rely on Zombitse and, to a lesser extent, Hazoroa forests for fuel wood (75% of surveyed respondents mentioned this product), construction wood (48%), supplementary food (25%), medicine (7%), and agricultural parcels, also called *hatsaka* (2%). Bara members of this settlement also use Zombitse to harvest coffin wood, but this represents a minority of people, according to our survey results (just as with agricultural land, out of 44 respondents, only one mentioned coffins as the third most important forest product). Though Zombitse is easily accessible from the settlement, the fact that it was classified as a National Park in 1997 has made it riskier for men to harvest timber there. For that reason, some revert to the alternative forest of Hazoroa, as E&F regulations require, for construction lumber (Table 6.2). This is, in principle, the practice. Table 6.1 presents a summary of Andranomaitso residents' forest uses.

Table 6.1. Forest Products in Andranomaitso

Forest Product	Number of women who cited	Number of men who cited	Percentage of respondents who cited
Fuel wood	16/21	17/23	75
Construction wood	2/21	19/23	48
Supplementary food	6/21	5/23	25
Medicine	1/21	2/23	7
Agricultural land	0/21	1/23	2
Coffins (<i>tamango</i>)	0/21	1/23	2

Note: N=44. One of the men who mentioned food as a third forest product did not discuss rules about this product.

Table 6.2. Sources of Forest Products for Andranomaitso

	Main Sources	Women	Men	Frequency of Citation
Fuel wood	Zombitse (Surroundings)	2/16	8/17	10/33
	Open Areas (<i>baiboha</i>)	14/16	11/17	25/33
Construction lumber	Zombitse		8/19	8/21
	Hazoroa	2/2	12/19	14/21
Honey, tubers	Zombitse			4/11
	Fields			6/11

Note: Some informants cited more than one source.

What our survey did not reveal is that three important activities, charcoal and fuel wood production as well as agricultural expansion by way of forest clearing, are backup or even primary activities for some residents, especially at times when agricultural production is insufficient. Market conditions are such that there is a strong financial incentive to engage in illegal activities that, incidentally, are more lucrative and predictable than maize culture alone, the latter so heavily dependent on sufficient rainfall (Association Hevitra Mara 1994, p. 47).

In addition to charcoal and firewood marketing, it appears that some individuals are engaged in illegal lumber harvesting. This practice is left over from the days when *Coopérative AVOTRA* was fully active from 1974 to 1980 (Rahaingosolo 1996). Once this logging company left the area, the workers that the logging project had brought in from the south of the country found themselves with no means to return home prosperous, and so they picked up where the larger logging company left off,

⁶⁵ One man claimed that he harvests lumber from both Zombitse and Hazoroa.

thereby finding ways to complement their agricultural activities. The extent to which residents engage in illegal activities is explored in the section on compliance below.

What Mules Apply?

In light of severe forest resource degradation, one is led to ask if forest users behave as if they were in an open-access system, bound by no rules. This, of course, is not the case. There are rules regulating access to and harvest of Zombitse forest, but a myriad of challenges ranging from livelihood strategies, institutional weaknesses, and socio-political organization constitutes serious constraints to making rules operational and effective.

Forest Legislation

If, like Analavelona, Zombitse used to be a sacred Bara forest, its fate was drastically different from Analavelona's in terms of conservation outcomes. So long as Bara herders were the sole users of Zombitse, establishing the sacredness of the forest must have been an effective and sufficient way to contain other potential users. In 1962, Zombitse became protected as a classified forest by government decree. This officially granted the state the authority to manage this forest and grant logging permits. The arrival of the AVOTRA lumber company in 1974 and the paving of RN7 in 1985 attracted non-Bara families to the area, which eventually overwhelmed Bara customs and rules and, eventually, required that formal legislation and "community" rules (suggested with outside intervention and pressure, to be sure) be established in order to contain environmental damage. Zombitse officially became a national park by government decree in April 1998.

To make sense of the maze of rules that apply in Andranomaitso, one must distinguish legal uses from illegal uses of Zombitse. Legal uses involve the forest

products discussed in the survey. These are: fuel wood for household consumption; building posts (again, for household consumption); and supplementary food, and medicinal plants, as well as some agricultural land. Tables 6.3, 6.4 and 6.5 present the rules that surveyed Andranomaitso residents acknowledged for the three principal forest products.

Fuel Wood

Judging from survey responses summarized in Table 6.3, fuel wood collection is largely regulated by prohibitions pertaining to entering Zombitse (cited by 82% of those who discussed rules on fuel wood collection), selling fuel wood (79%), cutting down trees (52%), and harvesting species specified by E&F (45%). While it is true that respondents also discussed three actions that are permitted, the one of most interest here concerns collecting dead wood on the outskirts of Zombitse (cited by 70% of respondents). Especially among women, one can note some discrepancy in terms of whether or not it is permitted to sell firewood: nearly one-third of them think that it is permitted to do so when the rule actually specifies that firewood is to be harvested for household consumption only. In all likelihood, this discrepancy betrays ongoing firewood commercialization that users engage in at the village level.

Table 6.3. Rules Cited for Fuel Wood Collection in Andranomaitso

	Number of women who cited	Number of men who cited	Percentage of respondents who cited item (N=33)
<i>Proscriptions (What Is Forbidden)</i>			
Collect inside of Zombitse National Park	12/16	15/17	82
Sell fuel wood	11/16	15/17	79
Cut trees	8/16	9/17	52
Harvest specific species	4/16	11/17	45
<i>Permissions (What Is Allowed)</i>			
Collect dead wood	10/16	13/17	70
Sell fuel wood	5/16	2/17	21
Collect fuel wood for the purpose of preparing food only	2/16	0/17	6
<i>Prescriptions (What Is Obligatory)</i>			
Follow rules	0	1/17	3
None (specifically mentioned)	16/16	17/17	100

Note: Out of 21 female respondents, 5 declined to discuss rules on fuel wood collection. Out of 23 male respondents, 6 did not discuss this product.

Construction Lumber (Building Posts)

Unlike firewood, prescriptions dominate when it comes to harvesting lumber for construction; respondents who discussed rules on harvesting this product were

unanimous about the requirement to obtain a cutting permit from E&F prior to cutting trees for building posts (Table 6.4).

Table 6.4. Rules Cited About Harvesting Construction Lumber in Andranomaitso

	Number of women who cited	Number of men who cited	Percentage of respondents who cited rule (V/M21)
<i>Proscriptions (One Must Not)</i>			
Harvest inside ZNP	2/2	17/19	90
Sell	2/2	17/19	90
Harvest during October-April	1/2	5/19	29
Harvest certain species and size	1/2	10/19	52
<i>Permissions (One May)</i>			
Harvest specific species	1/2	10/19	52
Harvest any species	-	1/19	5
Sell lumber	-	1/19	5
<i>Prescriptions (One Must)</i>			
Get a cutting permit from E&F and follow regulations	2/2	19/19	100

Note: 2 female and 19 male respondents discussed construction lumber as a second forest product.

Proscriptions about entering Zombitse to get timber and selling it are also strong (90% of respondents cited both these prohibitions). As far as which species to harvest or not to harvest, some species are permitted, which indicates some flexibility on the part of E&F. Out of nineteen male respondents, only one seemed mistaken in

thinking that harvesting of any species and selling lumber is permitted. One can say, therefore, that men are keenly aware of E&F's rules.

Food

As far as collecting supplementary food, half of those who discussed the rules regulating harvesting food mentioned that it is prohibited to enter Zombitse for this purpose (10% specifically said that it is fine to harvest outside of the Park's limits) while 90 percent said that it was fine to sell supplementary food (10% specifically said that it is not). The responses for food collection give the impression that this product is the least regulated by E&F or other rules.

Table 6.5. Rules Cited about Collecting Food in Andranomaitso

	Number of women who cited	Number of men who cited	Percentage of respondents who cited (iVMO) ⁶⁶
<i>Proscriptions</i>			
Enter ZNP with cutting and digging tools	1/6	4/4	50%
Sell products	1/6	-	10%
<i>Permissions</i>			
Harvest outside of forest	1/6	-	10%
Sell products	5/6	4/4	90%
Harvest honey from dead trees	-	1/4	10%

⁶⁶ Seven out of 21 interviewed women discussed a third forest product. Of those, 6 discussed food and 1 discussed medicine. Out of 23 interviewed men, 7 discussed a third forest product. Of those, 4 discussed rules about food collection; 2 discussed medicine; and 1 discussed *hatsaka*.

Overall, prohibitions are consistently featured among E&F rules regulating harvesting of the various products that Andranomaitso households need. In fact, they were the most frequently cited. However, what respondents said about what is permitted indicates that forest legislation seeks, at least to a limited extent, to accommodate people's basic needs.

It is difficult not to observe that forest legislation dominates the institutional landscape in Andranomaitso. This is hardly a surprise given this settlement's history, which could be summarized as a progressive and constant aggression against Zombitse. In Bara country, aggression against forests is painfully noticeable because Bara pastoralism has historically relied on standing forests. In addition, the most recent development being the stiffening of regulations that accompanied the designation of Zombitse forest as a National Park in late 1997 makes this observation even more pertinent. The subsequent discovery of sapphires in this area, in late 1998, was also a turning point for the settlement. This gave many of the households the chance to seek lucrative opportunities, as discussed below.

Are There "Community" Rules?

In the area, Andranomaitso is not so much known for its "usual" forest products as it is for its residents' persistent illegal uses of Zombitse forest. This village, which is conveniently located on RN7, has been a major source of charcoal and fuel wood for neighboring small towns (e.g., Sakaraha and Mahaboboka) and larger urban centers such as Toliara. In addition, lumber comes out of Zombitse forest to supply Sakaraha, Toliara, Fianarantsoa, and even Antananarivo woodshops, particularly furniture shops (Rahaingosolo 1996). Finally, maize grown using slash-and-burn techniques has been a highly sought-after commodity regionally and even internationally (the maize is exported for use as animal feed to neighboring islands including Comoros and La

Réunion, but also metropolitan France) since the mid-1970s, especially in the late 1980s (Fauroux 2000).

The expansion of agricultural fields into and to the detriment of Zombitse forest (whose original forêt classée status already entitled it to E&F's protection) was the impetus for E&F to condemn the practice in the early 1990s. This is when a set of rules regulating clearing and burning for agriculture came into being to meet the specific challenges that Andranomaitso presented.

The Dinan'ny Mpanao Hatsaka (DMH)

When the concept of community-based natural resource management reached Madagascar's environmental and legislative circles in the mid-1990s, some conservationists were already busy involving locals and implementing measures in an effort to contain deforestation in the Sakaraha area: The *Dinan 'ny Mpanao Hatsaka* (hereafter DMH) was indeed the talk of town! This *dina*, or convention, was a measure originally taken by E&F to control deforestation due to the practice of *hatsaka* in the area of Zombitse in the early 1990s. It acquired fame in conservation and decentralization circles because it was one of the first and, indeed, rare attempts to effectively transfer resource management control to so-called local communities 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 up in smoke. The other one took matters into his own hands and sabotaged crops by letting his zebus pasture in farmers' fields at night. These local initiatives did

not bring any change, as *hatsaka* persisted and tensions grew dangerously in the community (Koto 1996, pp. 6-9).

Partly in reaction to weak local initiatives, E&F attempted to join forces with Bara herders in 1991 by instituting a *dina* and by involving the community in drafting it. In its first form, the *dina* spelled out 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 for ANGAP, the national protected areas agency. One of the first actions that 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 distinguished the second from the first version was the inclusion of community-based monitors. To show good faith and flexibility, the state granted rule-breakers permission to keep their crops that season, as an exception, but it also ordered them to abandon their parcels for good once the growing season was over. The fine was also increased, it was thought, 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 leaders and state authorities). Rule-breakers will be

turned in so that state authorities can 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.

Judging from forest users' reactions to regulations, it is clear that the DMH dominates, and that it is highly prescriptive set of rules-in-use. It is also clear that the DMH is a misnomer, since the rules under this *dina* deal with not just *hatsaka*, as the name suggests, but also a broader range of forest products such as firewood, charcoal, and construction wood, to name just the most prominent ones. The DMH touches on so many forest uses that it is difficult for users to separate DMH from E&F regulations per se.

In addition, locally appointed E&F agents, known as KASTI (*Komitin 'ny Alasy Totonlo Iainana*, or Forest and Environmental Committee), have proven powerless and ineffective. These factors, taken together, have created some sort of institutional haze that precludes effective monitoring and sanctioning in case of non-compliance. I come back to this point below.

Assessing the Effectiveness of Rules-in-Use

Users' Reactions to Rules Governing Legal Uses

E&F's regulations per se focus heavily on construction lumber. This bias is reflected in users' perception of how binding are the rules pertaining to harvesting this particular product: as many as 95 percent of those who discussed how much they feel bound by construction lumber rules (N=21) said that they consider these rules to be binding. In comparison, 52 percent of those who discussed fuel wood (N=33) and 40 percent of those who talked about supplementary food (N=15) consider themselves bound by existing rules.

By their own accounts, users feel relatively uninhibited when harvesting fuel wood, tubers, and honey, but they are more self-conscious when it comes to cutting trees to use as building posts. The reason for this heightened self-awareness is likely to be linked to the fact that lumber is also harvested to produce timber and fuel wood for sale, both of which are illegal. Likewise, E&F requires Andranomaitso residents to get their building posts from Hazoroa, which is farther away. Given that Zombitse is easily accessible (a twenty-minute walk from the village) and that the needed tree species are still available there (some of the most sought-after species are *Cedrelopsis grevei*, *Securinega egriri*, and *Colubrina decipiens*), E&F's regulation seems particularly constraining. As far as firewood is concerned, most respondents said that harvesting boundaries are clearly limited (there is no confusion) and that dead wood is abundant within this authorized area just outside of the Park (only three informants said that supply was low or getting low). The same goes for food, medicine, and *hatsaka* parcels.

Assessing the Legitimacy of Rules

Are E&F's rules considered legitimate? In our survey, legitimacy was cast in terms of forest users' perception of whether rules are fair and whether users found anything objectionable about them. The best way to summarize respondents' reactions to the rules discussed is to say that more than half had problems with at least some of the rules. In fact, some 61 percent of respondents said that they had a problem with the fact that there is supposed to be no access whatever to Zombitse forest (ever since it became a National Park) and that the state has not set aside at least some area where villagers could pick up firewood and cultivate maize, not even on fields previously cleared.

Paradoxically, a majority (86%) "accept" the rules, not because it thinks that the rules are legitimate, but because most people feel that they have no say in rejecting them. The fundamental problem with state rules, as far as users are concerned, is that these do not take into account users' needs and aspirations (i.e., subsistence uses and income-generation). Some villagers perceive E&F's regulations as a hindrance to their prosperity. Elevating Zombitse forest to the rank of National Park, with accompanying tougher restrictions, is likely to have exacerbated the local feeling that rules unjustly alienate villagers from the forest on which their livelihood, health, and even wealth depend.

When asked how respondents would change the rules that they did not like, 61 percent of respondents said that they had no opinion on the matter (after all, 86% did not think that they had any say). For those who did share their opinion, the idea of getting rid of all rules had no appeal (only one person expressed such a radical view). Rather, respondents insisted that there was room for modifying some of the rules to better adapt them to villagers' needs. Most felt that there needed to be a point of compromise between regulators and regulated.

The question of whether there is room for negotiation is an important one, and one that finds no straightforward answer. As mentioned earlier, E&F representatives, when dealing with communities in general, try to find areas of compromise, at least sometimes, in order to get forest users back on track as far as legislation is concerned. Occasionally, therefore, E&F agents use their discretion to grant permission, as an exception, to individuals to cut trees for coffins prior to getting a permit or to harvest products grown on illegally cleared forests. These ad hoc generous and lenient moves on the part of E&F are nonetheless exceptional and mostly designed to bring forest users back on track under the law. As seen in the section immediately following this

one, however, negotiations do take place between state officials and Andranomaitso dwellers. This reality largely explains the deceleration of deforestation in Zombitse.

DMH and Power Dynamics

In its various incarnations, the DMH has undeniably brought about power dynamics at the community level that one can analyze at two levels. On one level, through local reactions to this DMH, a "we" vs. "they" dynamic operates in which Andranomaitso residents, on the one hand; and state authorities, on the other, have engaged in a battle to preserve their respective interests. As seen above, Andranomaitso residents' portrayal of this dynamic presents E&F as the protector of the forest and not necessarily of villagers' interests.

Originally, villagers recall, E&F imposed a new set of rules on Andranomaitso residents to contain deforestation. But because it was handling implementation single-handedly and because it had weak enforcement capacity and willingness, the *dina* failed to neutralize forest aggressors. First, E&F was never present in the community to monitor compliance closely. Second, to show good faith and sensibility vis-à-vis subsistence farmers, E&F granted 300 hectares of forested land for villagers to use. Unfortunately, some villagers took advantage of E&F's flexibility and cleared beyond the authorized limit. Third, E&F was apparently generous in the way it granted cutting and clearing permits, particularly to some individuals. Of course, E&F's generosity also served its agents well. It is fair to say, therefore, that the initial DMH was doomed at the outset because E&F did not show commitment to monitor compliance and because it was inconsistent in terms of sending a clear conservation message to forest users while implementing its own rules. Small wonder, then, that one of our informants summed the situation up saying, "When E&F was the only authority in charge, rules did not matter because they were not enforced."

Apparently, when WWF came into the picture in 1994, it started off on the wrong foot, acting like a typical new authority in charge, sounding and acting tough, monitoring and reporting infractions so that law enforcement officers started taking some community members to court in Toliara. While WWF was acting tough, however, E&F authorities were, for their part, undermining its efforts by giving forest users advice on the best time to smuggle illegal forest products out the village. At this juncture, the "we-vs.-they" line began to blur and heads of ethnic groups, who were entrusted with monitoring compliance at the village level, also encouraged infractions and protected rule-breakers from getting caught. Finally, rule-breakers who had been found guilty and sentenced to jail were frequently released before they even served time in jail. Clearly, the courts were going against conservation.

Having realized that its methods were "annoying" Andranomaitso residents without necessarily improving the fate of the forest (out of spite some villagers would sabotage WWF's conservation efforts by clearing the forest), WWF began an aggressive collaborative campaign with key authorities in the village, namely, the community's eight main ethnic leaders, giving them power and responsibility to monitor compliance and report infractions within the framework of the DMH. In addition, it assigned two of its agents to the village to make sure, in essence, that the guardians would be guarded.

Whether it did so inadvertently or on purpose, WWF's intervention transformed the power dynamic that evolved around forest protection in Andranomaitso. First, it capitalized on the settlement's social organization to co-opt its leaders into serving WWF's conservation purposes. By giving eight ethnic leaders the responsibility to monitor and report infractions, WWF sought to get the community on board with conservation. Second, it placed WWF agents in residence in Andranomaitso. In so doing, WWF introduced new "members" to this community of

village dwellers. To a large extent, WWF's strategy worked: "It is the presence of WWF agents in the village that created fear of entering the forest, [thereby reducing the number of infractions]," said a villager.

This is not to say that WWF was entirely successful in bringing down the number of infractions. Several factors continue to weaken the effectiveness of rules regulating access and uses of the forest. As mentioned above, some institutional constraints plague effective rule implementation. First, E&F has not effectively sided with WWF to counter deforestation in Zombitse. Second, the Toliara court violated Malagasy law on numerous occasions by releasing prisoners who had the means to bribe judges and buy their freedom. Overall, WWF's success is essentially at the mercy of various state authorities, some of whom have economic interests in exploiting Zombitse illegally.

There also exist social constraints that render difficult the execution of the DMH. For instance, within the same community, and especially within the same ethnic group, it is not realistic to expect villagers to denounce their peers' infractions even if they witness them. Randriatavy (1994) cites the example of *titike*, a moral commitment that individuals make to each other to respect traditions and the common good. This institution discourages telling on fellows and therefore weakens the monitoring and enforcement that the DMH calls for.

The DMH has also exacerbated divisions among villagers. Ethnic leaders were officially singled out and given responsibilities that were construed as going against the interest of their respective ethnic group: they were to report rule-breakers. Yet our surveys indicate that the primary criterion for selecting and approving a leader in Andranomaitso has to do with the leader's ability to demonstrate concern for the community's interests and protecting these interests against outside authorities. Faced with the obligation to report infractions (when they were obvious), these ethnic leaders

found themselves cooperating with outside authorities behind the scenes, thereby compromising their legitimacy and trustworthiness in the eyes of their fellow villagers. Our informants repeatedly deplored this development.

The advent of conservation efforts, we were told, also exacerbated Bara vs. non-Bara tensions because Bara people pride themselves in upholding inherently conservationist values while immigrants forego conservation to achieve prosperity. As the case of Analavelona communities illustrates, it is true that Bara cultural survival is highly contingent upon forest preservation.

It would be hasty, however, to attribute deforestation to immigrants exclusively. In fact, this Bara/non-Bara dichotomy may not be as useful and accurate as often suggested by statements such as:

the Bara community is a natural ally for WWF because of its traditions, and social and economic way of life. Bara patriarchs are the guardians of the Zombitse-Vohibasia sacred forest.. Zombitse-Vohibasia National Park may be considered as a real reflection of the harmony between local communities and nature (WWF 2002).

The statement was made by a WWF official based in Antananarivo, but members of the WWF team based in Sakaraha have observed that Bara leaders have begun adopting immigrants' strategies of land acquisition through clearing (Koto, 1999; personal communication). In principle, this local tenure development is not compatible *with* Bara values and pastoralism.

Compliance

At best, the DMH has produced mixed results. Faithful to European foresters' authoritarian tradition, E&F failed to effectively address forest users' feeling of

alienation from a resource that they felt entitled to access. The WWF team showed some creativity and cleverness in creating the illusion of management control among Andranomaitso leaders. However, WWF's efforts remained plagued with state authorities' lack of cooperation as well as with social constraints from within Andranomaitso residents. By introducing a new political dynamic, WWF's version of the DMH also created opportunities for state authorities and ethnic leaders to act in predatory ways that are detrimental to conservation. I further discuss these points below.

The people of Andranomaitso have the reputation of being bold and rebellious. It is no surprise, therefore, that this residential community has the highest percentage of people (27% of respondents) admitting to having broken a rule at one time or another, as compared to the average of 17 percent for this response among the five villages included in this study. Although more respondents claim that community members and outsiders tend to comply with rules than not, 87 percent of respondents acknowledged that someone got caught breaking a rule (forest legislation, *dina*, and *faly* taken together).

The most frequently cited infractions were illegal charcoal making, firewood commercialization, and clearing the forest to grow food (*tetika*). Eighty percent of respondents who discussed infractions identified at least one of these illegal activities. These respondents' accounts indicate that non-compliance with the DMH and with E&F legislation had not ceased as of 1998. This finding reveals that forest clearing and illegal activities continued beyond 1991. In fact, according to satellite images taken in 1990, 1994 and 2000, the rate of forest loss, measured in terms of conversion from forest to non-forest cover North and South of RN 7 in the Andranomaitso area, was as high as 24 percent between 1990 and 1994 (Landsat 1990; Landsat 1994). Between 1994 and 2000, however, this rate dropped to about 10 percent (Landsat

1994; Landsat 2000). Possible reasons for this reduction in deforestation rates are explored below.

Types of Infractions

Illegal uses of Zombitse complicate the Andranomaitso problem. Explaining the persistence of deforestation originating in Andranomaitso requires focusing on these illegal activities and the ways in which rules have tried to acknowledge and discourage them. In fact, the table below shows that those who discussed which rules are enforced consistently focused their comments on precisely illegal activities, in particular charcoal making, firewood production, and forest clearing for agriculture. This indicates that the rules-in-use are those addressing these activities, namely the DMH and E&F's requirement that those who want to harvest lumber or simply to enter Zombitse must first get a permit.

Table 6.6. Acknowledged Illegal Uses of Zombitse Forest

Illegal activity	Number of times cited (out of 44)
Making charcoal	31
Producing firewood	16
Forest clearing (tetika, hatsaka)	14
Hunting animals (lemurs, tenrecs)	4
Cutting lumber without a permit	4
Introducing machete into Zombitse	1
Going into Zombitse without a permit	1

Note: Forty-four respondents discussed which rules are enforced and how they are enforced.

Why Rules Have Not Stopped Deforestation

Although data show that deforestation did slow down in the Andranomaitso portion of Zombitse forest, a question remains: Why have concerted efforts involving E&F, WWF, community leaders, and even community members, failed to produce more resource-conserving behavior among Andranomaitso residents? If legal forest uses captured the extent of dependence on the forest, the story would be simple. However, legal uses (firewood for household consumption, construction lumber, supplementary food, medicine, coffins, and clearing for agriculture) represent only a fraction of residents' needs and claims. E&F rules seem to have accommodated these legitimate needs fairly reasonably. The aforementioned illegal uses of Zombitse, however, complicate the problem. Explaining the persistence of deforestation originating in Andranomaitso requires focusing on these activities and the ways in which rules have tried to address and discourage them.

Resource Users Are Well Aware of Rules

As seen above, the rules regulating access to and uses of Zombitse and surrounding forests are by and large clear and well known to Andranomaitso residents. The rules are strict in the sense that they are more prohibitive and prescriptive than they are permissive, and the consequences of breaking are harsh. These consequences are also well known to users, and they are perceived by a few as being "moderately" harsh and by most as "extremely" harsh. Warnings are not common, and fines range from Fmg 100,000 to five times that much.⁶⁷ Jail time is always a possibility but not necessarily a

⁶⁷ This represents a significant percentage of residents' average income. Fmg 500,000 can buy a nice adult bull.

⁶⁸ Out of 44 respondents who answered the question about sanctions, 6 replied that they did not know.

reality, judging from the number of times this sanction was mentioned: 23 out of 36 of respondents mentioned jail as a possible sanction.¹⁰⁰

This would lead one to think that these tough rules stand a good chance of being complied with because, logically, potential violators should be afraid of sanctions. However, the weakness of monitoring and enforcement contributes a great deal to diminishing these rules' effectiveness. For instance, as seen above, the credibility of incarceration as a deterrent has been undermined by higher state authorities' repeated and unwillingness to enforce court rulings (Kamosa, personal communication, 1999). The visibility of such institutional weakness aggravates the state's lack of credibility: individuals sentenced to serve jail time have come back home from Toliara, often on the same bus as E&F or WWF agents! Over time, these inconsistencies must have influenced how Andranomaitso residents perceive rules in such a way as to reduce their credibility.

Andranomaitso residents become familiar with rules through two principal channels. According to locals, WWF, E&F or the state work with clan heads to inform residents at least once a year. So, villagers become aware of rules from outside authorities, or they hear of them through community leaders. At any rate, they consider it easy to become familiar with rules.

Though informants did not explicitly state so, being part of the decision-making process for the fate of rule violators is actually another way that residents become familiar with rules and regulations. For instance, when someone gets caught carrying out illegal activities in and out of the forest, *ih*s *fokonolona* gets to deliberate what sanction should apply, as specified in the DMH. On numerous occasions, the *fokonolona* apparently punished charcoal makers, firewood sellers and forest clearers. In conjunction with the *fokonolona*, outside authorities (WWF, E&F and *Gendarmes*)

have intervened to apprehend rule breakers who refused to comply with *fokonolona* sanctions.

There is a clear sense that some rules indeed apply in Andranomaitso. Forty-one out of 44 respondents who answered this question said that rules are enforced locally. According to them, prior to establishing the DMH, rule enforcement was the sole responsibility of state authorities, mainly the E&F *Chef de Cantonnement*, whose visits were sporadic and enforcement decisions inconsistent. Once the DMH became operational, outside authorities continued to intervene more frequently than the *fokonolona* to enforce rules, but not by much. This was the situation in 1999.

Challenges to Effective Monitoring and Enforcement

Unclear Roles

Rules' failure to translate into resource-conserving behavior is partly to blame on problems inherent in the process of monitoring and enforcement. In it a known fact, for instance, that E&F agents have not systematically and consistently struck against rule breakers throughout the years. As mentioned previously, some villagers allegedly received advice from E&F agents on how best to smuggle products out of the forest when the probability of detection was lowest due to darkness! Likewise, logging companies have openly violated forest legislation by exploiting beyond areas officially approved by E&F without being reported by local officials, let alone prosecuted by state officials (Association Hevitra Maro 1994, 82).

With the integration of *fokonolona* members into the decision-making process, village ethnic leaders ended up sharing monitoring and enforcement responsibilities with E&F. It so happens that these local leaders manipulated the new monitoring process to encourage infractions so as to support Andranomaitso's defiance to outside authority. For instance, one of the ethnic leaders was also *président defokontany* in

1999, and his strategy was one of playing E&F against WWF to draw attention to Andranomaitso with the hope of getting personal favors from either institution, but also to draw resources (mostly material) into the village. In other words, giving power to local leaders did not circumvent the problem of predatory behavior on the part of state authorities. To the contrary, it encouraged the spread of corrupt practices.

Infractions were thus encouraged to help select individuals maintain economic and political power at the community level. In addition, rule-breakers were not equally and consistently sanctioned. Bribe solicitation has been counter to effective rule enforcement, a problem pervasive throughout Madagascar's administration. E&F is no exception. When asked if there were ways out of punishment once caught, 11 respondents said yes, 17 refrained from answering, and 16 specifically said that there was no such thing. Even though 11 hardly constitute a majority in this case, this number nonetheless indicates that sanctioning is not as predictable as it should be to render rules credible. Also, the facial expressions of some of those who refrained from answering strongly suggested that corruption was, indeed, pervasive.

This observation about the ineffectiveness of monitoring and enforcement brings up the question of whether the context in which rules about the forest were designed and implemented, rather than the rules per se, may explain non-compliance with rules. Social and economic forces deserve careful examination.

Community: Never Was, Never Will Be?

Andranomaitso residents are often referred to as a community, just as residents of other settlements are. This is to be expected given that, in the Malagasy rural context, the term *fokonolona* refers to a group of people who share ancestry and who are part of one settlement or village (*tanàna*). The most common translation for this Malagasy term is community. Yet Andranomaitso challenges most notions of "community" to

the extent that little commonality is to be found in the way Andranomaitso residents identify themselves and organize their affairs. Only in Andranomaitso is it the case that people do not clearly *distinguish fokonolona from fokontany* (state-mandated) affairs.

And why should they? What distinguishes this from the other sites of this study is the way the settlement came into being. The fact that migrants arrived in the area in successive migration waves is not so unusual for this region. What makes Andranomaitso different from surrounding "communities" is immigrants' lack of adherence to Bara custom in Bara territory. The clearest indicator of this is what one could term the victory of agriculture over pastoralism. This symbolic victory has had serious implications for conserving the forest. Another clear sign is the introduction of goats and sheep in the settlement, which is strictly forbidden in Bara culture: 18 percent of surveyed households raise sheep, and 7 percent have goats in the village. This indicates that the Bara may be more accepting or simply powerless in the face of non-Bara practices.

Andranomaitso also distinguishes itself in the diversity of ethnic groups represented among its inhabitants. Ethnic diversity does not necessarily preclude a sense of belonging to a community, but in Andranomaitso ethnicity has polarized people around interests that have not been uniform when it comes to forest conservation. The necessity to establish social contracts among Andranomaitso residents seems to signify that competing cultural and other values and interests may need to be neutralized through these contracts. The latter are mechanisms by which individuals or groups of individuals of, say, two ethnic clans, swear to always help (*ziva, fati-dra, vahy Uo, or ati-kena*) and never betray each other and their common interests (*titike*). The need to have established such unifying mechanisms could indicate a propensity to be divided rather than united on issues relating to governance.

Part of the reason why the seven or so local leaders have had a difficult time keeping the members of their respective ethnic group out of Zombitse has to do with the erosion of local institutions including that of *Ray aman-dReny*, which has perpetuated and even accentuated divisions in Andranomaitso. This inability of local leaders to restrain aggressors of the forest has been exacerbated by the settlement's proximity to markets (for forest products such as charcoal, firewood, and lumber) as well as alternative dispute resolution institutions such as the Toliara court.

The Power of Economic Gain

With all of E&F and, subsequently, WWF's efforts to contain deforestation, a clear break was achieved in 1998-99, shortly after sapphires were discovered in the area. While WWF project documents warn against the threat of more deforestation due to sapphire mining (Zombitse-Vohibasia National Park Management Plan, 1998), it appears that, lured by the prospect of quick and immense wealth, most males turned away from illegally exploiting Zombitse to mining sapphires.

This shows that Andranomaitso residents are very receptive to alternative economic activities deemed promising in terms economic (and therefore) social gains. It is ironic, indeed, that by illegally exploiting Zombitse, they are taking risks only to find out that they are not the primary beneficiaries; their gains merely allowing them to survive rather than to prosper (had they prospered, most would have left the area to return home).

The lack of economic alternatives to growing food and produce using *hatsaka* and to exploiting Zombitse illegally significantly reduces the chances that rules will ever produce resource-conserving behavior (Association Hevitra Maro 1994, 98). In order for rules to achieve the purpose for which they are designed (forest

conservation), there would need to be a shared sense of commitment to conserving, not to extracting maximum economic gains, from the forest.

Concluding Remarks

In the case of Andranomaitso, explanations of non-compliance with forest rules that do not touch on the various attributes of the rules themselves are compelling. Most obviously, easy access to relatively large markets for products has fostered a forest-for-cash behavior that, paradoxically, rules have encouraged through sporadic and inconsistent monitoring and enforcement.

When E&F allowed the logging company to operate in southern Zombitse, this business brought about fundamental changes in terms of demographic composition, economic opportunities, and social cohesion. By attracting various ethnic groups to the area, the logging business transformed livelihood strategies, allowing agriculture to supercede pastoralism and introducing slash-and-burn agriculture. Unlike around Analavelona, environment-friendly Bara values eroded, giving economic gain more influence than respect for spirits' tranquility.

Rules that were supposedly community-devised were developed and implemented to stop forest clearing, but the very absence of a sense of community (a group of people with shared norms, a shared history and shared institutions) has effectively prevented the DMH from curtailing deforestation.

Ultimately, what explains non-compliance in Andranomaitso is a lack of responsibility and willingness for maintaining the forest as well as a lack of accountability for breaking formal rules on the part of forest users, among whom state officials themselves (Randriatavy 1994, p. 22). In a case like this one, thus, rules are largely irrelevant.

In spite of a relatively abundant institutional supply, with conservation roles given to community members, WWF agents, and E&F representatives, the fact that WWF had a conservation purpose while E&F, other state officials, and Andranomaitso residents were interested in gaining from exploiting the forest did little to put an end to deforestation in Zombitse. In other words, key actors' purposes diverged, while at the same time local capacities to enforce rules were too weak to resist the forces of economic gain.

CHAPTER?

STATE VS. COMMUNITY IN IARINDRANO AND IHERA FORESTS

"It is not true that foresters have ruined forests here. The state did."

Kamosa, Sakaraha Chef de Cantonnement Forestier⁶⁹

Diera forest used to be the forest of choice for surrounding communities of Bara relatives, including Andranoheza, to harvest large trees for coffins. Even relatives outside the community of Mitia were authorized by Mitia residents to access this forest for this important purpose. That is, until a logging company appeared with a state permit to exploit Hiera forest in the 1970s. Within ten years, coffin trees disappeared, leaving Hiera community with a sense of betrayal, powerlessness and bitterness toward a state that allowed this tragedy to happen. Upon leaving, the logging business left behind a few loggers who became instruments manipulated by local leaders, who took up illegal harvesting to enhance their personal wealth. The shock that commercial logging introduced to this community is largely responsible for its disintegration into a divided social unit. This, in turn, has had an adverse effect on conservation.

By contrast, the Bara Zafimañely of Iarindrano succeeded in preserving their forest and keeping the members of this community under tight Zafimañely control in the face of outsiders' attempt to take control of this community's forest. In Iarindrano, too, the state authorized commercial logging, though not long enough to cause serious environmental and social damage. In this particular case, a single family of seven royal descendants used state rales effectively enough to maintain control of their forest and the entire territory that they control. This, indeed, is a case of Bara control over Bara territory.

⁶⁹Personal communication. Sakaraha, April 2, 1999.

In this chapter I show that, while rules can fail to mitigate entirely the negative effects of overexploitation on communities and their forests, they can, in some instances, help communities preserve their natural and socio-cultural heritage. The two contrasting cases covered in this analysis highlight the circumstances under which rules-in-use can induce resource-degrading or resource-conserving behavior.

Settlements Histories

Mitia

The people from this village are descendants of one common ancestor called Manda, who came with a cousin called Velpmbo and their nephew, Fiavota, to this area from eastern Fort Dauphin in the late eighteenth century (*talohan 'ny vazaha*).⁷⁰ At the time this group of Tanala left Fort Dauphin for this area, three Tafiala *mpanjaka* ruled Fort Dauphin: Zafimarijaha, Ralahifotsy, and Ralambo. These three kings did not get along, fought, and eventually parted, each taking respective followers with him. Manda and Velombo followed Zafimarijaha. Manda's descendants formed the Manamà clan. Velombo and Fiavota's descendants formed the Somontsy clan.

When they came to current Mitia, the area was populated with *Tamhihy vazimba* (Masikoro) who had established a *ziva* relationship with some Betsileo. There was also another group, the *Tambihyfoty* who had no *ziva* relations with the local Betsileo. Once the Tanala showed up from eastern Fort Dauphin, local history has it that the local Masikoro *Tamhihy* and the Betsileo fled to the western coast. The Manamà and Somontsy settled as agriculturalists.

It appears that few events mark the history of Mitia. In fact, people feel that their lives have not changed much since the colonial era (1896-1960). They say, they

⁷⁰ Before the French arrived.

still live in darkness (*anaty maizina*) and remain ignorant, the main reason being that neither they nor their parents put their children through school

According to our informants, the Manamà and Somontsy were heavily dependent on the forest from the beginning. From what they were told by their parents and grandparents, before they settled, Diera forest surrounded human settlements but the *vazimha* cleared a large portion of it, pushing its limits north, while practicing *hatsaka*. The forest continued to move back and away from village settlements, though at a slower rate, once the Manamà and Somontsy settled down. Today, they use Hierà and other forests for housing materials, for medicinal plants, for food, for pasture, and to make coffins for burial.

When the French colonized Madagascar, they abolished local kingdoms, thereby eroding the power of the various Bara *mpanjaka*, for reasons unknown to our informants.

Mitia's recent history was marked by two major events. The first was the arrival of a logging company owned and operated by a rich person from Toliara. This person and his workers arrived some time around 1986-1987 (in any case, more than ten years before the time of data collection). As rich people with cutting permits granted to them by the government, these loggers came into their territory and "did whatever they felt like doing in the forest." Though they came to the community to announce their presence, show their permit, and seal family-like relations based on mutual trust and the promise never to harm each other (*titike*) with the *fokonolona*, the latter felt that had no say about access to the forest (*izahay koa tsy afaka hisakana azy*; "we could not stop them anyway"). And so, not knowing what was to happen, they welcomed these friendly strangers into their territory.

It was not until this logging company was through with harvesting the most valuable trees, a decade or so later, that the *fokonolona* realized they were left with no

trees to make coffins for burial. With hindsight, *thefokonolona* feels strongly that, had it really been up to them, they would not have let any of this exploitation take place in the first place, as they derived no tangible benefits from the experience. They do not blame the loggers, however, as much as they do the government that granted them a cutting permit to exploit what they think of as *their* forest.

One of our informants, who was born in 1925, asserted that life had always been simple and orderly in the village until the late 1990s. This is no longer the case because their children are strong headed (*mahery loha*), as he put it, and no longer can be controlled. The main consequence of this weather-related phenomenon (as he jokingly presented it) is that the younger people do not get along with the elderly, thereby dividing *the fokonolona* into groups that isolate themselves from one another. Hence the administrative division that was institutionalized in May 1999. Paradoxically, our informants affirmed that they still act as one family (*mpilongo*) whose members help one another and continue to respect rituals related to death and other events.

Antanimainty

As a group, the people of Antanimainty, a cluster of four hamlets, claim to have a scanty memory of the past. What they do know is that their common ancestor was called Tsihevy and that he formed the Bara Sonjondrano clan. As far as they know, the Bara Sonjondrano have always shared their history and territory with the Bara Zafimaiely royal clan. Their village has existed since the days of a Bara *mpanjaka* called Mahongaky who ruled the area before the French came to colonize the island.

Of the three clans currently living in Antanimainty, the first settlers were the Bara Sonjondrano. Over eighty years ago, some Bara Halafia migrants joined the

Sonjondrano. The last to come were the Bara Sohorony. These three clans are all part of one family of *mpilongo*.

Contrary to the people of Mitia Afiivo, the people of Antanimainty assert that the forest has not changed since their ancestors settled down. The main reason for this lack of change is that they never practiced slash-and-bum techniques to grow rice, as the people around Zombitse do.

They saw the first logging company come to their territory in the early 1990s and they say that a businessman from Toliara by the name of Tovonasy, who brought his own workers, replaced the first one. By their own account, the people of Antanimainty have derived no benefits such as tax revenues and employment from the logging business, and they say that they see loggers only when they come down to the village to "look for women" in their village (the loggers have a house in one of the hamlets, Antsampanana).

Also unlike the people in Mitia Est, this *fokonolona* appears indifferent to loggers' presence. The only change that they acknowledge, a negative one, has to do with the availability of tree species needed for coffins: While they used to use *mañary* and *karabo* species, they now have to revert to less desirable substitutes such as *rotsy*.

larindrano

FTM's 1958 topographical map of Maromiandry (G-56) shows that the settlement of larindrano existed at the time surveys were conducted for this map in the late 1940s or early 1950s. The current inhabitants of larindrano are not sure when the settlement came into being, but they do know that it did not exist at the time E&F opened a *Cantonnement* in Sakaraha in 1940.⁷¹

⁷¹ Our finding contradicts what the JFRI team has for date of settlement, which is 1936. It could be that our sources simply did not agree. For our purposes, this discrepancy does not seem significant.

A Tanala man by the name of Remaharitse from the Farafangana area moved to Bara country to pasture Ms zebus, and he settled in a village called Ambinany on Bara Zafimañely territory. Remaharitse married the village head's daughter and subsequently asked his father-in-law for land to pasture his cattle once he and his wife had two children. Ramisoky, the father-in-law, granted him a portion of land, which was then called Isolo. Remaharitse was a literate man, who had worked for some time for E&F and become familiar with state regulations and administrative procedures. He thus had his land titled. Presumably, 800 hectares are registered to his name. Remaharitse's children contend that their territory includes 300 ha of larindrano forest.⁷²

Arindrano was the name of a cloth that people of high status used to wear. Since Remaharitse often wore such a cloth, the river, the forest, and the settlement sitting on his territory were given the name larindrano. Remaharitse and his wife had seven children, all of whom currently live in the original settlement.

According to villagers, a few major events stand out from this settlement's history. In 1968, an Indo-Pakistani logger from Antsirabe (south of Antananarivo) arrived in larindrano with sixty employees and forty vehicles as well as other impressive logging equipment. Karamaly, the logger, and his men logged *Hazomalania voyroni* (*hazo malagny*) and *Dalbergia trichocarpa* (*magnary*) for four years, after which Karamaly allegedly was caught smuggling gold and gemstones in large logs. At that point (1972), his logging permit was revoked and his logging camp inside the forest was dismantled. His equipment was then sold, and the proceeds were used for private purchases of furniture and utensils.

⁷² This information could not be verified at the *Service des Domaines* in Toliara because the "dossier," we were told, was too old to retrieve.

Between Karamaly's departure and the late 1990s, it seems that not much happened in larindrano, at least according to villagers. In late 1997, Vohibasia forest became a National Park, as part of the Zombitse-Vohibasia complex. At the time, some larindrano residents were using parts of Vohibasia forest. Once the forest was declared a National Park, however, they settled for using their portion of larindrano exclusively. When we asked them why they no longer were using Vohibasia, larindrano people told us that the river that separates their settlement from that forest was so infested with crocodiles that it no longer was worth the trip there. It goes without saying that larindrano uses went up from that point on, though it was not yet clear to what extent this affected the forest by the time we visited the area.

Around the same time, in late 1997, a social crisis developed in larindrano in which twenty Antanosy men were expelled from the community after conspiring to title the rice fields that they were borrowing from their Bara Zafimañely hosts. In reaction to Zafimañely's resistance, these Antanosy poisoned members of the Zafinamely family, four of whom died. For this crime the Antanosy had to compensate the Zafimañely with fifteen zebus upon leaving the larindrano settlement in 1998. Some of them resettled just outside the settlement of Ampio, northwest of larindrano, less than an hour away on foot.

When sapphires were discovered in the area, in late 1998, forty men came to larindrano and stayed there for a few months after which they left. It is not clear to villagers whether or not they found gemstones and other minerals by the time they left.

The final major event for larindrano was a natural disaster in the form of torrential rains that destroyed thirteen buildings, including a brand new school in 1998.

Ambatomainty Settlement

Ambatomainty inhabitants are Antefasy, i.e., of the same ethnic group as Remaharitse. This group of Antefasy initially migrated from Tanala country (east) to Bara country, where they settled down in Berobotsy, first, and then in Ambinany-Maromiandra, southwest of Iarindrano. From there, Remaharitse offered them land to cultivate rice, and so some of them settled in the southwestern portion of Iarindrano territory. Initially, twenty houses were built, and all of them were Antefasy households. The settlement was given the name Ambatomainty because of a big rock (*vatomainty*) present there.

Eventually, several ethnic groups became represented in Ambatomainty, but two dominated in number: the Antefasy occupy the southern part of the village, whereas the Antesaka, who made entry into Ambatomainty through marriage, are concentrated in the northern part. Also through marriage, some Antanosy left over from the logging business married into Ambatomainty and left Ampio to join their spouses. Another reason, besides ethnic identity, why houses are grouped into several clusters is because people chose to live near their agricultural fields. The settlement's proximity to Vohibasia forest and the destructive wild boars that it hosts is an important factor behind such a choice. The distribution of houses reflects a lack of social cohesion.

Ampio Settlement

Three Bara families came to the area, looking for land to pasture their zebus. After approaching Remaharitse's son, Resolo, the latter allowed them to use the area now called Ampio. The settlement started off as a *toest'aomhy* (zebu camp), but it slowly turned into a settlement made up of four clusters of houses, the most recent of which was set up by the Antanosy families whom the Zafimañely expelled from Iarindrano

settlement. Over time, the Bara newcomers of Ampio married the descendants of Ramaharitse, mainly because the land was good for agriculture.

How Do People Use the Forest?

Main Forest Products

Table 7.1 shows that the main products that Mitia and Antanimainty informants extract from Ihera forest are fuel wood (68% of informants mentioned it), food (50%), and construction wood (47%).

Table 7.1. Forest Products Mentioned in Mitia

Products Mentioned	Females (out of 17)	Males (out of 17)	Total (out of 34)	Percentage of informants who mentioned products
Fuel wood	17	6	23	68
Food	5	12	17	50
Construction wood	1	15	16	47
Medicine	2	1	3	9

Note: Out of the 36 people surveyed, one man and one woman neither mentioned nor discussed forest products at all.

Table 7.2 shows that the same three products (fuel wood, construction wood, and food) were also the most frequently discussed when it came to talking specifically about the rules that govern their uses and conservation (discussed by 71%, 62% and 27% of informants, respectively).

Table 7.2. Forest Products Discussed In Depth in Mitia

Products Discussed	Females (out of 17)	Males (out of 17)	Total (out of 34)	Percentage of informants who discussed rules
Fuel wood	17	7	24	71
Construction wood	7	14	21	62
Food	2	7	9	27
"Feux de Brousse" ⁷³	2	3	5	15
Medicine	1	1	2	6

Table 7.3 indicates that, for Iarindrano, Ampio, and Ambatomainty, these three products are also the most frequently harvested from Iarindrano and Vohibasia forest, though the frequency with which they were mentioned was different: food was most frequently cited, with 63 percent of informants mentioning it; construction wood was next (60%), and fuel wood was third (57%). Different types of tuber roots (locally known as *ovy*, *angily*, *sosa*, *baboa*, as well as honey, wild boars, and tenrecs are the foods that Iarindrano residents extract from these two forests.

Table 7.3. Forest Products Mentioned in Iarindrano

Products Mentioned	Females (out of 12)	Males (out of 18)	Total (out of 30)	Percentage of Informants who Mentioned
Food ⁷⁴	9	10	19	63
Construction wood	4	4	18	60
Fuel wood	11	6	17	57
Medicine	2	2	4	13
Fences for zebus		3	3	10
"Sondry"	0	1	1	3

⁷³ Even though these informants did not mention "feux de brousse," or agricultural fires, as one of the forest products, they ended up discussing rules pertaining to this particular activity when asked to discuss regulations. Strictly speaking, fires do not necessarily qualify as a forest product (most traces of agricultural fires are found outside of the forest), but they are regulated by E&F legislation, which is why some informants thought it appropriate to discuss this activity.

⁷⁴ "Food" includes *ovy*, *angily*, *sosa*, *baboa* (tubers—most frequently cited), honey, lambo, tenrecs.

Table 7.4. Forest Products Discussed In Depth in larindrano

Products Discussed	Females (out of 12)	Males (out of 18)	Total (out of 30)	Percentage of Informants who Discussed Products
Food	9	11	20	67
Construction wood	4	14	18	60
Fuel wood	11	6	17	57
Medicine	2	1	3	10
Fences for Zebus	0	0	0	0
"Sondry"	0	1	1	3

Compared with Mitia, percentages of informants who chose to discuss rules pertaining to extracting these products from the forest are more even: 67 percent of informants discussed food, 60 percent discussed construction wood, and 57 percent discussed fuel wood (Table 7.4).

The numbers in Table 7.5 suggest that, in terms of forest dependence, these two communities are similar in that the overwhelming majority of informants claimed to use the forest and that the main forest products are identical, though the main products received varying degrees of attention in informants' discussion of rules. For instance, fuel wood, construction wood, and food were the most frequently mentioned and then discussed in the household surveys. Medicine was the other forest product common to the two sites. The main difference between the two sites concerns Mitia informants' discussion of pasture fires, which larindrano residents did not discuss, most likely because Mitia residents have had to answer to E&F agents regarding pasture fires due to the relative accessibility of their territory.

Table 7.5. Comparison of Figures for Forest Products Discussed in Mitia and
larindrano

Forest Product	Percentage of informants who discussed	
	Mitia	larindrano
Food	27	67
Construction Wood	62	60
Fuel Wood	71	57

The Forest as a Source of Fuel Wood

The main source of firewood in the Mitia area is Diera forest and trees scattered about between the forest and settlements (this area is commonly called *montd*).

Antanimainty residents collect firewood in places called Lona River and Andranovory, while Mitia residents go to Kilisivy, Bétavolo River, Lona River, Koloboky, and Avoha. The average travel time to get firewood is one hour round trip on foot.

When going on foot, women collect firewood at least once a week, sometimes everyday, but most collect twice a week. When using a zebu cart (*katraka*), it becomes possible to carry enough firewood that one needs to go only once a week or even once every three weeks. Most men who collect firewood use a *katraka*. Most women go on foot, partly because it costs Fmg 2,000 to 2,500 per day to rent a *katraka*.

Unless firewood is picked up by zebu cart, which is only occasionally done, women of all ages are the principal harvesters of firewood. This explains why about 28 percent of surveyed men, compared to 92 percent of women, discussed this product in larindrano (the rates were 40% and 100% in Mitia). Firewood collection is considered a female task that is closely related to food preparation. Only when a man is single, divorced, widowed, or when his wife is ill will he take charge of preparing meals and gathering firewood. If a young female is present in the household, however, she is likely to be given the task of meal preparation and fuel wood gathering.

larindrano female residents harvest firewood in larindrano forest, in sections called Manetimena (east), Andonolotsanala (north), and Kilivondraka (south). Compared to Ampio and Ambatomainty residents, larindrano women travel further to get their fuel wood. For them, a round trip to and from the edges of the forest takes close to two hours (66 minutes each way, on average, according to surveys), about twice as long as their Ampio and Ambatomainty counterparts.

Ambatomainty and Ampio residents collect firewood in Vohibasia forest, in sections called Analatapaky, Amboapiky, and Ampasipoty for Ampio and Amboloando for Amabatointy. Some informants were specific about harvesting on the edges rather than in the forest. For Ampio residents, a round trip to and from the forest takes about one hour (33 minutes each way, on average). Ambatomainty residents seem closest to their source of fuel wood, since it takes them an average of 27 minutes to get to the forest edges.

Most women of larindrano travel to the forest by foot about three times per week and return with a bundle of firewood on their heads. Occasionally, men assist them and use zebu carts (*katmka*), which represents a significant saving in time and energy (it then becomes possible to get firewood once a month, twice if there are more mouths to feed). Using *akatraka* is exceptional, however, because only few households own one.

The Forest as Source of Construction Wood

For Mitia and Antanimainty residents, fiera is the exclusive source of construction wood. It takes each man about two hours round-trip to get construction wood from the forest, and men do this when the agricultural calendar is least busy, i.e., the dry season that extends from January to July, particularly June and July. Only men harvest construction wood, mainly because it is considered a physically demanding, labor-

intensive task and also because it is part of building a house, also a man's job. On average, houses need to be fixed or re-built every five years, though time frames vary from one year to fourteen. The technology used is rudimentary (machetes) and the frequency of extraction depends on the quality of house construction. That is, unless loggers are involved in assisting local residents, in which case saws are used. This assistance is however reserved to those who have the means to reciprocate, as will be discussed shortly.

In larindrano, there is a clear distinction between larindrano and the other two settlements across the river. While larindrano residents harvest construction wood from larindrano forest, people in Ampio and Antanimainty go to Vohibasias to harvest timber, which makes sense given the proximity of each forest to these settlements. Although most informants talked in general about larindrano and Vohibasias forests, a few were nonetheless detailed about specific sections of these forests where trees are harvested for construction. For larindrano some areas mentioned were Manetimena, Andolotsanala, and Analapela. For Vohibasias, Amboloando, Ankoabe, Angebolalina, and Ampasipoty (Ampio residents) were mentioned.

On average, it takes men less than an hour to reach the forest on foot. Ampio residents travel the longest distance to Vohibasias, as it takes them more than one hour to reach Ampasipoty. larindrano travel about 45 minutes to reach parts where trees are harvested, and Ambatomainty residents are closest in distance to their source of construction wood: on average, it takes them 35 minutes to reach the forest (the distance between settlement and the forest is about one kilometer).

According to larindrano informants, the average construction lasts from one to ten years, averaging three years. However, not all constructions are the same, and not all require the same building materials. Some houses are solidly built using numerous large trees (though none exceeded 15 centimeters in diameter) and mud, and they last

between six and ten years. The constructions that last only one year are usually temporary housing found in the fields. These require few, if any, large trees.

As is the case in Mitia, men go to the forest to cut trees for house construction or repairs in the slow period of the seasonal calendar, which starts in January and ends in June. This happens to be the dry season.

The Forest as a Source of Food

The main foods that Mitia and Antaminainty residents extract from Ihera are tenrecs (*trandraka*), and honey, for the most part, but also some bird species locally known as *akanga*, *vivihy*, and *ongongo*. Ihera forest is the exclusive source for both honey and tenrecs, though some people occasionally go to Analavelona (which takes three times as long) to get honey.

Men hunt tenrecs during the rainy season (*asara*), which lasts from December to April. The frequency of trips to the forest for this product varies from family to family and is dependent on the level of skill available. Some men use dogs to assist them, in which case they can get between 10 and 20 tenrecs daily during hunting season. Most households harvest for self-consumption and go on an ad hoc basis. Tenrecs have a very high fat content, which makes their meat filling. The majority of informants perceive this resource to be abundant.

Honey is available year round, but it is sweetest from mid-March to mid-July (*asotry*). Men with special skills gather honey from the forest to use as a sweetener and as medicine. Honey is stored in a wooden jar to keep it cool.

In larindrano, three types of food are extracted from the forest. The most cited were tubers (*ovy*), with 68 percent of informants mentioning them as forest products. In fact, tubers are a food substitute when food supplies start dwindling, usually in October (*afōsa*). During this dry season, users harvest and consume *ovy* as frequently

as everyday, as it temporarily replaces rice as a staple. The more fortunate ones need to substitute rice only once to three times a week during these four months. It is also a source of income for those who harvest enough and can take it to a local market.

Women tend to be the main harvesters of this tuber, although men, especially young ones, occasionally dig some up in the forest.

Honey was next, with 32 percent of discussants acknowledging it. Only one informant mentioned tenrecs, though in-depth interviews indicate that tenrecs are harvested on a regular basis, albeit only by a few skilled men. The same goes for honey, but honey is more difficult than *ovy* to harvest, which is why the task is left to a few skilled men only. During *asara* and *asotry*, men go, on average, once or twice a month to get honey, depending on how long their supplies last. They harvest it for self-consumption and to sell to fellow villagers. It is possible that they also sell honey at the market, though no informants mentioned that they actually did. To be sure, harvesting honey is a male activity, and it seems to be limited to Vohibasia National Park exclusively.

Unlike with other forest products, the women of larindrano harvest *ovy* in both larindrano (Analanapela) and Vohibasia (Amboloando) forests. It takes larindrano women less than one hour to get to larindrano and one to one-and-a-half hours to reach Vohibasia. Ampio and Ambatomainty residents harvest *ovy* in Vohibasia (Amboloando, Ampoakafo, Ampasapoty, Amboapiky) exclusively. The trip is shorter for the two hamlets, since it takes users between fifteen minutes and one hour to get to Vohibasia.

*What Rules Apply**Fuel wood*

In both Mitia and larindrano, community rules apply exclusively for harvesting fuel wood, even in Vohibasia National Park. Rules about harvesting fuel wood are expressed mostly in prescriptive and enabling terms. Only two informant in Mitia mentioned prescriptions, and none did in larindrano.⁷⁵

Proscriptions concern mostly species and location (sacred areas, or tany faly). In Mitia, 56 percent and 28 percent of those who discussed proscriptions for fuel wood collection mentioned at least one species and forbidden areas, respectively. These rates were 88 percent and 18 percent, also respectively, in larindrano. The single most frequently cited forbidden species in Mitia (M) and larindrano (I) is *mampisaraka* (*Potameia thoursii*), which was cited by 71 percent and 76 percent of informants, respectively. Though less frequently cited, some other forbidden species cited are locally known as hompy (*Ouivisianthe papinae*), hazonkataka (*Colliandra* sp.), ambiotsy (?), and fatra (?).

In terms of what is allowed, most larindrano informants simply mentioned that collecting dead wood was permitted. It is not clear whether this is a rule per se ("no sanctions are reserved for collected dead firewood... provided it is not in forbidden areas"), or if it is a default action permitted since cutting down trees for fuel wood is not permitted. At any rate, cutting trees down is neither practical nor necessary, since dead branches on the ground are abundant and already dry. The provision is, therefore, based on common sense rather than on the need to control behavior. In Mitia, informants mentioned species that were specifically good or abundant for firewood.

⁷⁵ When collecting wood, one must respect local customs (*faly*)... or else the mean spirits (*angatsy*) will visit them (*mihetsika tromba*).

Because of its abundance on the territory, fuel wood is considered an open-access resource in these two communities.

The cases of Mitia and Iarindrano show that community rules for firewood collection combine and balance proscriptions, permissions, and prescriptions. For instance, informants are anonymous that separation and even death in the family await those who burn mampisaraka (*Potameia thoursii*) for firewood. However, other widely available species of good quality such as magnary (*Dalbergia trichocarpa*), katrafay, tsinefo and tsingilofilo are permitted. In fact, there are at least as many permitted species as there are forbidden ones. The abundance of choices, the quality and availability of permitted species render it easy for users to accept and respect proscriptions.

Another point to note is that women and men's knowledge of rules regarding collecting firewood is equally high and, one may say, specific not only in terms of what they may and may not harvest, but also in terms of where they may harvest. In this sense, knowledge of community rules is equal among community forest users.

Construction Wood

In both cases and unlike fuel wood, state rules dominate for construction wood (in fact, informants discussed formal rules only). Informants consider trees for construction to be state property, which to them means that the state (E&F) controls what and how much may be harvested as well as how, when, and where the harvesting may take place. Unsurprisingly, the hamlets neighboring Vohibasia National Park were particularly aware of this question of state ownership.

Rules about construction lumber are expressed primarily as proscriptions ("prior to harvesting, one must get a cutting permit... or else one will pay a fine"), as indicated by the fact that all informants who discussed rules for this product (21 in

Mitia and 18 in larindrano) mentioned this particular requirement. In larindrano, all informants who discussed this product said that E&F requires them to get a permit prior to cutting trees down. In addition, all but two (89%) discussants mentioned that users must "follow what the permit says" (*manaraka ny voalazan 'nypermis*).

Associated with cutting permits are fees, which amounted to FMG 2,500 at the time of research, though some thought that the permit cost FMG 1,000, while others wondered if the fee had not gone up to FMG 5,000 (which, incidentally, is the fee for cutting permits for coffins). One informant from Mitia was mistakenly under the impression that cutting permits were free of charge, a sure indication that he never acquired one, either because he never built or repaired or because complying was not a priority to him.

For both sites, proscriptions and permissions also derive from forest legislation. Eight types of restrictions were cited. They concern size of trees, number of trees used, species, location of harvesting, time of harvesting, tree growth stages, number of permits per year, and selling of timber. Table 7.6 lists restricted species cited in larindrano for construction wood. Fewer informants specified restricted species in Mitia, although four of the six species were also cited there. These were: *hazomalagny* (*Hazomalania voyroni*), *magnary* (*Dalbergia trichocarpa*), *karabo* (*Cordyla* sp. 2), and *vory* (*Chlorophora greveana*).

In larindrano, restrictions on selling timber were the most frequently cited, as 78 percent of informants said that the trees they cut were for their use only. The four (out of eighteen, all men) informants who said that selling timber was permitted still mentioned restrictions on who could purchase the timber: timber can be sold to people from the same village only (2 out of 4) or to people living in neighboring settlements only (2 out of 4). One informant mentioned that, in case of a sale, the permit's owner could be used as a witness in case E&F came to check. The fact that four informants

mentioned that selling timber was permitted could indicate that this is a practice, i.e., an instance of non-compliance.

Table 7.6. Restricted Species for Construction Wood: Iarindrano

Vernacular Name	Scientific Name	Number of Times Cited (out of 18)	Percentage of Informants who Cited
hazomalagny	<i>Hazomalania voyroni</i>	11	61
karabo	<i>Cordyla</i> sp. 2	3	17
very	<i>CMorophora greveana</i>	2	11
daro	<i>Commiphora</i> sp. 2	2	11
magnary	<i>Dalbergia trichocarpa</i>	1	6
monongo	<i>Xanthoxylum seyrigii</i>	1	6

Hazomalagny (*Hazomalania voyroni*) is the most-cited species, and it was often cited in conjunction with tree size, the third most cited type of restriction on harvesting construction wood. Cutting some species such as *Hazomalania voyroni* is forbidden, as is that, by default, of certain species not specified in the permit.

Users may not harvest trees that are either too small (because they are too young, and still growing) or too big (because they are valuable to E&F) unless they pay additional fees for the latter. One informant from Mitia mentioned that the cost of *hazomalagny* was FMG 50,000, which is prohibitive, at least by villagers' standards. What the case of *hazomalagny* shows is that E&F uses rules (including tariffs and fees not specified by forest legislation) to effectively exclude community users from using this particularly valuable tree species.

Restrictions on where to harvest were as frequently cited as restrictions on tree size. Not surprisingly, only inhabitants of Ambatomainty and Ampio mentioned restrictions on location of harvest. This is most likely due to the recent establishment

of Vohibasia as a national park and accompanying "sensibilisation" measures carried out by E&F agents prior to finalizing the park's limits. This work entailed delimiting sections of the forest with neighboring communities in order to give them access to some forest resources. For instance, the area of Vohibasia called Ampasapoty is considered Ampio's forest. Outside of this section, the forest belongs to E&F.

larindrano informants also mentioned specific sections' names, in their case because they share larindrano forest with the neighboring communities of Anjoho (northwest), Bemandresy (north), Bonaky (northeast), Beroroha, Amparambato (east), Beroroa Bekinana (southeast), and Ambatomaintin'i Besakoa (southwest).

Temporal restrictions were also mentioned, albeit seldom (28% of larindrano informants talked about it; only two out of twenty one did in Mitia). The off-season, as far as formal rules go, is the rainy season, starting in mid-November and ending in mid-March, which is when seedlings grow. This period, commonly referred to as *asara*, happens to the busiest period in the agricultural calendar, as the bulk of men's work in the fields does not end until late December. There is some spare time for men from January to June. Unsurprisingly, all but two informants specified that they cut trees for construction in *asotry*, the dry season that goes from mid-March to mid-July or, in a few instances, in *afōsa*, starting mid-July to mid-November (rains start appearing in early October). In this case, the temporal rule is practical and well adapted to users' production systems. Compliance is no issue.

With so many restrictions, one wonders what users can actually do. Rules specifying authorized species (83% in larindrano) and tree size (61% in larindrano) were most frequently cited. Table 7.7 presents the species whose harvesting is permitted in larindrano. The most frequently cited authorized species for both sites were *Cedrelopsis grevei* (known locally as katrafay), *Securinega seyrigii* (forofoky),

and *Dalbergia trichocarpa* (magnary).⁷⁶ With those species, only smaller trees may be harvested. Katrafay and forofoky are preferred species because the trees are strong even though they are small *Qiazo matanjakafa madinika*).

Table 7.7. Tree Species Authorized for Construction Wood: Mitia and larindrano

Vernacular Name	Scientific Name	Percentage of Informants who Cited Tree in Mitia (N=21)	Percentage of Informants who Cited Tree in larindrano (N=18)
katrafay	<i>Cedrelopsis grevei</i>	38	89
forofoky	<i>Securinega seyrigii</i>	48	83
magnary	<i>Dalbergia trichocarpa</i>	29	6
taikafotsy	?	10	6

Interestingly, two informants from Mitia mentioned that it was permitted to hire someone to cut the trees authorized by the E&F permit, a provision not commonly mentioned. Since this possibility was not even brought up in larindrano, it appears that locals do hire outsiders, most likely loggers, to cut trees. Additionally, the vast majority of informants in larindrano clearly stated that it was forbidden to sell timber. Even though four (out of eighteen) informants, all of them males, mentioned that it was permitted to do this could indicate that this is a rule not always complied with, the proportion on potential rule-breakers appears small, especially compared with Mitia, where informants were more divided on this issue: nine people said that it was forbidden to sell timber while eight others said that it was authorized to do so (nineteen did not answer this question, specifically).

⁷⁶ Additional species cited in larindrano were avoha (*Bosqueia (Trilepisium) danguyana*), daro (*Commiphora* sp. 2), and tanilala (*Terminalia talinald*). In Mitia they are *karabo*, *lalipito*, *hazoampo*, *hazonkatomy*, and *voafotaky* (a small tree).

Based on these particular figures, it appears that the rate of non-compliance with this particular E&F rule is higher in Mitia than it is in larindrano. In all likelihood, certain Mitia residents hire loggers-in-residence to cut timber and then illicitly sell it for profit. Our direct observations in the village corroborate this: we saw lumber stacked in an elder's house on several occasions. In addition, casual conversations with women from the community also confirm this. When we informally inquired about the possibility that illegal timber commercialization might be happening in the village, one woman burst out laughing, saying: "Of course, it is going on!" (without mentioning who the culprits were). Moreover, one informant estimated that only one out of ten forest users follows E&F rules, adding that "outsiders do not respect regulations because nobody else does!" Finally, comments on compliance vs. non-compliance made during surveys in Mitia clearly indicated that E&F's requirement that a cutting permit and a burning permit be purchased before cutting trees and burning vegetation, respectively, is routinely ignored. Half of Mitia informants stated that one or the other type of infraction (sometimes both types) was common in the community.

Rules Pertaining to Harvesting Food Products

To the extent that no restrictions exist on where (with exceptions for the National Park, possibly), when, how, or how much to harvest them, tubers (*ovy*) are an open-access resource in larindrano. Anyone can harvest them. In addition, tubers can be sold at the local market. This resource is generally considered to be abundant and reliable.

In Mitia, honey and tenrecs are the main foods extracted from the forest. There, it is permitted to sell honey, whereas it is not permitted to sell tenrecs. In reality, although selling tenrecs is proscribed, selling tenrecs simply is not done (three

informant said that it brings bad financial luck).⁷⁷ Doing this is an open admission of one's poverty and desperation. It is thus a matter of social pride as much as it is one of concern for conservation.

There are at least three other factors that may aid social norms in preventing over-consumption of tenrecs. First, they are available only at a particular time of the year (27% of informants mentioned that February to April was the best time to catch them). Second, tenrecs have a particularly high fat content, which means that people need just a little to feel satisfied. Third, 67 percent of informants mentioned that they are not hungry for tenrecs all year round, but only during tenrec season. It is not surprising, therefore, that social norms rather than rules per se (with accompanying sanctions) suffice to conserve this particular resource, rendering it one on which people can count year after year.

How Forest Users Find Out About Rules

As is the case in other surrounding forest communities, newcomers find out about community rules through community leaders who tell them verbally what behavior is expected of them. Otherwise, children learn from their parents what the restrictions are for collecting firewood and food in and around the forest. In particular, they are told that *mampisaraka* and *kily* are forbidden species. So, oral tradition and word of mouth are the main media for communicating community rules.

For forest legislation, the state relies on local state representatives (the mayor, *thsfokontany* president, or local monitoring agents—KASTI⁷⁸) to communicate rules regulating tree harvesting and vegetation fires. This is done regularly and at least once

⁷⁷ This could be expressed in the form of a proscription: "One must not sell tenrecs harvested from the forest... or else one will have bad financial luck."

⁷⁸ KASTI stands for *Komitin 'ny AlaSy Ny Tontolo lainana* (forest and environment committee)

a year. Again, informants consider it easy to learn about rules using this system of communication. However, as will be discussed shortly, in practice it is not clear how state rules are to be enforced.

Compliance

The survey figures presented in Table 7.8 show similarities between the two communities when it comes to community members complying with fuel wood (community) rules and non-compliance with (state) rules. About the same proportions of informants who answered these questions answered that community members "always" abide by fuel wood rules (63% in Mitia and 67% in Iarindrano) and have broken rules at least once (14% and 10%, respectively).

Differences between these two cases, however, appear with regard to compliance with state rules, as rows 2 through 4 of the same table show. What our informants indicated is that (1) community forest users' compliance with state rules is better in Iarindrano than in Mitia; (2) significantly more rule-breakers have been caught breaking state rules in Mitia than in Iarindrano; (3) in Mitia, outsiders comply with state rules more than do community members; (4) community rules are better respected than state rules in Mitia and equally respected in Iarindrano. About outsiders' vs. locals' non-compliance with state rules in Mitia, the main reason for this difference is that villagers assume that loggers have permits to cut, though they are not sure of this because they are, arguably, in no position to check. As it turns out, one such outsider, who works as a carpenter, admitted that he felt free to harvest timber from Ihera forest because E&F does not monitor compliance with rules outside of those that govern harvesting construction wood.

Table 7.8. Survey Results for Compliance: Mitia and larindrano

	Mitia	larindrano
Community members "always" comply with fuel wood rules	63%	67%
Community members "always" comply with construction wood rules	62%	78%
Outsiders "always" comply with construction wood rules	78%	62%
No one in the village has ever been caught breaking E&F rules	39%	73%
No one in the village has ever been caught breaking community rules	56%	75%
I have broken rules at least once	14%	10%

Types of Infractions

Commonly cited infractions with state rules concerned cutting trees without first obtaining a cutting permit and burning vegetation (outside the forest) without first getting a burning permit. This was the case in both communities. For those who admitted to breaking rules, the rules in question were state rules, more specifically cutting permit requirements. According to the six men (three in each community) who conceded that they were rule-breakers, the main reason why they did not get a permit before cutting trees is because they could not afford waiting for permits to come through before building or repairing their houses. In the words of one informant, complying with state rules is "inconvenient."

As far as community rules were concerned, only Mitia informants discussed the fact that some community members had transgressed *soms fady* and paid dearly for it (consequences ranged from "losing an eye," "dying on the spot," "getting caught by mean spirits," and "sacrificing a zebu"). A male informant, who has converted to Christianity and looks down upon ancestral beliefs, said that he and his wife burned

mampisaraka for firewood and found it to be of superior quality. According to him, their transgression has gone unpunished.⁷⁹

Local Reactions to Rules

How Binding Are Rules?

When asked about the degree to which informants felt bound by rules that govern harvesting fuel wood, construction lumber and food from the forest, answers were very different from one site to the next. While in Mitia almost all informants felt "really bound" (*tena voafehy*) by fuel wood, construction wood and, to a lesser degree, food rules, informants in larindrano generally felt "somewhat bound" (*voafehy ihany*) by construction wood and food rules but largely unconstrained by fuel wood rules.

Table 7.9 shows how responses compared in the two sites.

Table 7.9. How Binding Rules Are in Mitia vs. larindrano

	Fuel Wood Rules		Construction Wood Rules		Food Rules	
	Mitia (N=23)	larindrano (N=16)	Mitia (N=45)	larindrano (N=21)	Mitia (N=12)	larindrano (N=17)
Not so binding	4%	75%	7%	5%	42%	18%
Really binding	91%	0%	93%	0%	58%	0%
Somewhat binding	4%	25%	0%	95%	0%	82%

Why would Mitia residents feel generally more constrained by rules than the people of larindrano? Going back to Table 7.8₅ one can see that the incidence of sanction (for breaking rules) is higher in Mitia than larindrano. In the eyes of Mitia residents, and compared to larindrano residents, the probability of detection and

⁷⁹ It is interesting to note, however, that the same informant bemoans the fact that Mitia has become of highly divided community. *Mampisaraka* literally means "that causes separation."

sanction is higher, which means that they need to exercise more caution when breaking rules. Rules can presumably be better enforced in Mitia than they are in larindrano. The other possibility, of course, is that there are more rule violations in Mitia than larindrano, which is why the incidence of sanction is higher there.

Legitimacy of Rules

Although one would expect that forest users who feel more constrained by existing rules would take issue with them (saying things like "rules are inconvenient," i.e., they impede free access) than those who did not feel as constrained, the survey data do not support this. Interestingly, reactions to rules are similar in both places. Based on informants' answers to whether or not there were rules that did not care for (question D24) or that they simply did not accept (D25), Mitia and larindrano informants are almost equally divided on the first question and in agreement that they could not think of rules that they did not accept for the second question (Table 7.10).

For those who questioned the legitimacy of rules, including those who would simply get rid of them, the principal points of grievance were cost and time. That is, most people could understand why rules are necessary to prevent over-harvesting (this was definitely the case in larindrano where no single informant considered that the total absence of rules would benefit forest resources), but they did not approve of the costs in money and time to get cutting E&F permits.

Table 7.10. Local Reactions to Rules: Mitia and larindrano

Question	Answer	Mitia (%)	larindrano (%)
D24	Yes, there are rules that I do not care for	13	12
	No, there are no rules that I do not care for	10	14
	No opinion	2	4
D25	Yes, there are rules that I do not accept	7	8
	No, there are no rules that I do not accept	15	19
	No opinion	1	3
D26	If it were up to me, I would suppress rule(s)	7	2
	If it were up to me, I would modify rule(s)	4	16
	No opinion	8	12
D27	Without rules, the forest would improve	1	0
	Without rules, forest degradation would result	6	22
	Without rules, people would be better off	6	4
	Other	4	2
	No opinion	6	2

Interestingly, resource ownership legitimizes one's imposing restrictions on accessing the resources (the forest is the state's and, therefore, the state is entitled to regulating its access). The problem is, in their view, they generally consider themselves without the financial and temporal means to comply with the rules. At the same time, some informants questioned the point of having rules since, according to them, rules were ignored altogether. Ultimately, the main reason why they comply is because they fear negative consequences such as heavy fines, incarceration and, in case of community rules, illness and death.

Hew Compliance Is Monitored.

Since sanctions for breaking community rules belong to the realm of personal beliefs and values and because fuel wood and forest foods are abundant, there is little talk about actual monitoring of compliance with the rules that govern the harvesting of these two products.

Instead, conversations about monitoring of compliance revolve exclusively around state rules regulating tree cutting (and vegetation fires). To monitor compliance with E&F's regulations, the state is more visible than it is to communicate rules. That is, state agents tour the area regularly to check on permits and fine individuals, or the whole community if no individuals are singled out, in case of infraction.

In some ways, the monitoring system in place in Mitia is more elaborate than the one in Iarindrano, as it involves outside monitors from several administrative levels (indirect monitoring) rather than community ones (direct monitoring). For instance, Iarindrano residents share monitoring responsibilities with E&F and are expected to report violations to Sakaraha, making monitoring a community responsibility. This is only possible because state agents are fully aware that the Bara Zafimafely family of Iarindrano are devoted to raising cattle, which requires strict monitoring of activities within the forest, especially given the risk of cattle theft by cattle rustlers (including, we were told, by Analavelona people).

In Mitia, E&F monitors compliance through local agents (referred to as KASTI and based in the neighboring village of Mahazoarivo), *gendarmes*, or through its own *Chefde Cantonnement* whose name was mentioned on several occasions, indicating that the latter actually pays occasional visits to the area.

Rule Enforcement

Are there differences in the ways rules are enforced in Mitia than in larindrano? Some survey results indicate that this is not the case, while other items support this claim. In fact, data on rule enforcement are strikingly similar for both sites. First, as mentioned previously, it is equally easy to find out about rules in these two communities. Second, informants from both sites are equally positive about the fact that rules are, indeed, enforced locally (in Mitia 25 informants said so, and just 2 disagreed; for larindrano the figures were 22 vs. 4, respectively). Third, there is consensus in both sites that, in case of detection, there are ways out of punishment when one deals with state agents.

One can nonetheless note a slight difference between the two sets of informants on the issue of whether or not outsiders vs. locals have been in charge of punishing rule violators in the community. Unlike larindrano informants, Mitia informants were almost equally divided on the question of whether or not outsiders had been in charge of punishing forest crimes. Some thought yes, others thought no. Based on related instances of outside intervention for the purpose of punishing forest crimes, those who answered yes were accurate. According to them, E&F officials fine individuals at least once a year for bush fires and for cutting trees without permits.

larindrano informants, for their part, unanimously agreed that neither community members (none said yes, 29 said no) nor outsiders (8 said yes, 21 said no) had ever punished forest crimes in the community. However, the data on outsiders being called in to sanction rule violators (question D18) are not consistent with stories that the same informants told us about how the *Chef de Cantonnement* had once come in person to collectively fine the community after a bush fire went out of control and burned houses in the community. This discrepancy could be due to the fact that informants were not thinking of bush fires but, rather, tree cutting per se when

answering question D18. It could also be due to the fact that this E&F appearance was a one-time occurrence, an unusual event not worth mentioning.

Thus both communities have experienced E&F's enforcement wrath. But the big difference between the two sites is, E&F agents pay regular visits to Ihera communities, whereas they have waited for *an in extremis* situation to directly intervene in larindrano.

Similar Situations, Same Protection Status, Different Conservation Outcomes

Given that the many similarities between the two sites, which are discussed below, and given larindrano's proximity to Vohibasia National Park, one would expect rule enforcement to be stricter there than in Mitia. Instead, the research indicates that, curiously, state agents are more present (physically and psychologically) in Mitia than in larindrano. Why would that be? Before addressing this question, I first turn to evident similarities between the two sites.

Similarities Between the Two Cases

The preceding sections allow us to observe that, in addition to the official status of the forests in question (Ihera and larindrano are both classified forests), Mitia and larindrano communities have much in common. As far as population size, both villages are small, with number of inhabitants somewhere between three hundred and five hundred. The ethnic majority for both communities is Bara.

Dependence on the forest for livelihood is equally heavy, with 94 percent and 100 percent of households surveyed claiming to use forest products for fuel, food, medicine, fodder, pasture and, most importantly, construction. For both communities, the forest is easily accessible, with travel time from settlements to forest of less than

one hour. The same is true of ease of access to markets, which villagers can reach in about three hours from their respective settlements.

Both communities share the experience of logging companies coming into their territory and selectively harvesting under the legal protection of state-sanctioned permits. However, in the case of Iarindrano, the loggers did not stay as long as they did in Mitia, most likely because they could not get along with state authorities on whose approval their forest exploitation depended.

Very similar rules apply at the level of these communities for the main forest products. Essentially, state (E&F) regulations apply almost exclusively for construction lumber and bush fires, whereas community rules are used to regulate the collection of fuel wood and foods such as game, tubers, and honey.

Finally, local users' reactions to rules-in-use are similar, at least with regard to their perceptions of how legitimate vs. illegitimate the rules are. In both cases, people are almost equally divided on the question of whether or not they have problems with some rules. They are also similarly divided on the issue of whether or not there are rules that they refuse to accept. One must note, however, that beyond these two points of similarity, opinions on rules diverge.

Accounting for Different Conservation Outcomes

Given the above similarities, and the drastically different conservation outcomes observed in both sites, one must ask: First, what are the outstanding differences between the two communities? Second, do these differences account for the differential effectiveness of rules-in-use in producing RCD vs. RDB? Four important differences help account for differences in rules' ability to produce conservation outcomes in Ihera and Iarindrano.

The first difference is with local reactions to rules. In Mitia, more people seem eager to suppress the rules instead of simply modifying them. The reverse is true in larindrano: there is more interest in rule modification than rule suppression. In addition, the majority of people with whom we spoke in larindrano saw a clear connection between a situation of open access (*res nullius*) and resource degradation. In Mitia, fewer people acknowledge the possibility of RDB, with an equal proportion considering such a possibility an improvement in people's welfare.

The second difference is with livelihood strategies, or production systems. In Mitia, about half of the people who spoke with us cultivate irrigated rice, while nearly everyone did in larindrano. At the same time, 40 percent of Mitia's informants said that they depended on "other activities" for livelihood, while none did in larindrano. Mitia's situation is reminiscent of Andranomaitso where residents exploit the forest, illegally producing charcoal and selling timber, to maximize their livelihood gains. In the case of Mitia, there is no charcoal production, but timber is produced illegally. The pressure to flaunt one's wealth is great enough to encourage certain community members to engage in this lucrative but illegal activity.

There are two possible explanations for these differences in livelihood strategies. First, given that logging has continued in fliera, albeit at a slower pace, the opportunities for marketing timber are better around Diera than larindrano. Market penetration is obvious in Mitia in the sense that trucks actually drive to Diera forest to collect timber. Second, larindrano territory is endowed with fertile lands particularly favorable for irrigated rice. The immigrants present there are interested in growing rice and have been successful enough to prosper through sharecropping with their Bara landlords. This has afforded the Bara the luxury of tending to their zebus exclusively, leaving menial agricultural tasks to migrant workers. The fact that the Bara Zafimantely did not expel the immigrants who murdered their father (but instead

relocated them at a safer distance) strongly suggests that the Bara benefit from migrant rice cultivators' presence on their territory.

A third important difference between the two cases has to do with social cohesion. Although one could argue that some form of mutual isolation exists in both communities, there is no outright animosity among residents of larindrano's settlements, whereas the tension is high in Mitia. In Mitia, the social fabric's erosion has seems to have encouraged economic stratification, with little restraint on flaunting one's wealth and showing little concern for the less privileged.⁸⁰ Christian values have also been embraced, leaving little room for Bara values, now relegated to the realm of "ignorant superstitions." *Mampisamka*, the essential marker of Bara identity, was excellent firewood, we were told by a Christian couple. By contrast, social networks are still strong in larindrano. When asked about economic stratification, our suggesting that some people might be poorer than others surprised, perhaps offended, people there. We were told in very clear words that there was no such thing as poverty in larindrano because everyone makes sure that nobody's needs go unmet.

The fourth outstanding difference between the two communities touches on monitoring and enforcement system in place for formal rules. As mentioned previously, the system of monitoring and enforcement can be labeled "direct" in Mitia, since E&F representatives intervene and perform these tasks on site. By contrast, E&F largely relies on larindrano residents to monitor activities taking place in and around the forest. Only in one extreme case did E&F show up to sanction rule violations. It has done so repeatedly in Mitia, where only 39 percent of respondents claimed that no one had ever been sanctioned by E&F, compared to 73 percent in larindrano.

⁸⁰ In addition to the classic herd size indicator, Western-style tombs have been erected and are very visible from the settlements.

This difference in direct vs. indirect state (E&F) intervention in resource management is, one can speculate, the main cause behind the final distinction between the two communities. If one looks at the extent to which people feel bound by rules-in-use, one can clearly see that Mitia residents feel more constrained than their larindrano counterparts, none of whom claimed to feel "really constrained" by fuel wood, construction wood, and food rules. By contrast, Mitia informants claimed to be "really bound" by the same rules, indicating that they feel more tightly controlled by them. Given the differences in monitoring and enforcement systems mentioned above, it is hardly a surprise that Mitia residents should feel less free than larindrano people, hence their more radical positions on rule suppression vs. modification.

This begs the question: Why is there more direct E&F intervention in Mitia than in larindrano, especially given larindrano's proximity to Vohibasia National Park? At least two explanations are possible. First, the financial stakes in controlling the Ihera area could presumably be higher than in larindrano, where strictly no logging has been reported for at least a decade. It is not hard to imagine that local residents might seek to enhance their economic power by collaborating with loggers who themselves collaborate with state agents to exploit Ihera at minimal cost. As mentioned previously, informants did not know for sure whether loggers actually had permits, and some of them probably benefit from "assuming" that they do. E&F, on the other hand, probably benefits from concentrating on cutting permits for construction and repairs while ignoring, as the carpenter mentioned, other logging activities in a place where some loggers are visibly active (there are logging trails, evidence of recent cutting, and collection posts all around Ihera forest).

Second, larindrano's local leaders (the seven Bara Zafimañely siblings) enjoy favorable conditions for forest conservation, which is in their best interest as Bara pastoralists. In that sense, local guardians of the forest and the state have converging

interests in preserving larindrano forest; In addition, since the logging business that tried to exploit larindrano abruptly ended, market penetration has not advanced there as much as it has in Diera. As a result and, one can argue, in the absence of state intervention (or state interest?), community rule enforcement capabilities are sufficient for controlling users' behavior. In spite of easy access to the forest from the settlements, compliance with rules is high because access is tightly controlled and behavior within the forest closely monitored by the Bara landlords. The state can thus rely on the local community to monitor consumption of wood for construction and coffins because it is the Bara Zafimañely's interest to protect the standing forest without which their zebus and, therefore, their economic status as well as their cultural identity would suffer.

In Mitia, non-compliance with state rules about harvesting timber results not from lack of enforcement, but from lack of predictable enforcement. This is in spite of the fact that E&F is more present physically and psychologically than in larindrano. Even though E&F is relatively more present in Mitia, it does not mean that its ability to monitor closely what is happening in and around the forest matched larindrano's guardians of the forest. Because E&F's presence on site is not permanent, it is at a disadvantage if compared to the Bara Zafimañely of larindrano. What, in fact stands in the way of better monitoring and enforcement activities on the part of E&F? The next section identifies the main impediments to more effective rule enforcement.

Eaux et Forêts' Limitations

While Bara communities generally do not differentiate among E&F personnel, the *gendarmes*, and agents from conservation projects (where applicable), all of whom are "the state" (*fanjakana*), E&F certainly distinguishes itself from other state institutions and from conservation projects. Against accusations of corruption and incompetence,

E&F agents have found ways to present themselves as the victims of severe limitations on their abilities to uphold their laws. Interviews with different foresters revealed three major limitations on E&F's enforcement capabilities.

Material Constraints

Material limitations are the first impediment to effective enforcement. When WWF arrived in the area in 1994, part of its mandate was not to undermine E&F's capabilities and credibility, much less supplant it, but to support this particular state institution in conserving the area's protected areas (Zombitse and Vohibasia). As things stood in 1998, however, WWF's material means were far superior to E&F's, as was its ability to reach out to the most remote areas of the region. Support staff, transportation, office supplies, and maps were virtually non-existent at E&F.

Sakaraha's *Chef de Cantonnement* barely had more than an office room (renovated at the project's expense), a desk, a chair, a bench, a map of the area from the 1960s, and a binder with a 1997 compilation of all applicable forestry laws at his disposal.

One can easily see that for one man, who happens to be physically unfit, to cover almost 8,900 square kilometers, with more than eight forests located in over 71 *fokontany* throughout 11 communes is an impossible task. Lack of personnel is the main reason why E&F has to delegate monitoring and enforcement responsibilities to the gendarmes who number 30 (for one E&F agent!) for Sakaraha.

While there is merit to the argument that lack of personnel and transportation severely limit E&F's ability to patrol and enforce its laws, it is also hasty to conclude that increased means would lead to more effective enforcement. According to WWF project personnel, infractions increased rather than decreased when the project gave the *Chef de Cantonnement* a motorcycle to tour the area. This is because the latter started distributing permits generously and collecting bribes that protected rule

breakers against reprisals. There are many allegations that, contrary to what he may claim, this individual has prospered greatly from negotiating the law with forest users (especially the people around Zombitse). He owns real estate in Sakaraha, he and his family live in a large house provided by his employer, he has plenty of access to food (judging from his physique) and, as rumor has it, to women, as well. In other words, this state figure is far from seen as a deprived individual

Institutional Constraints

Institutional constraints add to material limitations to explain why rule enforcement tends to be ineffective when E&F is in charge. Although such limitations are more numerous than this section can accommodate, one needs to point to the main ones. Various factors, some political, some cultural, others personal, combine to influence the individual foresters' decisions on how to implement the law.

E&F agents are required to monitor compliance and enforce forest legislation by going to the field and writing tickets (*procèsverbaux*) when they uncover infractions. Depending on the gravity of the infraction, rule-breakers are given the option to avoid a law suit by paying a fine to E&F or by doing work related to improving the state of forests (this is called a *transaction avantjugement*). If the rule-breaker refuses to settle the matter on site, then the *Chef de Cantonnement* refers the matter to the next level, which is the *Circonscription des Eaux et Forêts* (CIREF) in Toliara. At this level, E&F makes a recommendation to the prosecution on what penalty should apply in court. E&F agents deal with a wide variety of individuals, some of whom are docile and some others not.

The outcome of trials that have actually occurred has been variable and unpredictable. According to E&F informants, some judges are "pro-environment," while others are "indifferent." The former can impose sentences harsher than

recommended by E&F and, of course, the latter show little consideration for E&F's claims. Besides judges' personal inclinations, their impartiality is also compromised by the infiltration of politics into the legal process. As one E&F agent put it, politicians are only "pro-vote" and so, they find ways to stop judges from imposing harsh sentences on those constituents who have the means to bribe them. For Sakaraha's *Chef de Cantonnement*, the concrete result of such blatant corruption has been two out of twenty four convicted criminals getting six months of jail time in fifteen years, hardly a sign of effective rule enforcement.

The existence of well-established political and social networks further complicates the picture, not just at the provincial level, but also at the national one. At the level of Toliara, for instance, there is a network made up of three ethnic groups known as *Tokobetelo*. This group, whose members have little interest for forest conservation, is extremely influential in Toliara politics. This makes some E&F agents see that the legal system, which is based of French principles of law, cannot easily accommodate local socio-political dynamics, thereby rendering them (E&F agents) helpless and the system ineffective. At the national level, key people in the Ministry of E&F all belonged to a single political party (at the time of research).

Various other factors make it difficult for E&F to apply its laws. Given the constraints and context described above, E&F agents have little incentive to do their job. In fact, while they used to receive a bonus for tickets (it was called *a prime de provés verhaux*), this financial incentive, too, has vanished. Additionally, some E&F agents see flaws in the current forest texts. Not only, they say, do the core of forest laws dates back to the 1930s, but updates are slow to come through and become effective. The general feeling is that forest legislation is purely symbolic. Finally, personal factors come into play. In some cases, E&F agents have a hard time giving law enforcement precedence over sympathy when they know that some local users

break rules to grow food and pasture their zebus. Additionally, E&F agents reach a plateau in their career: their "severity curve" settles in a middle position after shooting up in the initial years of their careers. In other words, they soften.

Concluding Remarks

In spite of similar developments in their communities, Mitia and larindrano have reached strikingly different social and conservation outcomes in the past few decades. In the first case, rules-in-use have not prevented the degradation of Ihera forest. In fact, it was the manipulation of these rules that led to tree species loss. In the larindrano case, forest conservation has relied on these rules, precisely.

The main difference between these two communities is that, in Mitia, local key actors did not resist market pressures and gave personal financial gain precedence over community cohesion and welfare. This case, in fact, challenges the usefulness of pitting state actors against community actors since the competition has effectively gone from state vs. community (when the loggers first arrived) to community vs. community. This is a case where key community actors have come to collaborate with state actors to share with them the benefits of exploiting Ihera forest.

larindrano leaders, by contrast, re-claimed control over their territory and forest resources as soon as the opportunity presented itself. Although they do not claim that they had anything to do with the logging company being expelled from their territory, which is probably true, they used the fact that their family territory was titled and kept outsiders from exploiting the forest by offering them the opportunity to cultivate rice on a territory where soil conditions were favorable to agricultural production. In doing so, the Bara Zafmamenely of larindrano successfully preserved their pastoral activities and Bara cultural identity. Ultimately, they took advantage of discords among state actors (E&F vs. loggers), state rules (land titles), and local soil

conditions to monopolize access to the forest. By demonstrating that they were in control of forest resources, E&F has entrusted them with rule enforcement. The question is: how much longer will larindrano be able to stay off E&F's radar screen?

CHAPTER 8

CONCLUSIONS

The main question that this research asked was: What kind of rules, with what purposes, devised and applied in what contexts, are more or less likely to induce resource-conserving behavior (RGB) vs. resource-degrading behavior (RDB)? Having examined various governance systems under which forest resources are managed and/or mismanaged in the Bara context, one can better address the theoretical propositions made at the outset to assess their validity. Before doing so, the main findings of this research are summarized in the section below.

Key Findings

The first key finding from this research is that rules-in-use, or rules as applied, jointly shape farmers' incentives and strategies for securing their livelihood. The formal precedence of state rules is nominal and not effective in practice. Local user strategies can support biodiversity conservation, but can also entail over-exploitation of forests, leading to habitat and biodiversity loss. In some governance systems, community rules dominate the institutional landscape. This was the case in Anavelona. In other cases, state rules are the basis of the governance system. This was, arguably, the case in Iarindrano and Mitia. However, everywhere, community rules coexist with state rules. The case of Andranomaitso shows yet a third way in which the hybrid nature of rules-in-use manifests itself. There, rules-in-use are the product of explicit negotiations between state and community actors, on the state's initiative with a conservation project's support.

A second main finding is that rules are not operating in an environment of their own making. They result from dynamic interactions between state and community

actors who manipulate rules in order to protect or advance their interests. These interests can entail forest conservation (Analavelona and Iarindrano) or forest exploitation (Zombitse and Ihera). While Scott suggests that "[appropriation is, after all, largely the purpose of domination," one can also say that domination is largely the purpose of appropriation: the more one can benefit from exclusively exploiting or conserving the forest, the greater one's power to decide what should happen to the forest. Rather than being tools of administration, rules thus become instruments of power acquisition and maintenance. In this sense, rules are tools of exclusion.

Compliance with rules-in-use, in turn, depends on two sets of variables. The first set is *contextual*, and it involves key actors' purposes vis-à-vis the forest. In simplest terms, key actors have two choices: exploit or conserve the forest. While demographic and economic factors can shape these interests, as the official discourse suggests, factors such as livelihood choices, state ideology, and cultural values also come into play. These motivational factors are rooted not just at the local but at higher geographical and administrative levels as well. In addition, the relationships that involve contenders to the forest continually evolve, as key players and the resources themselves change. In other words, rules are dynamic, and they evolve with the contexts in which they are devised and enforced.

The second set of variables touches on specific *attributes* of the rules-in-use, namely: (1) whether or not the rules are compatible with people's livelihood strategies and production systems; (2) whether resource users consider the rules and those who implement them to be legitimate; and (3) whether monitoring and enforcement are predictable and credible. On all scores, community rules are more effective in inducing compliance than state rules in the rural areas of Madagascar.

A third finding concerns the limited usefulness of the state/community dichotomy. Seeing local communities pitted against state authorities in the competition

for resources can be useful or limiting, depending on the circumstances. It is useful when there are ways in which communities of forest users indirectly cooperate with state authorities to perpetuate the cycle of environmental degradation. This is what the case of Hiera forest shows us. In such cases, state institutions render local institutions powerless without necessarily succeeding in deterring resource-degrading behavior. At the same time, this dichotomy can be limiting when, as the case of the Zombitse conservation project, forest-dependent communities cooperate with state authorities to advance their economic interests at the expense of biodiversity conservation. It seems ironic that the *Dinan 'ny Mpanao Hatsaka* was implemented in a village where the history of the settlement precluded a real sense of community in which a collective purpose transcends individual livelihood interests through illicit forest uses.⁸¹

A fourth finding is that as the cases included in this study show and contrary to what conservation policies would have us believe, conservation outcomes have little to do with the official status of a given forest. If interposed in less-than-optimal conditions, as the case of Andranomaitso suggests, rules can be largely irrelevant and do not suffice to prevent resource-degrading behavior. In fact, they can induce resource-degrading behavior. The Malagasy government's conservation policies thus rest on a model whose causal link between rules and conservation outcomes is, at best, questionable. This is to say that more rules will not guarantee more conservation, unless they are enforced in enabling contexts. What do such contexts entail?

Conditions for Effective Governance Systems Dominated by Community Rules

The cases of Analavelona sacred forest and Iarindrano classified forest highlight conditions under which rules-in-use effectively steer behavior in the direction of

⁸¹ A written convention that binds Andranomaitso residents and state actors (E&F and WWF) for the purpose of eradicating deforestation via the practice of slash-and-burn maize culture, locally known as *hatsaka*, around Zombitse National Park.

resource conservation. In both cases, compliance with rules-in-use results from community-based enforcement mechanisms that involve both visible and invisible monitors (fellow villagers and ancestors' spirits, respectively). Compliance with rules results from fear of sanctions because the probability of detection is high, given how closely behavior is constantly monitored. In these two cases, monitoring is constant.

Key to understanding why Analavelona and Larindrano forests are well preserved is the realization that key actors from surrounding communities, i.e., Bara pastoralists, have a stake in preserving the forest. Beyond mere livelihood, cultural survival is also at stake. In both cases, minimal state intervention and maximum community involvement have permitted community rules and enforcement mechanisms to suffice. Around Analavelona, in fact, communities' strategies of containing the state have been successful, which means that resource management power has not been taken away from those whose interest it is to preserve the forest. In Larindrano, the community experienced an exogenous shock when the state permitted *exploitants forestiers* to harvest from Larindrano forest. However, when logging came to an abrupt end, the Bara landlords quickly and successfully seized the opportunity to re-establish themselves as controllers of the forest, thereby minimizing the devastating impacts of such outside intrusion on their local governance system and social cohesion.

Factors other than strong rule enforcement capabilities explain the success of these two community-based governance systems. First, the rules-in-use are compatible with people's *livelihood strategies and production systems*. This does not mean that livelihood strategies are the same for all. In fact, they are not: only the Bara Zafimanely landlords of Larindrano devote themselves to tending their cattle exclusively. Other inhabitants, who represent various ethnic groups, are agriculturalists who have taken full advantage of the local tenure arrangements

(sharecropping) and the physical conditions of Iarindrano's territory to secure their livelihood.

Second, *market penetration* has been equally limited for these two sites. In addition to the fact that these communities are physically isolated from major roads and markets, people have found ways to secure their livelihood without commercializing forest products. For both sites, only agricultural products (produce and livestock) are sold at the market. Otherwise, forest products are reserved for household consumption only. Given the difficulty of accessing these sites, foresters have had little incentive to visit them, which has allowed community-based governance systems to thrive. By default, therefore, community actors' and state actors' interests converge.

In sum, Analavelona and Iarindrano are cases in which external and community actors' interests converge on forest conservation. In order for local actors to protect their interests, they have had to develop and disseminate rules locally so as to keep appropriators out of the forest as much as possible. Especially in Analavelona, the rules-in-use are embedded in local beliefs about the forest, and they coincide with forest legislation, whose nature is highly restrictive (with proscriptions and prescriptions dominating). In both instances, compliance with the rules-in-use is largely contingent upon local actors' ability and willingness to enforce rules by way of constant monitoring.

Factors that Weaken Governance Systems Dominated by State Rules

Compared with the effectiveness of community-based governance systems, those communities relying on state rules have, at best, struggled to induce resource-conserving behavior. At all the sites included in this study E&F's regulations apply when it comes to cutting trees of particular species and sizes and burning vegetation.

State rules are less frequently invoked when it comes to the other main products, namely firewood, food, medicine, pasture, and worship. Only when a protected area is declared a state forest (*alam-panjakana*), as with national parks, do restrictions effectively apply as to where these "products" can be extracted from the forest. To some extent, therefore, forest legislation applies. The question is, are state rules well enforced at the local level? Do they tend to induce or discourage conservation?

Looking at the two cases where state rules dominate local governance systems, i.e., Zombitse and Ihera, one is forced to conclude that state rules have performed poorly. In the first case, the establishment of Zombitse as a National Park has done little to stop deforestation. While it is true that deforestation slowed down, it is not clear that state-encouraged rules and the way they were enforced had much to do with this deceleration. Rather, the new economic opportunities that the sudden discovery of sapphires afforded seem to have distracted, at least temporarily, those who exploited Zombitse illegally. In Ihera, the situation is equally bleak. Loggers were permitted into Mitia territory through state-sanctioned permits and, once they came in, things fell apart, both in the forest and within the community.

While it is easy to blame E&F for the plight of degraded forests, one must not hasten to point fingers at foresters. Rather, the context under which they are given responsibility to enforce state laws needs to be understood. This context is multi-dimensional, and it involves state ideology, local politics, institutional shortcomings, and well as personal limitations.

What foresters do, or fail to do, to increase the effectiveness of state rules in inducing conservation behavior is largely contingent upon the incentive structure in which they enforce rules. The case of Andranomaitso's *Dinan 'ny Mpanao Hatsaka* demonstrates that the institutional support promised E&F effectively took the form of power usurpation on the part of other institutional actors, including WWF (in this

particular instance). Inadvertently or not, the local conservation project threatened existing local interests in which key actors had been negotiating to extract as many material benefits as possible from Zombitse forest. When the WWF project became one of the local players, the rules of the games changed, and the game became one of exploiting the new rules to the same rent-seeking effect. Ultimately, E&F positioned itself to exploit the "institutional haze" brought about by the multiplication of stakeholders. In such a context, rules-in-use did little to stop deforestation. They even exacerbated the problem by creating new opportunities to perpetuate the game of exclusion.

The negative consequences of these dysfunctional institutions are not purely environmental. In Andranomaitso, the *Dinan 'ny Mpanao Hatsaka* did little to foster group cohesion and solidarity. In Mitia, state intervention and local responses destroyed the social fabric to the point where social organization and individuals' behaviors no longer reflected Bara values. In other words, a sense of community was lost in Mitia, and it could never be created in Andranomaitso. In such a context, the legitimacy (or lack thereof) of local leaders could do little to encourage compliance with rules about the forest.

What About Demographics and Economics?

In all sites visited, the number of people dependent of forest resources for livelihood has increased over the past half century. Yet, conservation outcomes have varied across these communities. Likewise, none of the communities are ethnically homogeneous, especially in the Andranomaitso and Iarindrano cases. Yet, conservation outcomes are drastically different there. One is therefore hard-pressed to demonstrate, based on the cases under study, that demographic factors are the principal force behind environmental degradation in Madagascar. This is not to

suggest that population pressures do not exist or that they do not strain local resource management systems. Rather, it suggests that there are other factors that can mitigate (or precipitate) the adverse effects of demographic pressures.

The claim that poverty is a driving force behind deforestation is also misleading. First, the fine line between "poverty" (i.e., the fact of living a deprived life where one's basic needs are not met) and living simply is all too often crossed when it comes to rural Madagascar. While the classic indicators of poverty used as international standards would place all these communities well below the "poverty line," the vast majority of informants claimed to be able to meet their basic needs every year. Second, one can argue that it was not poverty per se, as much as it was the search for livelihood opportunities that precipitated deforestation in Zombitse. There, people felt that they were meeting their needs until rules prevented them from doing so. The opportunity costs of complying with park rules were so great that some turned to illegal exploitation of Zombitse, thereby perpetuating the problem of deforestation.

Based on the size and nature of the sample considered in this analysis, the most that one can say is that explanations pertaining to rules complement rather than supplant those relating to poverty and demographic pressures. Rules, in turn, are malleable: they adapt to externally or internally induced changes, some of which are driven by demographic and economic forces.

But even with this arguably atypical sample of rural communities, certain conditions for resource conservation and resource degradation can be identified, as illustrated in Figure 8.1.

Key Actors' Interests	Key Actors' Purposes	RGB Rules	Most Likely Conservation Outcome
Converge	(A) on resource conservation	RCB rules can be effective	RGB can result (Analavelona)
	(B) on resource degradation	RCB rules are irrelevant	RDB is the most likely result (Zombitse)
Diverge	(C) stronger party wants to conserve, weaker party wants to degrade ⁸²	RCB rules can be effective	RCB can result (Iarindrano)
	(D) stronger party wants to degrade, weaker party wants to conserve	RCB rules can be ineffective	RDB is the most likely result (Hiera)

∞

For (A) & (C) the positive effect of rules on conservation outcomes is contingent upon (stronger) party's/parties' ability to

4. *implement rules that are compatible with production systems;*
5. *successfully legitimize their authority to implement rules so that users deem rules and enforcement authorities legitimate and*
6. *devise monitoring and enforcement mechanisms that induce compliance on the part of resource users.*

Figure 8.1. Conditions for RCB vs. RDB: Rules vs. Interests

⁸² A party is said to be *strong* when its enforcement and legitimation capacities are strong at the level of resource users; conversely, the party is said to be *weak* when these capacities are weak or non-existent.

Main Conclusions

The findings of this research suggest that Madagascar's conservation models are founded upon a questionable causal link between rules and conservation behavior. To view formal rules as panaceas for deforestation thus creates risks rather than certainty.

To understand conservation outcomes (RCB vs. RDB), one must identify key actors and their purposes vis-à-vis the forest as well as the rules that these actors devise to exclude other potential forest users from deriving benefits from using the forests at the local level. These are the rules that actually apply at the local level, or rules-in-use.

Key actors' success in monopolizing access to resources depends on one crucial factor: their willingness and ability to enforce rules-in-use. Key actors' enforcement capabilities partly rely on key actors' ability to legitimize their own authority and to devise rules that are compatible with local production systems.

At the local level, rules are not mere tools of administration, as the Malagasy state would have one believe. Rather, rules are means of exclusion and tools of power acquisition and maintenance.

Policy Implications

To say that the connection between rules and conservation outcomes is far from straightforward is an understatement. Until there develops an awareness that

- (1) rules-in-use, i.e., the rules that actually apply at the local level, result from dynamic interactions among actors who compete and cooperate, at the local level, to monopolize access to forest resources; these interactions are motivated by actors' interests vis-à-vis the forest. These interests can entail conservation but also forest exploitation and, therefore, degradation;

(2) forest users' perceptions about the rules and those who enforce them influence their decisions to comply or not to comply with the rules; and

(3) strong rules require strong enforcement capacities,

conservation models will remain, at best, simplistic, and conservation strategies will continue to be ineffective in countries like Madagascar.

An awareness of the complexity of the connection between rules and conservation outcomes should spark state and other policy-makers' interest in seeking ways to tap into local institutional capital in order to manage the natural resources that remain on the respective territories, given the specific environmental, social, economic, political, and cultural contexts that these communities know best. This will require a sustained political will to learn from communities rather than to teach them management skills that they may very well have had in the first place.

Appendix 1

Table 3.3. Key Informants Interviewed and Institutional Affiliations

Institution	Location (Level)	Key Informant's Title
Eaux et Forêts (E&F)	Sakaraha	Chef de Cantonnement
	Toliara	Chef de CIREF
	Antananarivo	Directeur du Programme Dette Nature
Service des Domaines	Toliara	Unidentified clerk
FTM	Antananarivo	Directeur Général
Andranoheza Community	Andranoheza	<i>Mpisoro</i> and Ms spouse (separately)
Fanjakana Community	Fanjakana	Village head Maire-Adjoint
World Wide Fund for Nature	Sakaraha	Agents de Conservation (4) Chef de Secteur (2) Directeur de Projet
	Antananarivo	Consultants (2)
Conservation International	Antananarivo	Member of Board of Directors (1)
Université de Toliara	Sakaraha (field work)	Graduate students (2)
Université d'Antananarivo/ESSA	Antananarivo	Chef de Département
Mahaboboka Commune	Mahaboboka	Mayor
Soatanana Fokontany	Soatanana	PCLS Treasurer
Tribunal de Première Instance de Moramanga	Moramanga	Prosecution Lawyer Judge

Appendix 2

Survey Questionnaire in Malagasy

B. ANTOM-PIVELOMANA [dependence]

BL Inona ny asa aman-draharaha hamelomanao ny ankohonanao (ny tenanao/tokatranonao)?

- (1) _Fambolena (a) _ vary tanety
(b) _ vary tanim-bary
(c) _ sady ta'vy no tamin'Vbary
(d) __ voly hafa <inona?>

- (2) _ Fiompiana
(a) _ akoho amam-borona
(b) _m kisoa
(c) __ omby
(d) _ osy
(e) _ tantely

(3) _ Maka zava-boahary anaty ala (_ kitay; _ charbon; _ hazo; _ hafa:)

(4) _ Mitantana fiompina na varotra na orinasa

(5) _ Mikarama amin'olona

(6) _ Mampiasa olona

(7) _ Hafa<inona?>

B2. Firy volana isan-taona ny tohitranonao no mihinana ny vokatry vokarinan'ny nareo?

- (a) _ vary (b) _ fambolena (c) _ vokatry hafa (d) _ fiompiana (e) _ tsy fantatro

C. FITANTANANA [Leaders' Legitimacy]

DIDIM-PANJAKANA	ZAVA-MISY EO AMIN'NY FIARAHA-MONINA (FOKONOLONA)
<i>C1. Iza no mandray ny fanapaha-kevitra momba nyfiainan 'ny tanàna?</i>	
C1a. (1) _ Ray aman-dreny(RAD) <famaritana?> (2) _ Manam-pahefana eo an-toerana <famaritana?> (3) _ Hafa<iza?> (9) _ N/A	C1b. (1) _ Ray aman-dreny(RAD) <famaritana?> (2) _ Manam-pahefana eo an-toerana <famaritana?> (3) _ Hafa<iza?> (9) _ N/A
<i>C2. Iza no manara-maso sy manitsy ny fandraisana anjara amin'ny asa iombonana?</i>	
C2a. (1) _ RAD (2) _ Olonatendren'nyRAD <3) _ Solontenam-panjakana eo antoerana (4) _ Hafa<iza?> (9) _ N/A	C2b. (1) _ RAD (2) _ Olonatendren'nyRAD (3) _ Solontenam-panjakana eo antoerana (4) _ Hafa<iza?> (9) _ N/A
<i>C3. Iza no manasazy ireo izay mandika nyfitsipika (lalàna) napetrak'ireo mpitantana?</i>	
C3a. (1) _ RAD (2) _ Olona tendren'ny RAD (3) _ Solontenam-panjakana eo antoerana (4) _ Hafa<iza?> (9) _ N/A	C3b. (1) _ RAD (2) _ Olona tendren'ny RAD (3) _m Solontenam-panjakana eo antoerana (4) _ Hafa<iza?> (9) _ N/A
<i>C4. I'za no mamaha ny fifandonana nafifanolanana mitranga eto an-tanàna?</i>	
C4a. (1) _ RAD (2) _ Solontenam-panjakana eo antoerana (3) _ Ny andaniny sy ankilany mpifanolana (4) _ Hafa<iza?> (9) _ N/A	C4b. (1) _ RAD (2) _ Solontenam-panjakana eo antoerana (3) _ Ny andaniny sy ankilany mpifanolana (4) _ Hafa<iza?> (9) _ N/A
<i>C5. Fomba ahoana no hamahana ny fifandonana mitranga eto an-tanàna?</i>	
C5a.	C5b.

C6. *Iza no be mpanao/mpanaraka?* (1) _ asam-panjakana (2) _ asam-pokonolona (3) _ mitovy (7) __ tsy fantatro

C7. *Mpitondra manao ahoana no tianao?* (1) _ manome fahalalahana anareo (2) _ mametra ny fahafahanareo
(3) _ nofidianareo (4) _ notendren'ny fanjakana
<Antony> (5) _ valin-teny tsy mitombona

D. FITSIPIKA [Rules]

DL Aiza no toerana hangalanao an 'ireo zava-boahary nafitaovana ireo?

Zava-boahary (a):

Zava-boahary (b):

Zava-boahary (c):

- Anaran'ny faritra:	- Anaran'ny faritra:	- Anaran'ny faritra:
- Toerana (localisation):	- Toerana:	- Toerana:
- Halavirany (distance):	- Halavirany:	- Halavirany:
- Fotoana:	- Fotoana:	- Fotoana:
- Impiry:	- Impiry:	- Impiry:

D2. Lehibesa kely io/ireo toerana io/ireo?

(1) __ Lehibe
(2) __ Kely/Tery
(3) _ Antony

(1) __ Lehibe
(2) __ Kely/Tery
(3) _ Antony

(1) __ Lehibe
(2) __ Kely/Tery
(3) _ Antony

D3. VOAFARITRA TSARA VE IO TOERANA IO? <limites visibles?>

(D) _ Eny (2) _ Tsia

(1) _ Eny (2) _ Tsia

(1) _ Eny (2) _ Tsia

D4. Mora h^a ivy aty an-tanàna ve io toerana fangalana zava-boahary io?

(1) _ Mora	(1) _ Mora	(1) _ Mora
(2) _ Sarotra	(2) _ Sarotra	(2) _ Sarotra
(3) _ Antonony	(3) _ Antonony	(3) _ Antonony

D5. Tazana avy aty an-tanàna ve ny zava miseho ao anatin'io faritra io? [oh. Olona maka zava-boahary ao]

(1) _ Eny	(1) _ Eny	(1) _ Eny
(2) _ Tsia	(2) _ Tsia	(2) _ Tsia
(7) _ Tsyfantagro	(7) _ Tsy fantatro	(7) _ Tsy fantatro

D6. Mila fahazoan-dàlana avy amin'otenkajaye ianao rehefa hamntasa azy?

(1) _ Eny: (^a)_Ny vadiko (no tompony) (^b)L Ny Rad-iko, ny Rafozako (^c)L Ny zanako (d)_ Fananana iombonan'ny iray tanàna (e)_ Fananam-panjakana (f)_ Antony hafa (2) _ Tsia	(1)L Eny: (a)_Ny vadiko (no tompony) (t>L Ny Rad-iko, ny Rafozako (^c)_ Ny zanako (d)_ Fananana iombonan'ny iray tanàna (e)_ Fananam-panjakana (f)_ Antony hafa (2) _ Tsia	(1L Eny. (^a L Ny vadiko (no tompony) (0>L Ny Rad-iko, ny Rafozako (^c)_ Ny zanako (d)_ Fananana iombonan'ny iray tanàna (e)_ Fananam-panjakana (f)_ Antony hafa (2) _ Tsia
--	---	---

Zava-boahary (a):

Zava-boahary (b):

Zava-boahary (c):

D7. Iza no manapa-kevitra ny amin 'izayfaritra ho ampiasainao?

(1) _ Izaho ihany	(1) _ Izaho ihany	(5) __ Izaho ihany
(2) _ Ny vadiko	(2) _ Ny vadiko	(6) __ Ny vadiko
(3) _ Ny tompony	(3) _ Ny tompony	(7) _ Ny tompony
(4) _ Hafa<Iza?>	(4) _ Hafa <Iza?>	(8) _ Hafa<Iza?>
(5) _ Tsy misy karazana fanampahan-kevitra toy izany	(5) _ Tsy misy karazana fanampahan-kevitra toy izany	(5) _ Tsy misy karazana fanampahan-kevitra toy izany

D8. Iza no manapa-kevitra amin 'izay tokony hampiasainao ireny zava-boahary ireny?

(1) _ Izaho ihany	(1) _ Izaho ihany	(1) _ Izaho ihany
(2) _ Ny vadiko	(2) _ Ny vadiko	(2) _ Ny vadiko
(3) _ Ny tompony	(3) _ Ny tompony	(3) _ Ny tompony
(4) _ Hafa<Iza?>	(4) _ Hafa<Iza?>	(4) _ Hafa<Iza?>
(5) _ Tsy misy karazana fanampahan-kevitra toy izany	(5) __ Tsy misy karazana fanampahan-kevitra toy izany	(5) _ Tsy misy karazana fanampahan-kevitra toy izany

Is)
00

D9. Iza no manapa-kevitra ny amin 'nyfotoana hampiasainao ireny zava-boahary ireny?

(1) _ Izaho ihany	(1) __ Izaho ihany	(1) _ Izaho ihany
(2) _ Ny vadiko	(2) _ Ny vadiko	(2) _ Ny vadiko
(3) _ Ny tompony	(3) _ Ny tompony	(3) _ Ny tompony
(4) _ Hafa<Iza?>	(4) _ Hafa<Iza?>	(4) _ Hafa<Iza?>
(5) _ Tsy misy karazana fanampahan-kevitra toy izany	(5) _ Tsy misy karazana fanampahan-kevitra toy izany	(5) _ Tsy misy karazana fanampahan-kevitra toy izany

D10a. Afaka mivarotra azy ireny ve ianao?

Zava-boahary (a)	(1)_Eny (2)_Tsia	<i>D10a(a). Ny olona rehetra ve dia afaka mividy azy ireny?</i> (1)_ Eny (2)_ Tsia <Iza no mahazo mividy?>
Zava-boahary (b)	(1)_Eny (2)_Tsia	<i>D10a(b). Ny olona rehetra ve dia afaka mividy azy ireny?</i> (1)_ Eny (2)_ Tsia <Iza no mahazo mividy?>
Zava-boahary (c)	(1)_Eny (2)_Tsia	<i>D10a(c). Ny olona rehetra ve dia afaka mividy azy ireny?</i> (1)_Eny (2)_ Tsia <Iza no mahazo mividy?>

	Zava-boahary (a):	Zava-boahary (b):	Zava-boahary (c):
<i>DIOb.NyTSYAZOatao</i>			
<i>DIOc.NyAZOatao</i>			
<i>DIOd. Ny TSYMAINSTY atao</i>			

Dll. Mora sa sarotra ny mahafantatra nyfitsipika mifehy isan-karazany?

Zava-boahary (a)	Zava-boahary (b)	Zava-boahary (c)
(1)_Mora	(1)_Mora	(1)_Mora
(2)_Sarotra	(2)_Sarotra	(2)_Sarotra
(7)_Tsy fantatro	(7)_Tsy fantatro	(7)_Tsyfantatro

D12. Mahatsapa voafehy sa malalaka ianao raha haka sy hampiasa ireo zava-boahary ireo?

- | | | |
|---|---------------------------------------|---------------------------------------|
| (1) _ Malalaka | (1) _ Malalaka | (1) _ Malalaka |
| (2) _ Voatery mihitsy | (2) _ Voatery mihitsy | (2) _ Voatery mihitsy |
| (3) _ Voateritery ihany | (3) _ Voateritery ihany | (3) _ Voateritery ihany |
| (4) _ Tsy manan-kevitra momba izany aho | (4) Tsy manan-kevitra momba izany aho | (4) Tsy manan-kevitra momba izany aho |

D13. Manaraka nyfitsipikaveny olona eto an-tanàna?

- | | | |
|--|--|--|
| (1) _ Manaraka foana | (1) _ Manaraka foana | (1) _ Manaraka foana |
| (2) _ Indraindray | (2) _ Indraindray | (2) _ Indraindray |
| (3) _ Tsy manaraka mihitsy
<fitsipika inona?> <antony?> | (3) _ Tsy manaraka mihitsy
<fitsipika inona?> <antony?> | (3) _ Tsy manaraka mihitsy
<fitsipika inona?> <antony?> |
| (7) _ Tsy fantatro | (7) _ Tsy fantatro | (7) _ Tsy fantatro |
| (8) _ Tsy misy valiny ("mic") | (8) _ Tsy misy valiny ("mic") | (8) _ Tsy misy valiny ("mic") |

D14. Fepetra inona no tena arahinareo/ankasitranareo?

- (1) _ Napetrakm'ny fokonolona
- (2) _ Napetrakin'ny fanjakana
- (3) _ sady(1)no(2)

D15. Manaraka nyfitsipika ve ny olona ivelan 'ny tanàna izay mampiasa ny zava-boahary eto?

- | | |
|---|-----------------------------|
| (1) _ Manaraka foana <a,b,c> | (7) Tsy fantatro |
| (2) _ Indraindray | (8) Tsy misy valiny (mic) |
| (3) _ Tsy manaraka mihitsy <fitsipika inona?> <antony?> | (9) _ n/a (tsy misy vahiny) |

D16. Efa nisy olona **tratra** nandika fepetra ve teto aminareo?

- (1) _ Eny <oviana?> <fepetra inona?>
- (2) _ Tsia
- (7) _ Tsy fantatro
- (8) _ Tsy misy valiny (mic)

D17. lanao io ve dia anisan'ireo olona efa nandikafitsipika mifehy ireny zava-boahary ireny?

- (1) _ Eny <lalana/fitsipikainona?> <nahoana?>
<impiry?> <oviana?>
- (2) _ Tsia
- (8) _ mic
- (9) _ n/a

D18. Efa nisy manam-pahefana ivelan'ny tanana ve nanasazy olona tsy nanarakafitsipika teto an-tanana?

- (1) _ Eny <oviana?> <avy taiza?>
- (2) _ Tsia
- (7) _ Tsy fantatro
- (8) _ mic
- (9) _ n/a

D19. Efa nisy olona teto an-tanana ve nasaina nampihatra ny lalana hanasazy ny mponina tsy nanarakafitsipika teto aminareo?

- (1) _ Eny <oviana?>
<momba ny zava-boahary inona?>
<lalana/fitsipika inona?>
- (2) _ Tsia
- (7) _ Tsy fantatro
- (8) _ mic
- (9) _ n/a.

D20. Nyfitsipika mifehy ireny zava-boahary iankinan 'ny fivelomanao <averimberina sy raisina tsirairay> ve ampiharina eto amin 'ny tanàna ihany?

(1) _ Eny <fitsipika napetrak'iza?>

(2) _ Tsia <inona?>

(7) _ Tsyfantatro

(8) _ mic

(9) _ n/a

D2L Ahoana ny fomba fampiharana nyfitsipika mikasikany zava-boahary iankinan 'ny fivelomanao <averimberina sy raisina tsirairay>?

D22. Inonà avy no karazana sazy ampiharina ho an 'ny olona mandika nyfitsipika?

(1) _ Fandikana voalohany:

(a) _ maivana

(b) _ antonony

(c) _ mavesatra

(2) _ Fandikana faharoa:

(a) _ maivana

(b) _ antonony

(c) _ mavesatra

(3) _ Fandikana matetika :

(a) _ maivana

(b) _ antonony

(c) _ mavesatra

(7) _ Tsyfantatro

(8) _ mic

(9) _ n/a

D23. Raha misy olona tratra mandika laldna/fitsipika, misyfomba ve ahafahana miala amin 'ny sazy tokony ho azo? (oh: manome tsolotra manam-pahefana)

(1) _ Eny <ahoana?>
<matetika?>

(2) _ Tsia

(7) _ Tsy fantatro

(8) _ mic

(9) _ n/a

D24. Misy lalàna/fitsipika tsy azoazonao ve?

(1) _ Eny <inona?>

<nahoana?>(a) _ Tsy ara-drariny (b) _ Tsy marina
(e) _ Tsy miraharaha izay zavatra ilaiko
(g) _ Tsy mitombina

(c) _ Tsy azo ekena (d) _ Tsy manan-kasina
(f) _ Tsy mifanaraka amin'ny hetahetanay/ko

(2) _ Tsia

(3) _ Tsy manan-kevitra momba izany aho

(8) _ mic

(9) _ n/a

D25. Misy lalàna/fitsipika tsy ekenao manokana ve?

(1) _ Eny <Inona?>

(2) _ Tsia (afapo amin'ny lalàna aho)

(3) _ Tsy manan-kevitra momba izany aho

(8) _ mic

(9) _ n/a

D26. Raha afaka manova ny lalàna efa misy ianao, dia ahoana no tianao hanovana izay lalàna tsy tianao?

(1) _ Tiako esorina tanteraka

(2) _ Tiako ovana <ahoana?>

(3) _ Tsy manan-kevitra momba izany aho

(8) _ mic

(9) _ n/a

D27. Inona no mety heverinao hitranga raha tsy misyfitsipika miaro ireny zava-boahary ireny?

(1) _ Mihatsara izy

(7) _ Tsy fantatro

(2) _ Miharatsy/Simba/Tapitra izy

(8) _ mic

(3) _ Ho sambatra kokoa ny mponina

(9) _ n/a

(4) _ Hiady ny mponina

(5) _ Vokatra hafa <inona?>

D28. Misy ala arovana ve manodidina ity tanàna ity?

(1) _ Eny <anarana><aiza?>

(2) _ Tsia

(7) _ Tsy fantatro

(8) _ mic

D29. Fantatrao ve ny faritra mametra io ala arovana io?

(1) _ Eny <mazava tsara> <hatraiza ny farany?>

(2) _ Tsia

(8) _ mic

Appendix 3

Survey Questionnaire in English

(8)_mic

Community:
Interviewee #

Date:
_ Female _ Male

Start Time:
Finish Time:

Born in:
Ethnicity:

Education:
HH Size:

A. MARKET AND ADMINISTRATIVE CENTER

A1a. What market do you go to?

A1b. Where are the administrative offices that you go to?

<i>A2. How far away is it/are they?</i>	
A2a. _ How many hours/minutes: _ Distance: _ Do not know _ How often:	A2b. _ How many hours/minutes: _ Distance: _ Do not know _ How often:
<i>A3. Do you consider this to be far away?</i>	
A3a. (1) _ Yes (far) (2) _ No (close) (3) _ So so (neither close nor far)	A3b. (1) _ Yes (far) (2) _ No (close) (3) _ So so (neither close nor far)
<i>A4. What do you go there for?</i>	
A4a. (1) _ To sell produce (2) _ To sell goods (3) _ To buy produce (4) _ To buy goods (5) _ Other <what?>	A4b.
<i>A5. How do you travel there?</i>	
A5a. (1) _ By foot (2) _ Animal cart (3) _ Vehicle (4) _ Train (5) _ Combination of the above	A5b. (1) _ By foot (2) _ Animal cart (3) _ Vehicle (4) _ Train (5) _ Combination of the above

B. LIVELIHOOD STRATEGIES

BL What do you do for a living/to provide for yourself your household, your family?

(1) _ Cultivation (a) _ tavy rice

(b) _ irrigated rice

(c) _ (a)and(b)

(d) _ other <what?>

(4) _ Farm or business (e.g., commerce)

(5) _ Work for someone

(6) _ Employ labor

(7) _ Other <what?>

(3) _ Breeding

(a) _poultry (b)_ pigs (c)_ zebus (d)_goats (e)_bees (f) _ sheep

(3) _ Harvest forest products (_ fuel wood; _ charcoal; _ lumber; _ other:)

B2. How many months per year does your household consume what you produce?

(a)_ rice (b)_ other cultures

(c) _ other production

(d) __ breeding

(e) _ do not know

C. GOVERNANCE

STATE/GOVERNMENT AFFAIRS	FOKONOLONA AFFAIRS
<i>C1. Who are the decision makers in this community?</i>	
Cla. (1) _ Ray aman-dreny (RAD) <definition?> (2) _ Local state officials <definition?> (3) _ Other <who?> (9) _ N/A	Cib. (1) _ Ray aman-dreny (RAD) <definition?> (2) _ Local state officials <definition?> (3) _ Other <who?> (9) _ N/A
<i>C2. Who monitors and ensures participation in collective work?</i>	
C2a. (1) _ RAD (2) _ Someone designated by RAD (3) _ Local government representatives (4) _ Other <who?> (9) _ N/A	C2b. (1) _ RAD (2) _ Someone designated by RAD (3) _ Local government representatives (4) _ Other <who?> (9) _ N/A

STATE/GOVERNMENT AFFAIRS	FOKONOLONA AFFAIRS
<i>C3. Who sanctions non-compliance with leaders' rules?</i>	
C3a. (1) _ RAD (2) _ Someone designated by RAD (3) _ Local government representatives (4) _ Other <who?> (9) N/A	C3b. (1) _ RAD (2) _ Someone designated by RAD (3) _ Local government representatives (4) _ Other <who?> (9) N/A
<i>C4. Who resolves conflicts resulting from collective work?</i>	
C4a. (1) _ RAD (2) _ Someone designated by RAD (3) _ Local government representatives (4) _ Other <who?> (9) _ N/A	C4b. (1) _ RAD (2) _ Someone designated by RAD (3) _ Local government representatives (4) _ Other <who?> (9) _ N/A
<i>C5. How are these conflicts resolved in this community?</i>	
C5a.	C5b.

C6. Which solicits the most participation? (1) _ government-initiated (2) _ fokonolona-initiated (3) _ same (7) _ don't know

C7. What type of leader are you most comfortable with ? (1) _ someone flexible
 (2) _ someone who imposes limits
 <why?> (3) _ someone you chose
 (4) _ someone designated by the state
 (5) _ answer does not make sense

D. RULES ABOUT FOREST PRODUCTS

D1. Where do you harvest those forest products that you need?.....

Product (a):

Product (b):

Product (c):

- Name of area/source: - Location: - Distance to: - Time to: - Frequency:	- Name of area/source: - Location: - Distance to: - Time to: - Frequency:	- Name of area/source: - Location: - Distance to: - Time to: - Frequency:
---	---	---

D2. Is this place (are these places) big or small?

(4) Big

(5) Small/tight

(6) In-between

(1) **Big**

(2) Small/tight

(3) In-between

(1) Big

(2) Small/tight

(3) In-between

270

D3. Are the limits visible/well defined?

(1) Yes (clear limits) (2) No

(1) Yes (2) No

(1) Yes (2) No

D4. Is it easy to see that area from the village?

(1) <input type="checkbox"/> Easy (2) <input type="checkbox"/> Difficult (3) <input type="checkbox"/> So so	(1) <input type="checkbox"/> Easy (2) <input type="checkbox"/> Difficult (3) <input type="checkbox"/> So so	(1) <input type="checkbox"/> Easy (2) <input type="checkbox"/> Difficult (3) <input type="checkbox"/> So so
---	---	---

D5. Is it possible to see what goes on in this place? /Is it possible to see harvesters/users from the village?

(1) _ Yes (2) _ No (7) _ Do not know	(1) _ Yes (2) _ No (7) _ Do not know	(1) _ Yes (2) _ No (7) _ Do not know
--	--	--

D6. Do you need to get permission from someone prior to using this resource?

(1) _ Yes: (a) _ My spouse owns it (b) _ My parents/ancestors own it (c) _ My child(ren) own it (d) _ The community owns it (e) _ The state owns it (f) _ Other reason (2) _ No	(1) _ Yes: (a) _ My spouse owns it (b) _ My parents/ancestors own it (c) _ My child(ren) own it (d) _ The community owns it (e) _ The state owns it (f) _ Other reason (2) _ No	(1) _ Yes: (a) _ My spouse owns it (b) _ My parents/ancestors own it (c) _ My child(ren) own it (d) _ The community owns it (e) _ The state owns it (f) _ Other reason (2) _ No
--	--	--

Product (a):

Product (b):

Product (c):

D7. Who decides where you are going to harvest this product?

(5) _ Myself (6) _ My spouse (7) _ Its owner (8) _ Other <who?> (5) _ No such decision	(1) _ Myself (2) _ My spouse (3) _ Its owner (4) _ Other <who?> (5) _ No such decision	(1) _ Myself (2) _ My spouse (3) _ Its owner (4) _ Other <who?> (5) _ No such decision
--	--	--

D8. Who decides how you are going to use this product (what for)?

(1) <input type="checkbox"/> Myself (2) <input type="checkbox"/> My spouse (3) <input type="checkbox"/> Its owner (4) <input type="checkbox"/> Other <who?> (5) <input type="checkbox"/> No such decision	(1) <input type="checkbox"/> Myself (2) <input type="checkbox"/> My spouse (3) <input type="checkbox"/> Its owner (4) <input type="checkbox"/> Other <who?> (5) <input type="checkbox"/> No such decision	(1) <input type="checkbox"/> Myself (2) <input type="checkbox"/> My spouse (3) <input type="checkbox"/> Its owner (4) <input type="checkbox"/> Other <who?> (5) <input type="checkbox"/> No such decision
---	---	---

D9. Who decides when you are going to use this product?

(1) <input type="checkbox"/> Myself (2) <input type="checkbox"/> My spouse (3) <input type="checkbox"/> Its owner (4) <input type="checkbox"/> Other <who?> (5) <input type="checkbox"/> No such decision	(1) <input type="checkbox"/> Myself (2) <input type="checkbox"/> My spouse (3) <input type="checkbox"/> Its owner (4) <input type="checkbox"/> Other <who?> (5) <input type="checkbox"/> No such decision	(1) <input type="checkbox"/> Myself (2) <input type="checkbox"/> My spouse (3) <input type="checkbox"/> Its owner (4) <input type="checkbox"/> Other <who?> (5) <input type="checkbox"/> No such decision
---	---	---

D10a. Are you allowed to sell this product?

Product (a)	(1) <input type="checkbox"/> Yes (2) <input type="checkbox"/> No	D10a(a). Can anyone buy it? (1) <input type="checkbox"/> Yes (2) <input type="checkbox"/> No <who may buy?>
Product (b)	CO <input type="checkbox"/> Yes (2) <input type="checkbox"/> No	D10a(b). Can anyone buy it? (1) <input type="checkbox"/> Yes (2) <input type="checkbox"/> No <who may buy?>

Product (c)	(1) _ Yes <i>D10a(c). Can anyone buy it?</i> (1) _ Yes (2) _ No <who may buy?> (2) _ No
-------------	--

	Product (a):	Product (b):	Product (c):
<i>D10b. What is proscribed</i> (must not)			
<i>D10c. What is allowed (may)</i>			
<i>D10d. What is prescribed</i> (must)			

D11. Is it easy or difficult to know about these rules?

Product (a)	Product (b)	Product (c)
(3) _ Easy <how?>	(1) _ Easy <how?>	(1) _ Easy <how ?>
(4) _ Difficult	(2) _ Difficult	(2) _ Difficult
(9) _ Do not know	(7) _ Do not know	(7) _ Do not know

D12. Do you actually feel bounded by these rules, or are they flexible?

- (4) _ They are lax
- (5) _ Very binding
- (6) _ Rather binding
- (4) _ No opinion

- (1) _ They are lax
- (2) _ Very binding
- (3) _ Rather binding
- (4) _ No opinion

- (1) _ They are lax
- (2) _ Very binding
- (3) _ Rather binding
- (4) _ No opinion

D13. Do the people in this community tend to follow these rules?

- (1) _ Always
- (2) _ Sometimes
- (3) _ Never <which?> <why not?>
- (7) _ Do not know
- (10) _ No answer ("mic")

- (1) _ Always
- (2) _ Sometimes
- (3) _ Never <which?> <why not?>
- (7) _ Do not know
- (8) _ No answer ("mic")

- (1) _ Always
- (2) _ Sometimes
- (3) _ Never <which?> <why not?>
- (7) _ Do not know
- (8) _ No answer ("mic")

DJ4. What type of rules do you tend to abide by/follow?

- (1) _ Fokonolona-devised
- (2) _ State-devised
- (3) _ both (1) and (2)

D15. Do users from outside the community tend to follow/respect the rules?

- (1) _ Always <a,b,c>
- (2) _ Sometimes
- (3) _ Never <which?> <why not?>
- (7) _ Do not know
- (8) _ No answer
- (9) _ n/a (only community members use the resource)

D16. Has anyone ever been caught breaking a rule (rules)?

- (1) _ Yes <when?> <what rule?>
- (2) _ No**
- (3) _ Do not know
- (4) _ No answer (mic)

D17. Are you among those who have broken a rule (rules)?

- (1) _ Yes <what rule(s)?> <why?>
<how often?><when?>
- (2) _ No
- (8) _ mic
- (9) _ n/a

D18. Has anyone from ~~outside~~ the community been given the responsibility to sanction rule-breakers in this community?

- (1) _ Yes <when?> <from where?>
- (2) _ No
- (7) _ Do not know
- (8) _ mic**

D19. Has anyone from ~~within~~ the community been given the responsibility to sanction rule-breakers in this community?

- (1) _ Yes <when?> who?
<for what product?>
- (2) _ No
- (7) _ Do not know
- (8) _ mic**
- (9) _ n/a

D20. Are the rules regulating the use and conservation of products (a), (b), (c—on which your livelihood depends- actually applied at the level of the community?

(1) _ Yes <whose rule?>

(2) _ No <which?>

(7) _ Do not know

(8) _ mic

(9) _ n/a

D21. How are the rules actually implemented for those products on which your livelihood depends <repeat>?

D22. What types of sanctions apply if a rule is broken?

(1) _ First infraction : (a) __ light

(b) _ medium

(c) _ heavy

(2) _ Second infraction : (a) _ light

(b) _ medium

(c) _ heavy

(3) _ Repeated infractions : (a) __ light

(b) _ medium

(c) _ heavy

(7) _ Do not know

(8) _ mic

(9) _ n/a

D23. If someone gets caught breaking a rule, is there a way out of punishment (e.g., bribes)?

(1) _ Yes <how?>

<how common?>

(2) _ No

(7) _ Do not know

(8) _ mic

(9) _ n/a

D24. Are there rules with which you feel uncomfortable/uneasy?

- (1) __ Yes <which?>
<why?> (a) _ not right (b) _ not true (c) _ not acceptable (d) _ has no weight
(e) _ indifferent to my needs (f) _ not compatible with my wishes (g) _ make(s) no sense
- (2) _ No
(3) _ No opinion (8) _ mic (9) _ n/a

D25. Are there rules that you do not accept/that you reject?

- (1) _ Yes<which?>
(2) _ No (I am satisfied with the rules)
(3) _ No opinion (8) _ mic (9) _ n/a

D26. If you could change existing rules, how would you change them?

- (1) _ I would get rid of them altogether
(2) _ I would modify <how?>
(3) _ No opinion (8) _ mic (9) _ n/a

D27. What do you suppose would happen if these rules about resources were suppressed?

- (1) _ The resource(s) would improve
(2) _ The resource(s) would be depleted/impoverished
(3) _ People would be happier
(4) _ People would fight
(5) _ Other results <which?>
(7) _ Do not know (8) _ mic (9) _ n/a

D28. *Is there a protected forest in the vicinity of this village?*

(1) Yes <name><where?>

(2) No

(7) Do not know

(8) mic

D29. *Do you know the limits of this protected forest?*

(1) Yes <clearly> <from where to where: N, S, W, E?>

(2) No

(8) mic

Appendix 4

Table 5.4b. Rules about Fuel Wood Collection for Analavelona Communities

	Andranoheza	Mikoboka
<i>Proscriptions</i>		
Sell firewood	48%	100%
Use <i>Mampisaraka</i> sp.	68%	80%
Use other species	20% ⁸³	33% ⁸⁴
Harvest from <i>faly</i> places	52%	40%
Cut down trees	8%	0%
None	8%	13%
<i>Permissions</i>		
Selling firewood	52%	0%
Use dead/dry wood	62%	0%
Use specific species	4% ⁸⁵	100% ⁸⁶
None	29%	0%
<i>Prescriptions</i>		
Use dead/dry wood	8%	0%
None	88%	100%

Note: Percentages are of respondents who answered the question about rules applying to the collection of firewood.

⁸³ Ambohitsy sp.; Lombiry sp.; Adabo sp.; Fopoho sp.; Kitata sp.; Anjerezo sp.; Savoia sp.; Kilysp.

⁸⁴ Andrarezo sp.; Listaky sp.; Ampoly sp.

⁸⁵ Katrafay sp.; Magnary sp.; Rotsy sp.; info given by a man.

⁸⁶ Most appreciated and/or commonly used because they are readily available species mentioned are: Sohihy sp.; Rotsy sp.; Tsingilifilo sp.; Lalo sp.

Table 5.5b. Rules about Lumber Harvesting for Analavelona Communities

	Andranoheza	Mikoboka
<i>Proscriptions</i>		
Sell timber	46%	93%
Cut down large trees	41%	0%
Use specific species	32%	79%
Burn while or after harvesting	30%	0%
Cut trees unauthorized in permit	9%	0%
None	9%	14%
Cut past winter season	5%	0%
Cut without a permit	5%	0%
Hunt animals while harvesting	9%	0%
Wear jewelry in forest	0%	7%
Wear soiled clothes	0%	7%
Cook chicken in the forest	0%	7%
<i>Permissions</i>		
None	50%	0%
Cut/Use smaller trees	45%	0%
Sell timber	41%	7%
Use specific species	18%	100%
Cultivate cleared land	4%	0%
<i>Prescriptions</i>		
Obtain a cutting permit (E&F)	91%	71%
Respect permit's deadline	22%	36%
Replace trees (replant)	4%	0%
None	4%	14%
Get spirits' blessing	0%	14%

Table 5.6b. Community Rules about Harvesting Food from Analavelona Forest

	Andranoheza	Mikoboka
<i>Proscriptions</i>		
Catch/Kill birds inside the forest	90%	0%
Do "dirty"bad things	60%	0%
Take pork/sheep/goat meat into the forest	30%	0%
Harvest anything but honey and <i>tenrecs</i>	10%	0%
Take women into the forest	30%	0%
Kill animals	10%	0%
Sell honey and/or <i>tenrecs</i>	10%	31%
Wear clean/new clothes	0%	8%
Wear jewelry	0%	8%
Burning while harvesting	0%	8%
None	0%	39%
<i>Permissions</i>		
Harvest honey and <i>tenrecs</i> for consumption only	70%	0%
Sell honey	0%	31%
Harvest other animals	10%	0%
Take things not considered alive	10%	0%
Wear old clothes	0%	8%
None (in particular)	20%	62%
<i>Prescriptions</i>		
Observe various rituals	60%	15%
Ask for forest/spirits' blessing	0%	23%
Obtain <i>fokonolona's</i> permission prior to entering the forest	20%	0% ⁸⁷
Go separately if couple	10%	0%
None	20%	69%

⁸⁷ In Mikoboka, this rule was not mentioned in the surveys, but it was brought up in the conversation on several occasions.

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