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On the Evolution of the Costa Rican Forestry Control System

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1. Introduction

Costa Rica was one of the most deforested countries in the world; nowadays it has become a leader in plantation forestry, sustainable forest management (SFM), and the design and implementation of innovative forest policies aimed at protection and utilisation of forest resources and promotion of the forest sector. Over the last three decades, the country has made significant efforts to protect its natural resources. It now has an integrated system of conservation areas (SINAC) which is responsible for the protection of pristine ecosystems of different categories, covering over 24% of the country's territory. At the same time, SINAC is also responsible for the administration and control of the use of forest and wildlife resources. Some studies (CATIE, 2001; De Camino et al, 2000), indicate that deforestation and illegal logging are still problems of considerable magnitude.

Costa Rica's forest policy and legislation, evolved over many years, are oriented to the promotion of forestry-based development. An integrated forest administration system has been established, including both central and decentralised control functions, internal and external forest monitoring, revenue systems and innovative forest financing mechanisms. The Costa Rican forest administration system is worthy of analysis for two reasons. First, because it claims credit for the recovery of important forest cover through payments for environmental services; second, because it has faced opposition both inside and outside the forest sector which has undermined some important functional components of the administration, control and revenue collection systems.

A working hypothesis is applied to analyse this case study, with the intent to learn constructive lessons from the Costa Rican experience: that effective systems of forestry verification are a product of wider pressures and developments in the host society, and do not arise endogenously in the forest sector.

The paper consists of nine sections, including this brief introduction. Section Two summarises a few central aspects of the Costa Rican forest sector. The third section reviews the historical and political origins of the forest control system, while the fourth describes its present status. Section Five discusses the multiple dimensions of its structure and functioning. Section Six analyses some key aspects of the system. Section Seven describes recent developments and future options for forest control in Costa Rica. On the basis of this analysis, Section Eight discusses the working hypothesis. Section Nine summarises the main lessons that can be drawn from Costa Rica's experience.

2. Context of the analysis

2.1 Forest resources

Costa Rica has a continental area of 5 million hectares in the Central American isthmus, extending from northwest to southeast between the Pacific and the Atlantic Ocean, and internally divided by a mountain range. These characteristics allow the existence of a variety of microclimates, and 12 different life zones (according to Holdridge system) which support high biodiversity (4% of the world's total) (Morales and Calvo, 2002).

62.8% of Costa Rica's land area is characterised as having 'forest capability', which means that most of the land should be dedicated to activities related to the management and protection of its forest, and sustainable provision of forest-related goods and services (MINAE, 2001). Nevertheless, this widespread forestry activity has not had a significant impact on the national economy; in the last decade the contribution of the forest sector to GDP decreased from 2 to 1.3 (Lebedys, 2004). However, McKenzie (2000) developed a methodology to evaluate the contribution of the forest industry to GDP through improving the way in which transformation and commercialisation were accounted, which brought the contribution to the traditional GDP from 1.5% to 5.4% for the year 1998. Moreover, MINAE (2002) suggests that if the contribution of the main environmental services (carbon fixation, biodiversity protection, scenic beauty, protection of watershed functions, etc.) to GDP were fully accounted, the contribution of the forest sector could have been at least 10%.

The latest figures, for the year 2001, report a forest cover of between 2.07 and 2.14 million hectares, which is about 40-46% of the national territory (Calvo, 2002; Rodriguez, 2005). The area covered by forest plantations at the year 2000 was 178,000 hectares, 69% of which was planted with exotics (such as Melina, Teak, Eucalyptus, Pines and other conifers), and the rest with native broadleaves (Morales and Calvo, 2002).

Between 1950 and 1990, Costa Rica implemented an aggressive agricultural development policy which promoted land titling, use of technology, construction of infrastructure to access markets, and subsidised credits for monocultures of coffee, bananas, sugarcane and beef (among others) oriented to international markets (Watson et al, 1998). As a consequence, Costa Rica's forests underwent massive deforestation. Between 1973 and 1989, deforestation reached one of the highest rates in the world, ranging between 55,000 and 32,000ha/yr (an average of 31,800ha/yr) (De Camino et al, 2000; Morales and Calvo, 2002; Watson et al, 1998; PNDF, 2002). A critical point was reached in 1985 when forest cover was reduced to just 24% of the original forest area (ONF, 2001).

By the end of the 1980s, this continuing deforestation process drove the State to implement a system of incentives to promote reforestation. The system of forestry incentives evolved with time to include SFM, and forest protection in private lands. The 1996 forest law changed the nature of forest production incentives into a payment to compensate forest owners for the conservation of forest functions which provide environmental services to society (De Camino et al, 2000). The new system has made significant achievements; for instance, official figures show that the Costa Rican forest cover has increased to 46% of the national territory, (about 1,12 million hectares) in some stage of forest regeneration. This demonstrates that forest loss has reversed in the last 20 years. Since 1986, the yearly increase in forest cover has been about 20,000ha/year (De Camino et al, 2000). The main drivers of this process are pro-active forest policies and a shift in national development policies towards marketing services and eco-tourism.

Nevertheless, MINAE recognises that the reforestation rate has decreased in recent years owing to problems with long term financing, marketing and profitability (PNDF, 2004). One of the biggest challenges in forestry is the investment necessary to industrialise cultivated wood and establish forest products in the national and international market (PNUD, 2001). Moreover, forest loss is still a concern as forests managed under sustainability standards are not profitable owing to high costs and forgone incomes resulting from excessive management and harvesting regulations, high transaction costs, and traditional intermediation. This situation, together with high demand for timber, has driven forest owners to convert their forest into pasture land in order to access other less heavily regulated forest harvesting licences.

2.2 Forest tenure

The National Conservation Area System (SINAC[1] for its acronym in Spanish) protects approximately 1.3 million hectares of natural ecosystems, most of them forest. The national park system is composed of 33 national parks, 8 biological reserves, 31 protected zones, 11 forest

[1] *Sistema Nacional de Áreas de Conservación.*

reserves, 49 wildlife refugees, 14 wet lands, 1 national monument, 2 absolute natural reserves and 9 other protected areas, which represent 25.56 % of the total country (Calvo, 2002). However, these protected areas still comprise many private properties and only 743,000 hectares of State-owned land. Table 1 shows details of land tenure in these protected areas. These private properties have limitations in the use of forest resources depending on the management category of the protected area.

In Costa Rica communal property has not developed because different governments have promoted the private property system through many different laws since 1934. These allowed any small farmer to obtain a piece of land by removing its forest cover, in order to demonstrate that the land has been worked. Only indigenous reserves have community-owned land. In these sites, communities are legally represented by the Indigenous Development Associations for each reserve. Indigenous reserves comprise an area of 323,868 hectares, located mainly in the Talamanca mountain range in the southern part of the country near Panama (Morales and Calvo, 2002).

Table 1. Classification of State land tenure.

Management Category	State Property		Private Property		Total
	Area (ha)	%	Area (ha)	%	Area (ha)
National Parks	481,190	85	86,751	15	567,941
Biological Reserves, National Monument, and National Absolute reserves	12,660	54	10,640	46	23,300
Protected Zones	37,687	24	119,410	76	157,097
Forest Reserves	73,107	26	209,553	74	282,660
National Wildlife Refugees	71,744	41	103,722	59	175,466
Wetlands	67,085	88	9,092	12	76,177
Total	743,473	56	539,168	44	1,282,641

Source: in Morales and Calvo, 2002

According to Costa Rican legislation, forest resources can only be used in privately owned property or indigenous reserves. According to the 1984 Agricultural Census (Table 2), 97% of the 96,542 of the agricultural crop producers reported are small and medium-sized farms less than 200ha, which control 53% of the total agricultural land. Small farmers (under 10ha) represent 42.2% of the holdings, but control only about 5% of the land, while large owners (over 200 ha) are only 3% of farmers and control 47% of the land (World Bank, 1993). Land holdings and land use patterns have produced a pattern of highly fragmented forest cover, with larger forest patches found on larger holdings and small forest patches scattered across small, medium and large holdings (Watson et al, 1998). This forest fragmentation brings the problem of biological degradation and makes it difficult to scale up forest management as an economic activity.

Table 2: Agricultural Land distribution in Costa Rica

Size Class Hectares	Holdings Number	Holdings percentage	Area Hectares	Area Percentage
0 to 3.9	40,745	42,2	57,138	1,9
4.9 to 9.9	17,082	17,7	108,179	3,5
10 to 49.9	26,193	27,1	584,987	19,1
50 to 199.9	9,685	10,0	875,012	28,5
200 +	2,833	2,9	1,445,024	47,0
Total	96,542	100,0	3,070,340	100,00

Source: The World Bank, 1993, citing agricultural census data from 1984.

2.3 Estimation of illegal logging in Costa Rica

'Illegal logging' is any activity that violates the current legislation (Forest Law 7575) and its regulations. Criminal sanctions can therefore be brought for use of forest resources in State lands and protected areas, ignoring declared forest bans, use of forest resources in private property without valid permits from the State Forest Administration (AFE), or land use change in forested land.

An illegal logging study for Costa Rica by CATIE (2001) shows that 31% of commercialised wood comes from illegal sources. Illegality can occur in the harvesting, transport or industrialisation of the wood because there is a lack of coordinated action from the forest administration to control the wood market chain (ECTI, 2002). CATIE (2001) suggests that 51% of the illegal wood comes from sources where a permit could have been obtained, 11% from sources where a permit could in principle have been obtained but was denied for various reasons, and 39% from sources for which it is not possible to obtain a legal permit such as protected steep slopes and riparian zones, protected areas such as national parks and biological reserves, or from protected tree species. Likewise, MINAE (2001) reported that in 1998 SINAC authorised 605,344m^3 of extraction, while the actual quantity entering industry was 814,028m^3; thus the difference, 208,684m^3 (25.6%), came from illegal logging, largely from trees outside forest where the forest administration has less control. The rest of the legally supplied wood came from natural forest (30%), agricultural land (28%), and forest plantations (16%).

In 2003, the volume of wood industrialised was 713,586m^3. The forest administration authorised the extraction of 558,839m^3 of standing timber in all harvesting permits, which suggests an illegal supply of wood to the industry of 154,729m^3 (22%). From the 78% authorised timber, 23% came from agroforestry systems, 31% from plantation forestry, 20% from trees outside forest, and only 4% from natural forests (ONF, 2004). In the period between 2000 and 2003, the authorised timber coming from natural forest decreased from 30% to 4%, and the largest supply of wood came from cultivated timber in agroforestry systems and plantations.

3. Historical, political and institutional origins of the SNCF

The institutional history of the Costa Rican forest sector is 35 years old. This brief history could be described in four distinctive periods. In this section, 27 years (1969-1996) of institutional build-up from the first to the present forest law are described in three periods: the first forest legislation from 1969 to 1985; the second forest legislation from 1986 to 1990; and the third forest enactment from 1990 to 1996. The fourth period governed by the last forest law (1996 to the present) is described in the next section.

1969-1985

After the first forest law (4465) was enacted in 1969, the State assumed a more significant role in controlling the deforestation process and tree harvesting in native forest, and established for the first time a forest incentive for promoting reforestation. Moreover, the General Forest Directorate (DGF[2]) was created as a dependency of the Ministry of Agriculture (MAG[3]) with the mandate to manage forest, national parks and wildlife. In 1973, the National Parks came under the management of the National Parks Service (SPN[4])(de Camino et al, 2000).

Ten years later, in 1979, there was a first effort to provide a comprehensive national statement of forest policy: the result was the National Forest Development Plan (PNDF[5]). This forest policy focused on three main areas: forest development in buffer zones and reforestation of forest-use areas; access to credit and technical assistance for the efficient use of forest resources; and

[2] Dirección General Forestal (DGF).
[3] Ministerio de Agricultura y Ganadería (MAG).
[4] Servicio de Parques Nacionales (SPN).
[5] Plan Nacional de Desarrollo Forestal (PNDF).

efficient and rational logging extraction. By this time, Costa Rica had also become noted for its creation of a solid system of protected areas. Forest policy in this period was also notable for introducing fiscal incentives, such as tax exemptions and subsidised credits for reforestation; however, these incentives excluded small and medium farmers with land suitable for reforestation because they were not tax payers. (MINAE/PNDF, 2002; Watson et al, 1998). In this period natural forest was not managed but harvested legally, and even forest harvesting permits authorised clear-cut silviculture allowing land use change to take place.

1986-1990

This period was marked by important institutional developments in the forest sector. Moreover, there was growing concern in society about the sustainable use of natural resources, which contributed to a political process that culminated in the National Conservation Strategy for Sustainable Development (ECODES[6]). ECODES aimed for a supportive association between production and conservation under principles of sustainability in all areas of national development. Environmental awareness grew with the proliferation of environmental NGOs that pushed for greater civil participation. Between 1989 and 1990, the Forest Action Plan for Costa Rica (PAF-CR) was developed and institutionalised. The PAF-CR developed a common view for the role of forest in the national development, outlined the obstacles to a forest based development, diagnosed the state of the forest at that time, and drew up a broad-based strategy to achieve their goals.

Even though there was an attempt to involve a wide range of sectors in the PAF-CR, it was difficult to integrate the farmer organisations into the process. However, there were advances in the participation and organisation of small farmers in reforestation and natural forest conservation and management programmes. Specifically on forest legislation, two new forest laws (7032 and 7174) were enacted to regulate the use of native forest and private plantations. A centralised DGF was organised with 10 technical departments to oversee the complex procedures of planting, managing, harvesting, transport and industrialisation of forest products, and a strong legal department to oversee all administrative procedures. In 1986, forests and the forest sector were declared in a State of Emergency due to the evident depletion through heavy timber harvesting and deforestation processes all over the country. In 1987, The Ministry of Natural Resources, Energy and Mines (MIRENEM[7]) was created and the SPN and DGF were brought into it. In addition, the Wildlife General Directorate (DGVS[8]) was created, taking over responsibility for wildlife management from the DGF (De Camino et al, 2000).

In 1987, the incentives for reforestation changed from fiscal tax exemptions to transferable cash bonds (CAF) paid during the five years after forest plantation establishment, which was a more equitable system. A system of transferable cash bonds paid in advance (CAFA) was also created in order to attract small farmers into reforestation. Moreover, DGF created the Forest Financing Department to manage subsidised forestry credits as another mechanism to promote the forest sector. These incentives strengthened both forest industry and smallholder organisations, which started a participation process that would strengthen the forest sector. In addition, the administration of the National Park system benefited from 'debt-for-nature-swaps' in which the Costa Rican government redeemed discounted debt titles bought by international organisations in order to be invested in conservation programmes (Watson et al, 1998; De Camino et al, 2000; MINAE/PNDF, 2002; Rodriguez, 2005).

Nevertheless, this period was characterised by low participation from the broad social base of the forestry sector. In 1993, MIRENEM created the CONACOVIRENA[9] as a council to support and help organise civil society into Forestry Surveillance Committees, (COVIRENAS[10]) with a mandate to provide support to DGF officials in the social control and oversight of all activities related to the use of natural forest, including wildlife, at properties and road sites. In addition, the

[6] Estrategia de conservación para el Desarrollo Sostenible (ECODES).
[7] Ministerio de Recursos Naturales, Energía y Minas (MIRENEM)
[8] Dirección General de Vida Silvestre (DGVS).
[9] Consejo Nacional de Comités de Vigilancia de los Recursos Naturales
[10] Comités de Vigilancia de los Recursos Naturales

National Forest Council (CNF[11]), created initially by the 1969 forest law, gave more representation to the private industrial forestry sector in this period. In the case of forest industries, there was a policy for their protection with a roundwood export ban, tax exemptions, and stringent new requirements for establishing new industries (De Camino et al, 2000; MINAE / PNDF, 2002).

In this period, the concept of sustainable forest management as it is known today was introduced as a set of regulations described in a forest management plan and prepared by a forest professional, with the aim of conserving and improving the existing forest ecosystem. This was the first concrete policy action for changing from exploitative extraction to forest management based on ecological and silvicultural considerations. In addition to this SFM policy, there was also the first direct ban on forest conversion to other land uses in lands of forestry aptitude. SFM became a radical change in terms of forest resource use, and it was the main strategy for conservation and protection of forest. SFM also benefited from the results of research in the fields of forest ecology, silviculture and management in academic institutions and NGOs[12] with the technical and financial help of international cooperation[13]. However, SFM was implemented with a strong administration (permits) and control by the State, characterised by excess paper work and procedures. This created uncertainty about the possibilities for forest resource use given the high transaction costs (which included the implementation of a stumpage tax and a forest resource guarantee certificate of 20% stumpage value) and a decrease in net harvesting incomes due to direct management regulations. On the other hand, such strict SFM regulation did permit discretional judgement by forest officials, which allowed for corruptive arrangements in terms of tax evasion, illegal felling and bribes for obtaining legal harvesting permits. This strong State administration also affected plantation forestry, which was heavily regulated in almost all aspects of silviculture when it was to benefit from monetary incentives.

1990-1996

This period has been considered a major milestone in the forestry history of the country, characterised by a broad debate on conservation and development, just before the United Nations Conference on Environment and Development (UNCED) in 1992. Costa Rican development began to adopt the principles of sustainable development articulated in ECODES. This attempt tried to reconcile the agricultural expansion that had produced record deforestation rates with the impressive network of protected areas that gave little regard to people's needs. In this decade, Costa Rica promoted its green image as a model of conservation and sustainable development. Ecotourism became the country's top revenue earner contributing a fourth of total national income, while cattle and wood production, as well as other economic activities traditionally associated with deforestation, decreased in importance to the overall national economy. (Watson, et al, 1998; MINAE/ PNDF, 2002).

At the international level, the Costa Rican Government ratified the main institutional treaties and agreements stemming from the UNCED such as the Framework Convention on Climate Change and the Biodiversity Convention. At the regional level, Costa Rica joined the Central American Alliance for Sustainable Development (CCAD[14]), and the Central American Council for Forest and Protected Areas (CCAB-AP). The impact of these wider political processes encouraged a series of legislative and institutional developments at the national level that changed the national vision. The Law of Environment was approved in 1995 with the aim of regulating and reducing the impact of natural resource use on the overall environment. This law established the National Environmental Technical Secretary (SETENA[15]) to approve environmental impact assessments, and the National Environmental Controller. It also created Regional Environmental Councils with responsibility for forest administration, environmental control and setting regional policy priorities. As a result, MIRENEM was transformed into the Ministry of Environment and

[11] Consejo Nacional Forestal
[12] Such Institutions were the Tropical Agricultural Research and Higher Education Centre (CATIE), The Organisation of Tropical Studies (OET), National University (UNA), Costa Rican Technological Institute (ITCR), Tropical Scientific Centre (CCT).
[13] COSEFOMA-GTZ and DIFID.
[14] Comisión Centroamericana de Ambiente y Desarrollo.
[15] Secretaría Técnica Nacional del Ambiente.

Energy (MINAE[16]) by 1996. That same year, the DGF and the SPN were reunited with the DGVS to form the National System of Conservation Areas (SINAC[17]) within MINAE. This measure established a decentralised territorial system of natural resource use areas (buffer zones) based around major national parks (core areas), each of them with a regional administrative centre. For conservation areas, the intention was that public and private activities would be interrelated, and solutions were found in collaboration with central and local governments, NGOs, donors, and the public. SINAC is responsible for the development of the forest sector, as well as for the sustainable use of forest and natural resources, and faces increasing demands for their protection.

In 1991, the first decree of forest evaluators (Decree No.20483-MIRENEM) was enacted, which required that all forest harvesting operations and reforestation projects must be supervised by a professional. This could be considered the birth of the forest regencies. At the same time, a new law of the professional College for Agricultural Engineers No. 7221 (CIA) allowed the incorporation of forest engineers and aimed for direct participation in the forest sector. The role of forest professionals evolved from the practice of elaborating harvesting and reforestation plans and unregulated supervision of forest operations into a professional practice under institutional support which gave them explicit obligations and responsibilities in their duties. By 1993, with the creation of the forest regent[18] figure (decree No.22084-MIRENEM), the forest professional also became involved in the supervision of forest management and harvesting, incentive implementation in plantation forestry, forest protection and other professional practices such as the supervision of forest nurseries. The supervision of such forestry operations by the Regent was a decentralised private service performed on behalf of the State Forest Administration (AFE[19]) to make sure activities were implemented according to the law. The AFE and the Professional College also had the responsibility to oversee the fair practice of the forest regent; they therefore appointed the Forestry Controller Office[20] and the CIA Forestry Overseer[21] as two verification bodies in the forest regency control system.

In 1994, the private sector, cooperation projects and the AFE agreed there was a need for standards for SFM and certification for natural forest. By 1995, a technical committee on SFM was established composed of the private and academic sectors, with the aim of evaluating forest management procedures and advising the AFE. The concept of SFM evolved to a major investment effort towards forest management, but still linked to timber production. Forest management standards continued to increase with strict technical and administrative procedures for the formulation and harvesting control of forest management plans, which had to be elaborated in two stages: a general forest management plan over the cutting cycle; and an operative plan for the management units to be harvested. The system of transport licences and log tags was introduced for road and industry yard control, which would make forest control easier for forest and police officials. In addition, the natural forest management transferable bond (CAFMA[22]) and natural forest protection bonds (CPB) were created in order to compensate for the strict package of SFM regulations and protect non-commercial forests from land use conversion. Nonetheless, pressures from the International Monetary Fund called for the elimination of all forestry incentives by 1996.

4. Present SNCF institutional and legal framework

The fourth and present forest law (7575) emerged in 1996 from a discussion between forest sector organisations such as universities, environmental and forestry NGOs and the forestry chamber (CCF[23]). It created a more flexible role for the government, with specialisation of

[16] Ministerio de Ambiente y Energía.
[17] Sistema Nacional de Áreas de Conservación.
[18] Regente Forestal
[19] Administración Forestal del Estado
[20] Contraloría Forestal del MIRENEM.
[21] Fiscal Forestal de la Fiscalía del Colegio de Ingenieros Agrónomos
[22] Certificado de Abono Forestal para Manejo de Bosque
[23] Cámara Costarricense Forestal

government functions and delegation of responsibilities to other entities, and set the conditions for wider civil society participation. It indicated that MINAE was to be considered the Forest State Administration through SINAC.

Among other things, Forest Law 7575 changed the concept of *production* incentives oriented to timber production in plantation forestry and natural forest management, and introduced an innovative concept of payment for environmental services, to be paid to forest owners for preserving forest functions when applying sustainability principles in the management of natural forest, forest plantation and agroforestry systems. In addition, DGF's forest financing department became the National Forestry Finance Fund (FONAFIFO), a decentralised organisation authorised to collect and administer financial resources dedicated to the development of the forest sector, including administration of the payment for environmental services system.

Moreover, this forest law removed all regulations on the establishment, management and harvesting of trees from plantation forestry and agroforestry systems, leaving only the requirement for a certificate of origin issued by a forest regent in order to transport these forest products to industry. This forest law also prohibits forest conversion to other uses, this time in all land types, and does not allow the concession of public forest lands. A management plan for harvesting natural forest is required by law, and it should evaluate all possible impacts to the ecosystem. The forest law states that forest management should be based on SFM standards, and establishes the National Commission for Forestry Certification (CNCF[24]) for setting standards and procedures for SFM and the certification of natural forests and plantations based on sustainability principles, criteria and indicators (Decree No25721-MINAE art.26). It is composed of organisations with a solid technical background such as national universities, national and international research centres, FONAFIFO, and the professional college of Agricultural Engineers, with the participation of a representative of SINAC as the commission secretary. The SFM and forest control standards are oriented to low impact management, preservation of low frequency and protected forest species, protection of areas of hydrological importance, and fragile topography. The protection of forest was promoted through the Forest Conservation Certificate (CCB) which recognises the provision of environmental services from these forests.

Another body created by the forest law 7575 was the National Forestry Office (ONF[25]), with the intention to improve the participation and role of the private sector with respect to the previous CNF, which had essentially advisory functions in regard to reforestation incentives. ONF was established as a public, non-governmental organisation composed of landowner organisations, environmental NGOs and the forest industry. ONF's mandate is to recommend forest strategies and policies, and support the state forest administration in the promotion of forest development (MINAE/ PNDF, 2002). Another type of civil society participation that was formalised under this forest legislation was the COVIRENAS, (decree No.26923-MINAE), considered an ad-honorem body under the control of MINAE to support control activities relating to the forest, wildlife and environmental legislation.

In 1998, a national forest policy forum revised and defined the forest policy of Costa Rica for 10 years. In 2001, the National Forestry Development Plan was completed through a participatory process involving all forest sector actors (See box of national policies in Rodriguez 2005).

5. Background of the Costa Rica forest control system

5.1 Organisational structure of the System

The legal framework in force mandates that the Forest State Administration (AFE) be positioned under the Ministry of Environment and Energy (MINAE) [26]. In 1998, the Biodiversity Law

[24] Comisión Nacional de Certificación Forestal
[25] Oficina Nacional Forestal
[26] Asamblea Legislativa de la República de Costa Rica, 1996. No. 7575 Ley Forestal. Reglamento a la Ley Forestal (7575), La Gazeta No. 16, 23 de enero de 1997, San José, Costa Rica.

(7788) created the National System of Conservation Areas (SINAC) within MINAE as responsible for the AFE. SINAC is a de-centralised and participatory management and coordination system organised around core protection areas. SINAC consists of 11 *conservation areas* (AC), each of them having a regional administrative centre in which operative and financial decisions are taken with a relatively high degree of autonomy. Direct contact with "*the client"* takes place at the level of the 32 *sub-regional*, local offices. These local offices manage the process of *'forestry promotion and control'*, which involves most public competences inherent in the forest administration:

- checking timber harvesting requests[27] in the office
- carrying out field inspection to verify timber harvesting requests
- granting timber harvesting permits (THP) to forest owners (or their representatives)
- verifying[28] that timber harvesting in the forest is done according to the National Standards for SFM and other relevant provisions
- issuing timber transport permits (TTP) and tags to forest owners (or their representatives)
- controlling timber transport together with the police and COVIRENAS.
- checking that primary industrialisation of forest products are carried out according to legal provisions
- enforcing the law on administrative issues and denouncing law infringement for prosecution by the judiciary

The function of overseeing timber harvesting operations in the forests was delegated to forest regents in 1991. These are independent professional foresters sworn in, accredited and supervised by the Professional College of Agricultural Engineers (CIA, for its acronym in Spanish) into which the administration of and authority over the Forest Regency was delegated by law[29]. The forest regents are authorised to carry out the following functions in support to the forest administration:

- Submit written reports to the forest administration before, during and at the end of harvesting operations; these reports are legally binding, since forest regents generate public faith in forestry issues.
- Provide technical guidance to timber harvesting personnel in the forest in order to put into practice the official criteria and indicators for SFM[30], which are mandatory
- Request the forest authority to issue official timber transport permits and tags to forest users.
- For timber harvested from forest plantations or agro-forestry systems, forest regents are empowered to themselves issue *certificates of origin (CO)* and timber transport permits.

The Forest Regency is supervised by the *Forest Executive Overseer* of the CIA, whose activities should be financed by 2% of forest tax revenues. The forest regents are paid directly by forest owners or loggers for the services they provide. Approximately 150 forest regents are in charge of 4000 forest regencies per year. Another actor in the Forest Control Scheme is the National Police, which records the timber transport permits (TTP) shown to officers by truck drivers at roadside checkpoints, in exercise books.

Finally, the Forest Law allows civil society to organise itself in *Forestry Surveillance Committees*, (COVIRENAS) with a mandate to provide social control and oversight over all activities related

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[27] The instrument for timber harvesting in natural forest the planning instrument is the "management plan". For timber harvesting outside natural forest there are several other instruments called "commercial forest inventories", "small permits" and "permits for plantation certificates of origin"

[28] The law allows the administration specifically to do this verification by own resources or by contracting out these services to external auditing firms or individuals.

[29] Colegio de Ingenieros Agrónomos de Costa Rica. Ley Orgánica del Colegio de Ingenieros Agrónomos de Costa Rica. Ley No. 7221 (1991) y su Reglamento Decreto No. 22688 – (1993) MAG-MIRENEM. Imprenta Nacional, La Uruca, San José, Costa Rica.

[30] Presidencia de la República de Costa Rica, 9 de octubre del 2002. Decreto Ejecutivo Nº 30763-MINAE. Los Principios, Criterios e Indicadores para el Manejo de Bosques Naturales y su Certificación en Costa Rica. Gaceta 194. San José, Costa Rica

to the use of natural forests and wildlife, but under the coordination and supervision of SINAC. Since the forest law gives public competence to issue small timber harvesting permits to Local Environmental Councils[31] and Municipalities, they could be considered part of the AFE; however, a lack of technical expertise and institutional capability have meant that this duty is also carried out by SINAC's local offices.

5.2 Forest administration

Several options exist for requesting permission to harvest timber in Costa Rica (Timber Harvesting Request Instruments THRI)

- **(MP) Management Plan:** THRI for natural forest which has to be prepared by a graduate in forestry, comply with legal standards for SFM, and be supervised by a forest regent.

- **(FI) Commercial Forest Inventory:** THRI for more than 20 trees per property[32] on pasture land outside natural forests, which are prepared by a forestry graduate and supervised by a forest regent.

- **(SP) Small Permit:** THRI for less than 20 trees per property designed for domestic use, which is prepared by local SINAC officials on behalf of small land owners, and does not require forest regent services.

- **(CO) Certificate of Origin:** THRI for trees in forest plantations or agro-forestry systems which can be harvested and transported without restrictions under the responsibility of a forest regent.
- MP, FI and SP have to be formally approved by the AFE, and a Timber Harvesting Permit must be issued, while CO is issued by a forest regent, and they have to be registered in SINAC to be valid. That is why the following analysis deals mainly with these three first THRI. During 2004, SINAC local offices issued 3,747 Timber Harvesting Permits (THPs): more than 50% of these were SP while only 10% were MP and IF, and the rest was harvested with CO in plantation forestry and agroforestry systems (Arias, 2005).

Administrative procedures

In order to harvest timber from natural forests or remnant trees on private land, forest owners or their delegates have to appoint a forest engineer to prepare a THRI. After legal requirements and technical criteria are deemed to have been met, a forest regent certifies either MP or FI, and SINAC's local officer starts checking the THRI documentation and conducts a field inspection. When the THRI is approved, then the forest owner (or his representative) must hire a forest regent as a responsible party for the harvesting supervision on behalf of the AFE, and both forest user and forest regents must register a contract at the CIA, where a forest regency quota has to be paid upfront. Once the forest regent contract is presented in SINAC, the AFE issues the timber harvesting permit (THP).

In the case of plantation forestry and agroforestry systems the forest regent issues a CO that has to be filed and stamped at SINAC's local office. However, CIA requires a regency contract to be submitted before issuing any CO. Moreover, regency reports must be presented not only to keep track of the harvesting activities, but also to keep control of the CO-TTP's issued in forest regency control paper.

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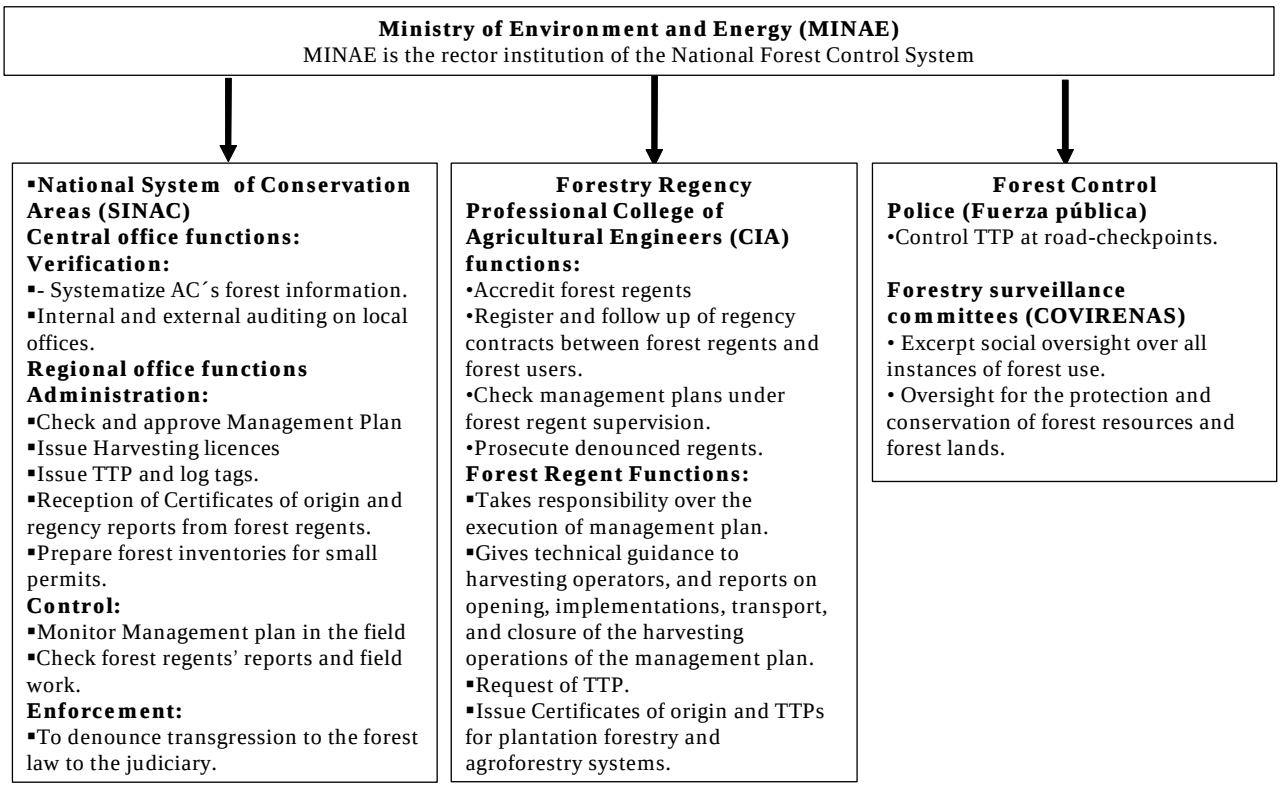
[31] Consejos Regionales Ambientales were created by Law No. 7554, October 4th 1995. These bodies are legally empowered to authorise the harvesting of 3 trees per hectare and year up to a maximum of 10 trees per property on agricultural land outside natural forests (Law No. 776; April 24th 1998 which reformed Law No. 7554.

[32] A new decree in progress establishes 10 trees per property and 3 trees per hectare as the boundary between a commercial and a small inventory permit.

To begin with harvesting operations, the forest regent gives technical guidance to harvesting personnel, marks logging trails in the forest, and renders an *initial* regency report to the AFE about the initial conditions of the forest and the forest harvesting operations. Usually, second and subsequent regency reports are produced as timber at the landing becomes ready to be transported to the industry. The forest regent has to submit such *harvesting* reports in which he/she informs about the current status of harvesting operations, reports on the balance of timber volume and species harvested in relation to the authorised volume, and certifies that all forest legislation has been respected in the harvesting operations; and finally, timber transport permits forms (TTPs) and plastic tags to mark the logs for this specific THP are requested from the AFE.

Figure 1: Basic structure of the Costa Rican Forest Control Scheme

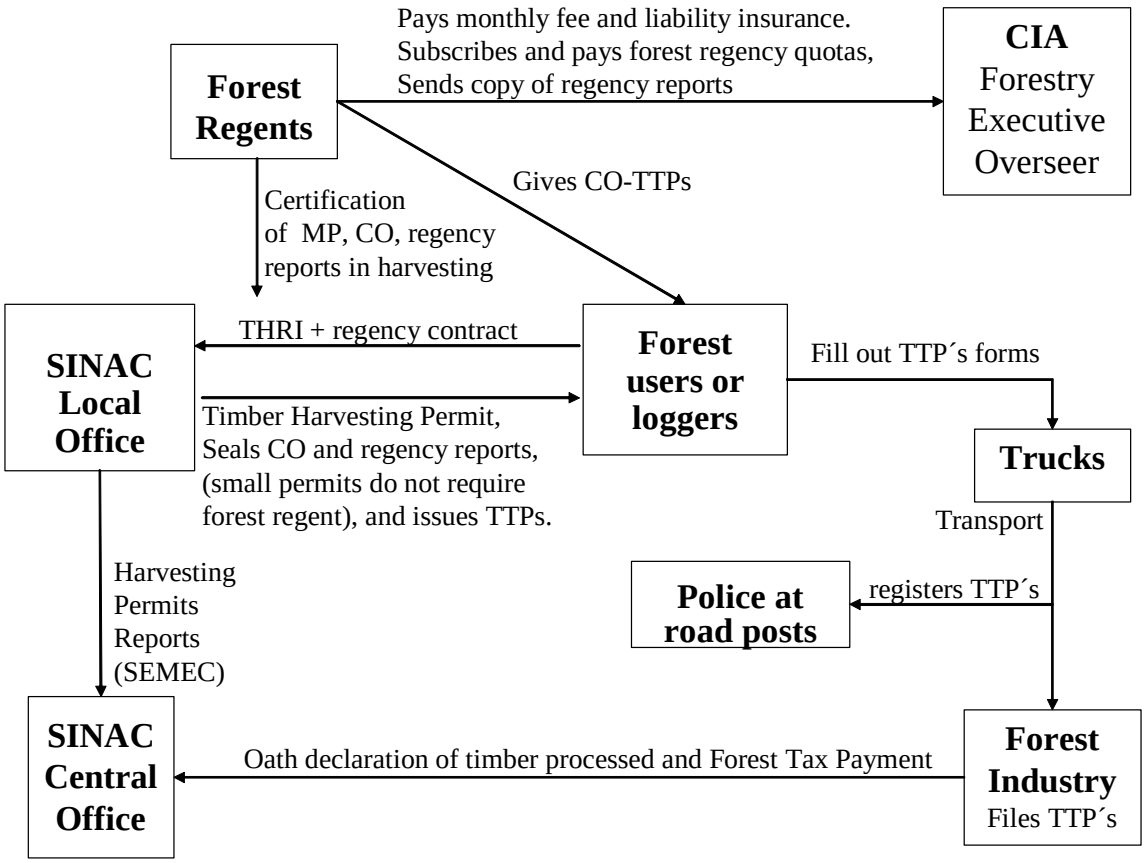


Source: Elaboration by authors.

After the AFE checks that the forest regent report meets all requirements, it issues the TTP forms to the forest user. These have to be filled out by writing up the timber species and volumes that every truck will transport to industry. During transport, truck drivers stop at police[33] road checkpoints where TTPs are registered by the policemen at duty in an exercise book, and the TTPs are stamped so they can not be re-used. Once harvesting operations have concluded, the forest regent has to send a *closing* report to the administration in which he informs them about the final condition of the forest after harvesting operations, certifies that logging machinery has been removed, logging trails have been closed, and no waste and spills have been left on the management unit, and also presents the final balance between the authorised and extracted timber volume. Unused TTPs and tags are returned with this report.

[33] Fuerza Pública

Figure 2: Flow of administrative procedures



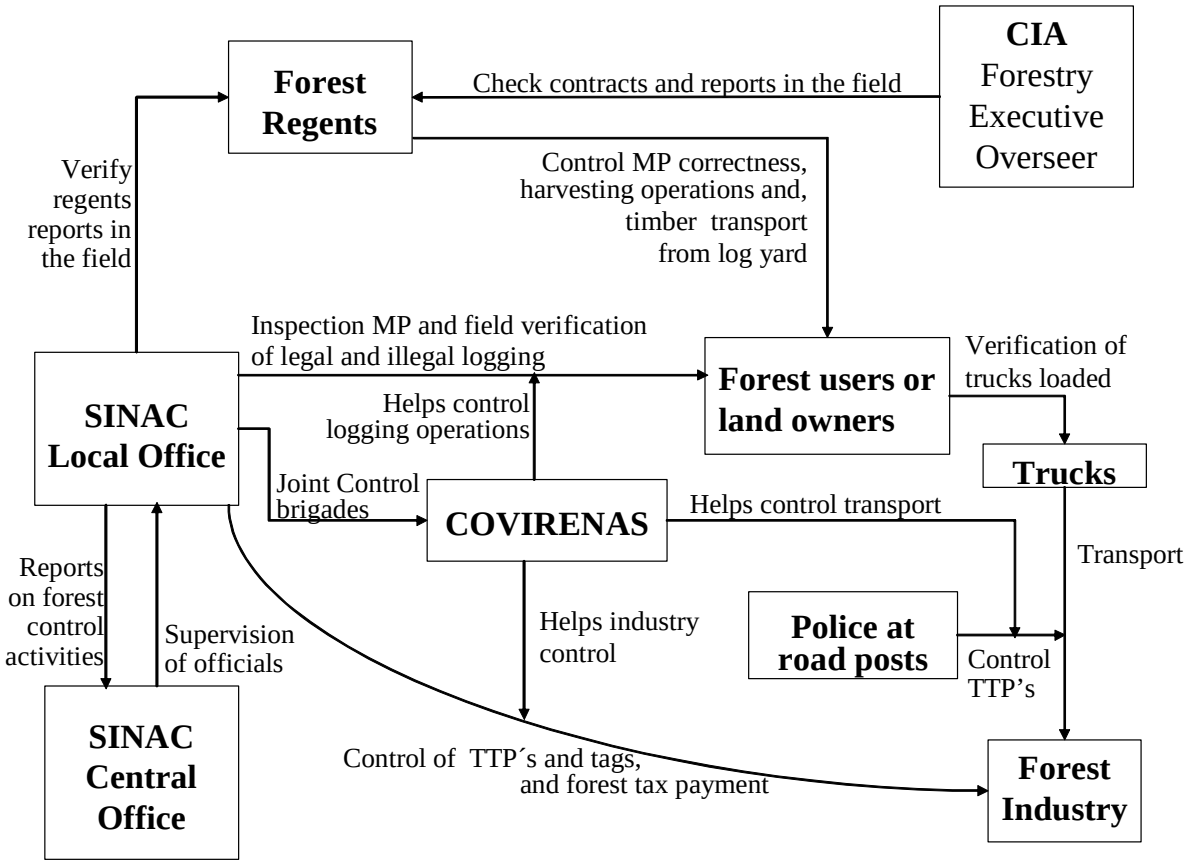
At the forest industry, logs are left in the yard ready for processing, and TTPs are filed. Moreover, all TTPs collected and processed each month have to be summarised on the oath declarations required for the payment of the forest tax in a SINAC account at the bank. At the other end, all SINAC's local offices finish their administration with the submission of a database containing all THRI processed, and all THP issued, to the central office of SINAC to be used in their statistics and control activities. Figure 2 illustrates the flow of administrative procedures described above.

5.3 Verification and control procedures

Figure 3 shows the flow of verification and control procedures to be presented here. Even before Timber Harvesting Permits (THP) are issued by the forest authority, field inspections are carried out by the AFE in order to verify that THRIs meet the provisions prescribed in Costa Rican Forest Regulations. Moreover, SINAC brigades not only verify THRIs, but can also control other clandestine activities related to illegal logging, illegal forest conversion, and other illegal procedures in the harvesting and transport of forest products.

The Forest Regency Contract ensures that a forest regent takes the responsibility for monitoring the execution of a THP which he/she acknowledges to be technically sound and feasible, and the registration of the contract at the CIA ensures that the Forest Executive Overseer is kept informed of all forest regencies. The Law allows the Forest Executive Overseer´s Office of the CIA to verify the correctness of forest regent reports.

Figure 3: Flow of verification and control procedures



Before a harvesting operation starts, the forest regent must countercheck the soundness of the MP in the field. During the timber harvest, the forest regent verifies that harvesting operations in the forest have been carried out in accordance with legal provisions, making sure especially that standards for SFM are met. On the other hand, the forest regent may also use such a regency report to inform the administration of any problem or unlawful operation, and recommend either that it be corrected before issuing TTPs or even that the THP be withdrawn. The AFE will grant TTPs only after receiving a positive forest regency report, which they may even verify in the field before granting TTPs since these are only issued on one or two fixed days of the week. Arias (2005) reports that SINAC local personnel performed 2188 field inspections of MPs, IFs and SPs during 2004.

TTPs can be used as a document for control of the chain of custody, in which the forest user and industry can verify the amount and type of products transported from the source to the end destination. Moreover, police at the road checkpoint check that the timber transported is accompanied by an original and valid TTP. The local SINAC official should inspect the industry to make sure that all stockpiled logs and timber are legally obtained, by checking the TTPs and tags. In addition, they collect all used TTPs and make sure that forest taxes have been paid for of the correct volumes and periods.

Forestry and Natural Resources Surveillance Committees, (COVIRENAS) are ad-honorem, participatory bodies which have the mandate to provide societal control and oversight over all verification and control activities related to the use of forests resources under SINAC's supervision. SINAC-COVIRENAS, and often police brigades, help to control logging activities in the farms, control timber and other natural resource traffic at the roads, and also visit log yards at the industry.

Local SINAC offices report to the central offices on forest control activities, while SINAC's central offices supervise the performance of forestry officials.

Forest control in Costa Rica shows many loopholes in the system:

- The preliminary inspection and certification of the MP by the forest regent is aimed at verifying its correctness. However, arguments against restricting the professional practice of the forester have nullified the importance of such control activities since the forest regent is evaluating their own work.
- In the same line, the forest regent goes beyond the control of harvesting of the MP, and is defined by law as the responsible actor for the harvesting operations. The lack of clarity between the roles of controller and a responsible party for the harvesting operations makes the Forest Regency either an expensive professional service or define the role of the forest regent as unrealistic due to the lack of full applicability of the defined responsibilities. In this sense, it is impossible to have a forest regent or even a forest user at the harvesting site on a permanent basis; therefore the TTPs end up being filled out by untrained forest workers or truck drivers, with no responsibility in the process, and the identification of improperly completed TTPs is no longer a useful control instrument for the chain of custody.
- Truck drivers are not obligated to stop at a Police road post, and checkpoints are not found at every important crossroads. This makes control of timber transport difficult and ineffective in many timber routes in the country, and allows for TTP re-use owing to the lack of a police stamp.
- The control of processing industries, which is considered vital in controlling illegal sources of timber, has not been designed to be systematic and remains sporadic.
- COVIRENAS has a broad mandate in forest control activities; however, they are not independent in action because they have no financial autonomy and operate under the supervision of SINAC, which limits their action and the possibilities for controlling SINAC functions.
- SINAC has limited possibilities for action to control forest conversion and clandestine illegal timber; rather it is easy for them to control those who operate legally. This generates criticism from the legal forest users, who feel that they face unfair and disloyal competition from illegal users because SINAC controls the legal rather than tackling clandestine timber use and deforestation processes.

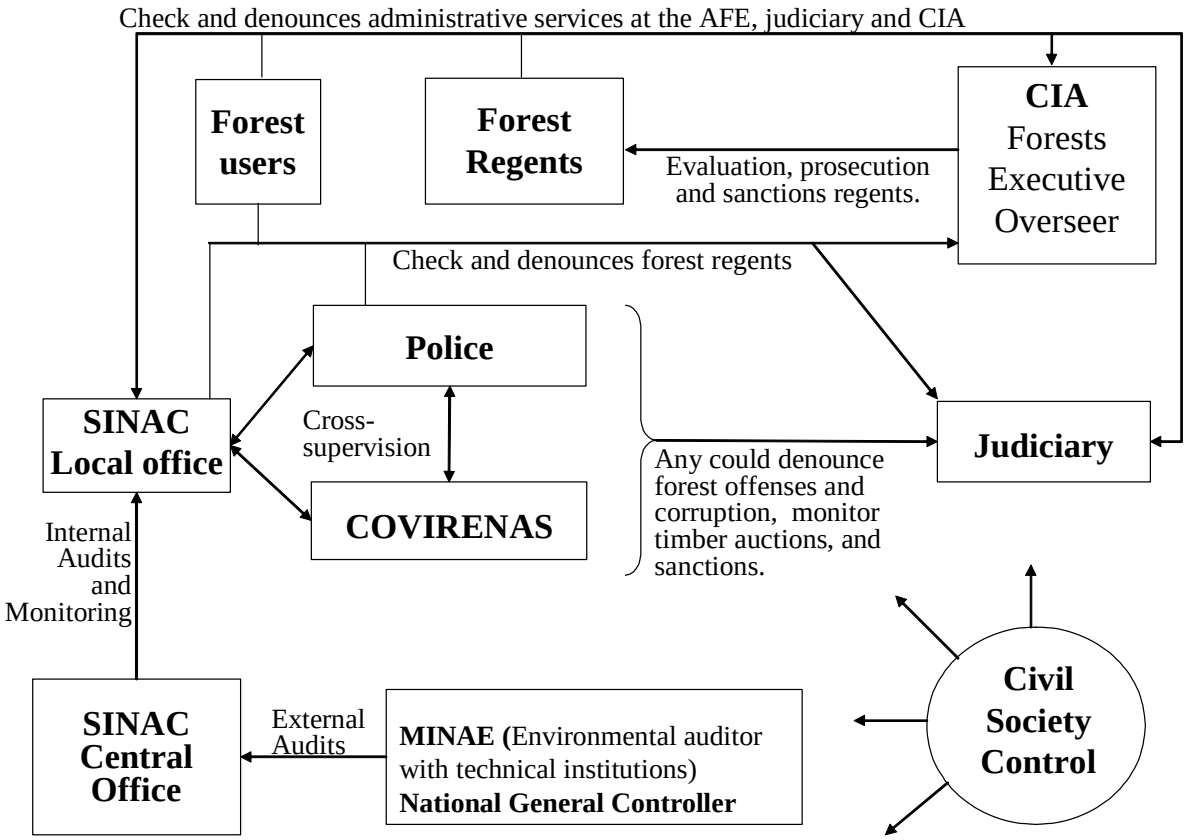
5.4. Cross-checks and enforcement approach

Apart from the verification and control procedures carried out by all actors, the system has built in cross-check and balances which allow the different actors, and others from outside the system, to verify each others' activities and report any irregularities, as seen in Figure 4. Forest users and forest regents have the chance to check on the quality of the administrative services and functions of the local SINAC and CIA officials, and also to denounce SINAC and CIA at the administrative, professional (CIA) and judiciary levels for any irregularity in administrative procedures.

SINAC officials, COVIRENAS and police cross-check each other on their control functions. If these actors, together or individually, or even any person, detect a breach of the forest law regarding timber harvesting or transport activities, they first seize the illegally transported or felled timber as a preventive measure in the face of an eventual judiciary sanction, and define an administrative trustee for the confiscated timber. If applicable, SINAC as the AFE will start administrative sanctions for the withdrawal of the Timber Harvesting Permit and TTPs. At the same time, since a forest crime is also sanctioned as a penal offence in Costa Rica, either the AFE, the police or COVIRENAS will also forward an accusation to the public prosecutor and will submit the seized products to the judiciary, so they will appoint a judicial trustee. The judiciary will auction the timber and place the money in an account, from which 50% is paid to the Municipality and 50% to the forestry fund if the accused forest user is found guilty.

The AFE, Police, COVIRENAS, the forest user or any member of civil society may also denounce a forest regent who has acted incorrectly to the CIA and the Judiciary. This should trigger CIA's internal evaluation, prosecution and sanctioning processes to try forest regents who have infringed forest regulations or the professional code of conduct. The forest regent could be suspended. The forest regent has the chance to challenge any accusation report. Any of the above could also bring the forest regent to the judiciary to respond to accusations of any penal offence. The AFE can even request the judiciary to award them the forest regent's liability insurance as a reimbursement for the costs of compensating for environmental damage caused by the regent's improper actions.

Figure 4: Cross-checks and sanctioning in administrative and verification procedures



SINAC central offices also check the local offices with internal audits and periodic monitoring. If they find evidence of irregularities, they can intervene in local offices and reallocate or suspend the officials in question until the evaluation is over. Another mechanism of checks in the system is the external forest audits, which are undertaken sporadically in order to evaluate the administrative and control procedures of forest harvesting operations. These assessments are commanded by MINAE Environmental Auditor and the National General Comptrollers office and executed by independent parties such as universities and research organisations, which have acted as independent forest monitors.

5.5 Budgetary independence

The organisations which integrate the Forest State Administration (AFE) are the National Forestry Office (ONF), the National Forestry Finance Fund (FONAFIFO), and the National System of Areas of Conservation (SINAC). The financial sustainability of these organisations is considered in forest law through different strategies, however their effectiveness is in doubt (Rojas, 2002). In order to function, many of these organisations depend on the collection of forest tax and revenues coming from the auctioning of seized timber (which are part of the forest verification system). For example, the ONF is financed by 10% of forest tax collected and 40% of the proceeds that the AFE receives from auctioning of seized timber. FONAFIFO, with its more flexible scheme for obtaining financing for the promotion of the forest sector, still receives 40% of the revenue collected as forest tax.

More specifically, the actors of the SNCF, such as SINAC, function with a budget constituted of different funds for National Parks, wildlife, forestry and even donations from international organisations. Article 35 of the biodiversity law allows SINAC to design a financing mechanism which would enable it to execute its mandate with efficiency and flexibility. This mechanism can include funds from the central government budget or any other government entity, as well as funds coming from admission fees, payment for environmental services, debt swaps, canons established by law such as the recently approved water canon, concessions of non-essential services or activities carried out in the protected areas, and donations. Article 36 gives SINAC the option to manage such funds in trusts, or through organisations at the national level or at a specific conservation area. Moreover, article 38 specifies that funds generated in National Parks and through concessions in each conservation area must be used exclusively for the protection and development of those areas.

Specifically, the forestry fund mentioned above was mandated in the forest law 7575 for use in promoting the development of the forest sector, its administration and control. The forest fund is derived from a general forest tax, auctioning of seized forest products, and other sources such as donations. The forest tax is 3% of the transferred value of the logs at the moment of primary transformation; this transferred value is established by the AFE. AFE-SINAC is meant to obtain 23% for administration, control, environmental education and promotion of the forest sector.

However, owing to the lack of clarity on the text of the law recovery of forest tax has been difficult in recent years, and the tax is no longer collected. The Costa Rican Forestry Chamber (CCF) contested the forestry tax arguing that there were inconsistencies in the determination of the base amount for the collection of the levy. Those inconsistencies could be solved legally by SINAC, however there has been a lack of clear will in SINAC to make sure that the forest tax is collected again. The lack of resources from the tax is weakening the operative functioning of important institutions which deal with forest administration and control, such as SINAC, MINAE's environmental auditor, CIA for administration and supervision of regencies, regional environmental councils, and Municipalities. The two latter organisations did not enter into the administration of small THPs due to a lack of expertise in forest administration and control.

Under these circumstances, SINAC and CIA have been able to use other sources of income to fulfil their functions. The SINAC forest control unit has been financed by funds from the National Park Fund and central government core budget. FONAFIFO has even been able to provide funds to SINAC for their core operations. CIA supervises forest regents financed by the affiliation fees of their members and forest regency quotas. SINAC and CIA have the capability to use alternative sources of income, guaranteeing a sustainable role in the verification system. However, lack of proper funding has led to a certain degree of interference; the AFE has lost some independence of action as it sometimes has to accept the provision of transport and food by forest users when carrying out field inspections.

The fact that the forest regents are paid for their services directly by the loggers or the forest owners constitutes an external interference which makes them susceptible to the economic interests of their clients, and reduces their performance and independence in the verification system. It has been reported that most THPs are not followed up with a *closing* report by the forest regent, mainly because once the timber has been removed the forest owner loses interest and is not willing to pay the regent for the last inspection visit, even though it is mandatory.

Other bodies such as the police have a budget outside the forest sector, which allows them to operate with independence. However, the police role in the forest verification system depends on political will, and their control does not cover all possible important timber routes, limiting the effectiveness of their actions. Likewise, civil society inspectors organised into COVIRENAS work on an ad-honorem basis with no financial support, and under the supervision of SINAC, which makes them dependent and ineffective.

5.6 Legality standard

According to the Costa Rican forest law (No.7575), the legality standard for forest resource use is defined in two conditions: observance of harvesting prohibitions and compliance with procedures required in the allowable forest harvest. Otherwise, there are sanctions from three months up to three years imprisonment, together with the confiscation of machinery and equipment involved in acts considered illegal logging. This refers to the following activities:

- Use of forest resources in lands under the Natural Patrimony of the State or protected areas, or invasion of these lands to convert them for uses other than those established by law.
- Failure to respect declared forest prohibitions.
- Use of various forest products in private property without a permit from the AFE, or failure to comply with permit conditions for harvesting operations (excluding plantation forestry and agroforestry systems).
- Transport of timber and sawn wood without the required transport documentation (article 56).
- Development of activities in a forest that imply a change of land use (total removal of the forest and its functions).
- Creation of paths in forested areas without authorisation, or the use of machinery in forest against the recommendations of a management plan.

A problem with the legality standard is that forest legislation is not fully compliant with the principle of *typicity*, according to which all legislation must include a specified sanction for each of the prohibitions described in the law. This makes the prosecution function of the AFE and judiciary very complex, leading to the suspension of criminal proceedings in many cases. This situation in practice allows the offenders to act with impunity.

In addition, the forest legislation created the National Commission for Forestry Certification (CNCF[34]), which has the responsibility to recommend standards for SFM to SINAC to be enacted as a part of the mandatory legality standard in Costa Rica. After a national consultation process in 1998, later updated in 2002, the official standards for SFM were finally enacted, consisting of 8 principles, 25 criteria and 103 indicators.

Criteria and indicators derived from principles 1 to 5 require forest owners to observe national laws and international treaties, to hold tenure rights which are recognised by the State, to respect the rights of workers and indigenous people, and to make efficient use of goods and services from the forest. Principles 6 to 9 draw up criteria and indicators for forest management, harvesting, planning, monitoring, and evaluation of SFM and impacts, as well as the maintenance of the natural forest over time. Finally, principle 10 is voluntary and applies to the planning and management of forest plantations.

[34] Comisión Nacional de Certificación Forestal created by article 26 of the Ruling to the Forest Law 7575 (Decree No25721-MINAE)

6. Case Study Analysis

6.1. Functional conflicts

6.1.1 Concentration of functions in SINAC with limited means of response

There is a policy and legal provision in place to empower Regional Environmental Councils and Municipalities to administer small forest permits. However, in practice these are being administered by SINAC local offices, for a number of reasons. Firstly, regional environmental councils were never implemented. Secondly, the authority of Municipalities to issue small permits has been suspended by MINAE, because of their low technical expertise and capacity to handle permit administration and abuses detected in some Municipalities where foresters outside the Municipality were allowed to participate in permit administration, opening up an illegal source of permits. Moreover, at a national level the central government has decided to disband both the National Institute for Municipal Advice and Promotion (IFAM) and the National Directorate for Community Development (DINADECO), which were the institutions charged with providing such capacity building to local governments. The absence of a proper programme for the construction of implementing regional environmental bodies, and capacity-building at the municipal level has impeded the ability of local governments to administer and control forest resources at domestic scales. Costa Rica's experience suggests that a progressive, effectively levied, and well managed land tax by Municipalities could provide a linkage to locally-controlled use of forest resources (Watson et al, 1998) and a motivation for local government to assume the forest competences already granted them.

On the other hand, the legal mandate for the AFE to undertake preliminary field inspections before approving a THP only if there was a reasonable motivation to do so has been replaced by an administrative order[35] that obliges the administration to conduct field inspections before approving every single THP. Arias (2005) reports that more than 50% of all THP are for 'Small Permits', resulting in a huge administrative burden for SINAC's local staff, which has caused waiting times between one and three months for this type of permit.

6.1.2. SINAC´s loss of forest control competences over the CIA

Since the administration and oversight of the Forest Regency was delegated by law to the CIA, the AFE lost its competence to properly control the work of forest regents. There is little coordination between SINAC and the CIA´s forest executive overseer office, which also lacks capacity to oversee most regent contracts in the field. Since regents are poorly controlled, they generally do not complete their duty of supervising a harvesting operation from start to finish, and end up delaying or failing to submit regency reports.

Results from sporadic external audits on THP administration and transport provided encouraging results:

- In 2001, during an isolated control action undertaken by the CIA, 59 forest regents were sanctioned with temporary suspension.
- In 2004, more than 60 incriminatory denounces against forest regents had neither response nor field visit by the CIA.
- In 2005, three forest regents were temporarily suspended by the CIA.
-

To this date, not a single forest regent has lost his accreditation since the forest regency was established 10 years ago (Esquivel E. 2005, personal communication).

At the level of the CIA, it seems unreasonable to expect that an association of professionals would be the only verification, evaluating, and sanctioning authority of its own constituency. The rather poor performance of CIA in prosecuting and sanctioning forest regents is not subject to any external oversight. Moreover, the forest regency seems to be considered marginal to the activities of CIA, which is much more concerned about agricultural issues.

[35] MINAE Directriz DM-173-2001. 30 January 2001

6.1.3. Police lost on the roads

Police control units are isolated in the forest control chain, and are not well placed to tackle the majority of timber traffic in the country. They just register information contained in the TTP in exercise books, with very little knowledge which would enable them to verify timber species, calculate volumes or cross-check TTPs with the origin of the timber loaded on the truck. In addition, there is no further reporting or link to any other structure of the verification and control system. There is no system for exchange of information between the police and AFE and police do not have access to data help by the AFE about the activities they are supposed to control on the road. The exercise books in which they register the information about timber transport permits, once full, are simply filed at the checkpoints with no further use. The police only check trucks that stop voluntarily at the checkpoints to show TTPs; this implies that clandestine timber transports in closed trucks or vehicles which simply do not stop, will never be detected unless further (non-systematic) road checks are carried out with AFE and COVIRENAS.

6.1.4. An unfinanced verification system

The fact that the industry has refused to pay forest tax imposes a significant financial stress on the different elements of the forest verification system, limiting its operational efficiency severely:

- The Environmental Auditor, who works in the Ministry of Environment, has very limited resources to carry out his duties since his budget is supposed to be supplied partly from the forest tax which was never paid by the loggers. According to Arias (2005) this instance has stayed isolated from SINAC's forest control process, being perceived to be weak and ineffective.
- The Forest Executive overseer office of the CIA has inadequate capacity and resources to oversee and systematically control Forest Regencies(only 2 executive forestry overseers for 6 – 8 thousand regent reports yearly), and acts only when a regent is denounced by a third party. The CIA limits itself to registering forest regency contracts with the main objective of collecting regency quotas in order to finance its limited operations.
- Very few, and sporadic, external and internal audits have been contracted by SINAC to evaluate administrative and control activities at central and local offices of SINAC, police, forest regents, and CIA.
- There are very few COVIRENAS that still survive in the conservation areas, and most of them are related to wildlife and national parks issues, not so much with illegal timber harvesting or transport. The lack of financial provision for COVIRENAS has kept them weak and ineffective actors in the forest control system.

6.1.5. Political economy: who loses, who gains?

The present situation is that a general forest policy process has been carried out through increasing international pressure and demands from conservation and social organisations. The role of these groups has been definitive in the definition of the national forest policies. They include: small landowner's organisations; academic and research institutes; conservation groups; international donors; individual opinion leaders; forest industry associations; community organisations; and others.

- **Environmentalist and Forestry NGOs and academic institutions:** Collectively, these currently have considerable political influence. Generally such groups have an advocacy orientation, promoting environmental awareness and training, sometimes linked to their own research. The environmentalist groups also act as 'watchdogs', reporting activities that damage the environment to the authorities or to the public (Watson et al, 1998). However, this group is divided between technical forestry and forest owners NGOs which are in favour of SFM (FUNDECOR, CODEFORSA, etc); and environmental NGOs which are against it (APREFLOFAS, FECON, etc).
- **International donors**: Donors and international environmental NGOs are very influential in shaping forest policy in Costa Rica. They provide funds and, in collaboration with senior academics and the larger national environmental and forestry

NGOs, provide a strong coalition for an agenda which prioritises biodiversity conservation and improved SFM of natural forest (Watson et al, 1998).

- **Forest industry associations:** These undertake a wide range of national and regional activities, ranging from joint management and execution of production and processing projects, to national lobbying for development policies that benefit the forest sector (Watson et al, 1998). The influence of some of these organisations over forest policy development, and forest policy in practice, has been very strong over the last few years (CCF, ONF).
- **Smallholder organisations:** Although at the beginning it was difficult to integrate the peasant's organisations into the reform process in the forest sector, in 1990 Community Development Associations arose which enabled the incorporation of small and medium owners into programmes of reforestation and handling of forest (ASIREA, JUNAFORCA, ACICAFOC, etc.) (TNC *et al*, 2005).
- **Community organisations:** Committees of Surveillance of the Natural Resources (COVIRENAS) have the function of supporting conservation, in coordination with the SINAC officials inside each conservation area. They carry out control and surveillance activities of forestry and other natural resource use, and also work in reforestation, environmental restoration and environmental education. SINAC has two perspectives on the role of COVIRENAS: first, that the work of the COVIRENAS complements the efforts of the national park guards in and outside of the protected areas; second that COVIRENAS tend to operate confrontationally rather than work jointly with the national park guards.

Hidden and overloaded actors of the SNCF

The SNCF fails to identify and define the roles of many stakeholders who play an important role in timber harvesting, such as the logger, trucker and intermediary, which means that they remain informal actors in the system with very little accountability. At the same time, the role of the forest engineer has been reduced to only the preparation of forest management plans and timber harvesting inventories. Most of their other responsibilities have been given over to the forest regent. The forest regent has thus been overloaded with responsibilities related to timber harvesting such as verification of the management plan and forest inventories, responsibility for the execution of harvesting activities, administration aspects of transport permit requests, and forest harvesting control. The initial concept was that the forest regent would help AFE with forest control activities, however the forest regent has ended up with a series of administrative and management responsibilities, which reduces or excludes the role of other actors in the SNCF.

Two main problems arise from this. First, the execution of harvesting operations has been condemned to inefficiency because the party responsible for the harvesting operation is an external actor, not one of those involved in the process, which represents a high cost because the forest regent must be engaged for administrative procedures involving the request of transport permits and log tags. The second issue is a conflict: can the forest regent control and evaluate his own expertise in forest management? It would seem more logical to allow the forest professional, other responsible actors such as loggers, or even the forest owner, to assume responsibility for the harvesting operation for small THPs, and allow forest regents to control operations in a more flexible and independent way from forest users, including responding to requests of the AFE. This would also make the execution of the harvesting operation more cost-efficient, and it would be an opportunity give forest users accountability for their activities.

6.2 Economics of the system

Forestry is subject to three basic problems which condition its competitivity as a land use: (i) direct regulation on resource management already discussed earlier; (ii) high transaction costs of legal use; and (iii) the fact that it usually requires intermediaries to access markets. These factors determine direct costs (out-payments to different technical and legal actors and contractors within the forest sector plus other services, taxes and fees) and indirect costs (time invested in formalisation of permits and follow-up procedures, plus the use of other capital owned by the forest user).Table 4 shows the cost of obtaining legal permits for harvesting timber from natural forest (NF), three types of forest inventories (FI), plantation forestry (PF), and the cost of

'legalisation' of illegal logging though the purchase of legal transport permits on the black market from SINAC officials, forest regents, or industry members.

In the case of forest inventories for harvesting remnant trees from pasture land, there are two kinds of commercial forest inventories (CFI) for more than 10 trees per farm: one is the actual procedure, and the other accounts for the costs of applying the GPS location of the inventory to the forest cover map for the year 2000 in order to rule out any possibility of historical land-use change. The third type of forest inventory is the small forest permit (SFP) for a 'domestic' harvesting request of less than 10 trees per farm, in this case carried out with the technical assistance of SINAC forest officials (see also section 5.2 where these different THRI are described).

Table 4: Costs of accessing legal permits under SNCF for natural forest (NF), trees outside forest (TOF) and plantation forestry (PF), in comparison with the costs of 'legalised' illegal logging

Activities	Cost of activity		Cost per cubic meter roundwood	Natural forest	Trees outside natural forest				"Legalized" Ilegal logging
				Management and Harvesting Plan	Forest Inventories with "Bosque 2000" and GPS verification	Forest Inventories without GPS verification	Small permits	Plantation Forestry and Agroforestry	
Harvesting permit preparation									
Natural forest Management plan	$2.9	/m^3stpg	$3.4	$3.4					
Forest Inventory	$1.4	/m^3stpg	$1.6		$1.6	$1.0			
Regency contract firm	$15.0	/unit	$0.2	$0.2	$0.2	$0.2			
Certificate of ownership	$10.0	/unit	$0.1	$0.1	$0.1	$0.1	$0.3		
Intermediary empowerment	$10.0	/unit	$0.1	$0.1	$0.1	$0.1			
Formalization of Harvesting Permit									
Certificate of origin	$2.6	/m^3stpg	$2.6					$2.6	
Transaction cost/day (M/D, expenses and travel)	$43.0	/unit	$0.6	$2.9	$2.9	$2.9	$1.2	$0.2	
Bureucracy opportunity cost (50% anually)	$119.0	/month	$1.6	$6.1	$3.0	$3.5	$2.6	$0.4	
Bribing fees for purchasing trasnport permits (with reusage effect)	$159.8	/unit	$6.5						$6.5
Timber Harvesting									
Forest Regency services	$1.0	/m^3rw	$1.0	$1.0	$1.0	$1.0			
Total				$13.9	$9.0	$8.8	$4.1	$3.3	$6.5

Source: Navarro et al. (2006)

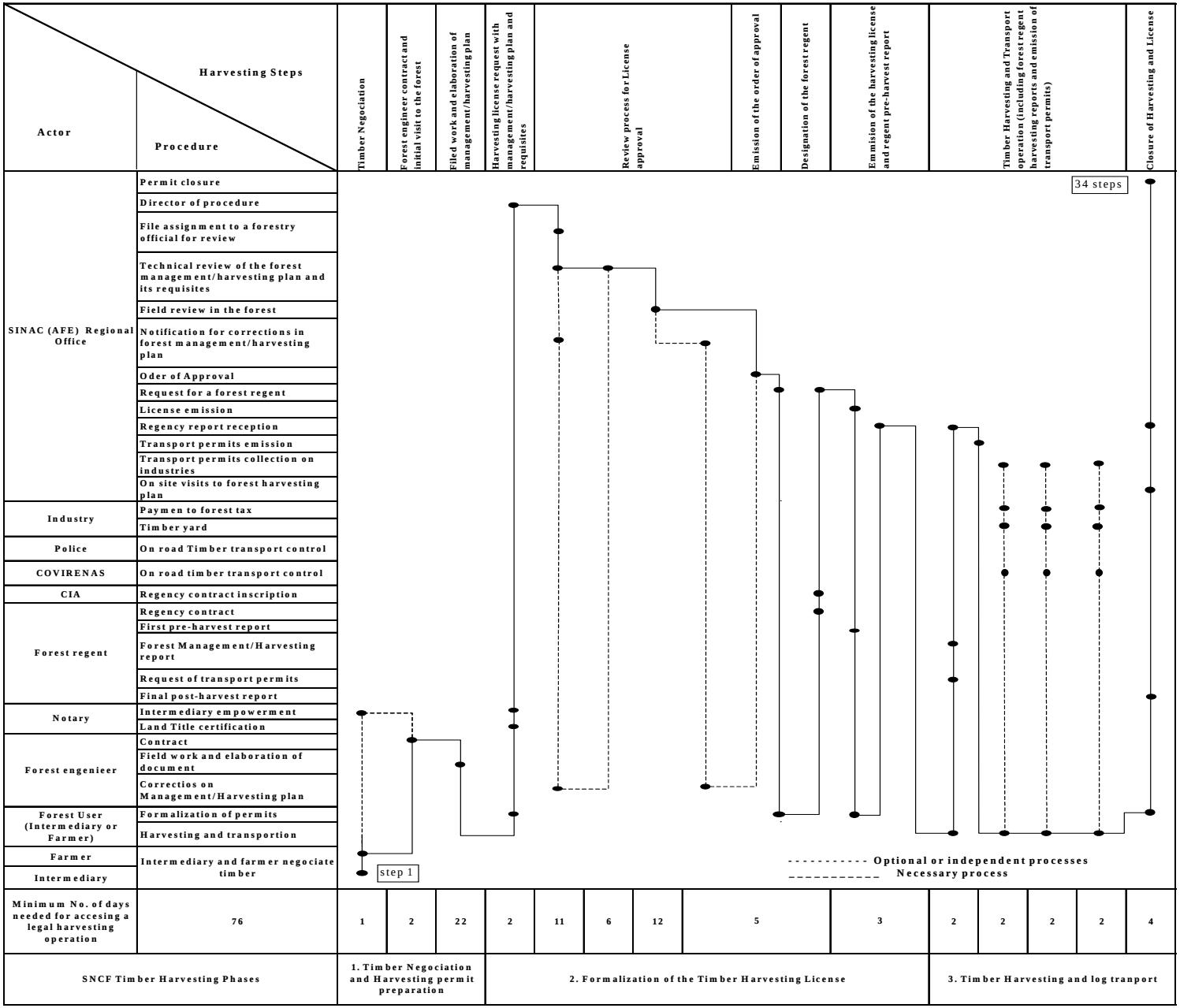
Calculations for NF and CFI in Table 4 are based on a harvesting permit in the Atlantic zone of Costa Rica consisting of 20 trees, with an average of 87m^3 of stumpage volume (4.3m^3/tree) and producing 73.6m^3 of roundwood, which is an 85% yield. In the case of small forest permits (SFP) they are based on 10 trees yielding 36.8m^3 (50% of the previous example). Figures for PF assume a final harvest of 191.3m^3 roundwood. The NF and FI require 3 transport permits for each licence, and the plantation forestry permit requires 11 transport permits. (Navarro et al, 2006).

The cost of obtaining a legal harvesting permit are: in NF, USD13.9/m^3; in CFI with land use change corroboration, USD9.0/m^3, and without it, USD8.8/m^3; and in SFP, USD4.1/m^3. In the case of plantation forestry, the costs for accessing legality are USD3.3/m^3, slightly less than for SFP. Still, it is possible to 'legalise' an illegal harvest in NF and forest inventories through the purchase of a transport permit at a cost of USD 6.5/m^3, because this system lacks effective cross-checks of transport permits in a central information system. SINAC officials, forest regents or industry members, with responsibility for the custody of TTPs, can provide such illegal 'services' at low risk of being detected.

In terms of the distribution of these costs as income for other actors: for the natural forest permit, 32% of the costs incurred by the forest user were collected by the forester for preparation of the management plan and regency services, 2% by the notary for property certification and intermediary legal empowerment, and 1.5% by the professional college (CIA) for inscription of the regency contract. The remaining 65% are permit follow up costs and the opportunity costs of delayed net incomes that the forest user assumes inside the household. In the case of commercial

forest inventories with (and without) land use change corroboration, the forester keeps 29% (21%) of the expenditure in the preparation of the study and regency services for the permit respectively. The notary and professional college get 3.0% (2.3%) each; however, with these types of permit the forest user has a higher percentage of follow up costs and opportunity costs from delayed incomes than with the NF permit: 66% (73%). In the case of SFP, out of the \$4/ m^3, the CIA and private forester do not collect the costs. The notary retains 6.7% and the remaining 93% represents follow up costs and opportunity costs of delayed net incomes that the forest owner assumes inside the household. The costs for accessing legality are 35% higher for NF compared with CFI; however the forest inventory is 50% higher than the cost of accessing a legal harvest of an SFT. The Costa Rican SNCF does not charge a stumpage tax, instead it uses an aggregated value tax that is paid only from the industry onwards and should not considered part of the cost of accessing legal use of the forest resource.

Figure 5: Barriers to legality represented by actors involved, number of procedures, steps and minimum number of days required for accessing legal harvest operation in Costa Rica.



Source: elaboration by the authors

In the case of PF, out of the USD3.3/m^3 costs, the forest regent retains almost 80% of the costs as revenue, and the forest user bears 20% of the cost. Even though the cost of accessing legality for a PF is lower than for other forest permit types, it is high compared with other competing land uses which do not carry such transaction costs for accessing markets legally.

Table 5: Effect on the forest value coming from endogenous factors associated with the management and harvesting of natural forest, starting from a SFM unregulated condition. 2006

Description	**Conditions**	**Forest Value (USD/ha)**	**Difference Value (USD/ha)**
Scenario No1: Unregulated SFM of natural forest, without transaction costs to operate legally and no intermediation (S1)	S1: No Intermediation costs (IC), No transaction costs (TC), No direct SFM criteria in respect to endangered species (ES), cutting cycle length (10yr) (CC), initial harvest intensity (75% of commercial trees) (HI_{75}), and protection areas are 10% of management area (PA_{10})	1,566.0	
	S2 = S1 – IC (USD 13.0 /m^3)		473.0 (27%)
Scenario No2: S1 – Intermediary costs (IC)		1,093.0	
	S3 = S2 – TC (USD 13.9/m^3)		375.5 (21%)
Scenario No3: S2 - Transaction costs (TC)		717.5	
	S4 = S3 – ES		323.8 (18%)
Scenario No4: S3 - endangered forest species (ES)		393.7	
	S5 = S4 – CC_{15}		187.2 (11%)
Scenario No5: S4 – Cutting cycle restrictions (CC_{15})		206.5	
	S6 = S4 – $HI_{60\%}$		145.7 (8%)
Scenario No6: S5 - Diminishing harvesting intensity to 60% of commercial trees ($HI_{60\%}$)		60.8	
	S7 = S4 – $PA_{40\%}$		262.0 (15%)
Scenario No7:S6 + increase of protection areas to 40% of the area ($PA_{40\%}$)		-201.0	
Total			1,767.4

Source: Navarro and Bermúdez (2006).

Figure 5 is a De Soto Graph showing other types of barrier to legality in terms of the number of actors, procedures, and steps required to obtain a 20-tree legal harvesting permit for a commercial forest inventory. The number of actors involved in the process is 11, with 31 procedures and 34 steps. The number of days required for a complete harvesting process, from negotiations of the timber between the forest owner and the logger to the closure of the harvesting licence, are on average 76 days. However, Arias and Zamora (2005) report that

obtaining legal harvesting permits could take up to 3 months for CFI, and more than 6 months for natural forest.

CNCF developed SFM standards, based on the FSC, and are perceived as being biased towards ecological, technocratic, and legalistic approaches, without regard for the social and economic concerns of forest owners. The SFM standards resulted in a complex set of principles and hundreds of indicators, which are felt to be too many and much too restrictive to allow SFM in private forest land. Table 5 is adapted from Navarro and Bermudez's (2006) calculation of the negative economic effect which several factors have on SFM as a private investment. The factors, evaluated in terms of the effect they would have on the forest land value (FLV), were: the loggers' intermediation costs for accessing timber markets; the cost of legal use of the resource; and four SFM regulations which have an effect on the harvesting intensity. The calculation of the FLV starts with an unregulated scenario of SFM (S1), with no intermediation, no cost for accessing legality, and no regulation. The initial conditions are: no tree species ban; cutting cycle length optimised according to the forest owners unique characteristics (10years); an allowable cut of 75% of the trees above 60cm dbh; and protection areas covering only 10% of the total area.

The results showed that this unregulated scenario will produce a FLV of USD1,566/ha[36]. However, after including the intermediation and access to legality costs and also the mandatory SFM regulations such as a tree species ban, cutting cycles of 15 years, reduction of the allowable cut to 60% trees above 60cm dbh, and protection areas covering 40% of the land, the FLV decreases to USD-210/ha. The total FLV loss is USD 1,767.4/ha. Table 5 shows that the high cost of legality and intermediation decrease the value of the investment by USD848.5/ha (48% of the decrease), and the four SFM regulations account for 52% of value loss. Other competing land uses such as cattle raising, banana and pineapple ranges offer land values between USD1,340/ha, USD10,307/ha and USD19,288/ha respectively, and land prices for forest land oscillate between USD1200/ha and USD3000/ha. Thus, only non regulated SFM could be a competitive land use against cattle raising, banana, pineapple, or any other agricultural system with a land value higher than the forest value. Natural forest could also be a viable investment in places where the forest land price is lower than or equal to the forest land value, which are usually remote areas. The mandatory SFM standards have their origin in standards set for voluntary forest certification. This has led to relatively high legality standards for timber harvesting even for very small forest areas. The consequence is that most people try to avoid this instrument, and harvest timber using another type of permit. In extreme cases forest owners try to get rid of the forest by converting it clandestinely into pasture land.

6.3 Pro-poor dimensions

During the last thirty five years the different stakeholders in the forest sector have been gradually brought into the political reform process, which is currently aiming for sustainable development of this economic sector but with high costs for some actors and the State. For example, the remarkable success of the National Protected Area System in terms of biodiversity and ecosystem conservation has been achieved at the expense of the livelihoods and cultures of a number of local groups, who have lost access to forest goods and services. However, a number of projects and initiatives in these protected areas are beginning to restore that balance, by trying to ensure that these groups benefit more from conservation related activities.
Similarly, throughout the evolution of this political reform and learning process, pro-poor policies have been adopted. For example:

- Tree harvest licensing costs for small owners have been reduced to between USD4.7 and 4.9/m^3 for roundwood up to 10 trees per year in non-forest areas).

[36] *The real minimum acceptable rate of return on the investment was calculated at 3.28% considering FONAFIFO credit line on forestry.*

- Regarding land tenure, forest users have several ways to prove legal ownership or possession rights[37] of the property to grant legal access to the forest resource.
- Forest tax has to be paid by the forest industries, not by the owner of the resource, facilitating forest harvesting by forest users (including small land owners).
- The financial resources available to FONAFIFO are used to pay land owners for the environmental services which their natural forest, forest plantations and agroforestry systems provide to society. Those funds are assigned for 1ha (minimum) up to 300ha (maximum) per owner per year. The system recognises several types of land tenure, and prioritises to small owner organisations, and in regions where communities have low development indexes.

6.4 Impacts

The Costa Rican Forest Control Scheme relies heavily on the public forest administration at the local level, which lacks the resources and capacity to carry out forest administration and control efficiently. Therefore the transaction costs together with the direct costs for harvesting timber legally from natural forests are extremely high (see section 6.2), which forces many actors to search for other ways and strategies. Sustainable forest management is no more attractive, since the payment for environmental services for SFM has been eliminated, and forest owners prefer to transform forests to 'silvo-pastoral' systems and pasture land by eliminating the forest cover surreptitiously. This is done by first clearing the understory of the forest, establishing grasses and then asking the administration for a harvesting permit to clear all the commercial trees on this 'pasture' land at once. This kind of harvesting permit is less costly to obtain, and offers higher potential revenues per hectare as the whole inventory can be extracted at once. According to FUNDECOR (2003), 30% of the trees that were covered by harvesting permits granted for trees in pasture lands between 1999 and 2001 in the Region of Sarapiquí were actually part of a natural forest that had been degraded intentionally since forest clearing was prohibited in Costa Rica in 1996.

6.5 Forest Control System dead locks

Costa Rica's forestry sector is at a crossroads. In order for a successful sustainable forest control system to be achieved in Costa Rica, some key constraints must be overcome:

- *Weaknesses in local government*
  Whilst the involvement of municipalities in the forest policy process is a positive recent development, they and other local government institutions lack the experience or capacity to adequately implement an administration and control system for the use of forest resources at the local level.
- *Lack of incentives to compensate for the costs of accessing legal use of natural forest.*
  Natural forest can be eligible for payments for environmental services after a harvesting phase. However, other incentives need to be implemented to compensate the high costs of accessing legality and direct management regulation, which decrease the net revenue to the forest owner. Moreover, the long waiting time for THPs to be approved for harvesting natural forest has been interpreted by forest users as an administrative ban on forest management, given that since 1998 there has been a sharp decline in THPs granted in natural forest. In 1988, 250,000m^3 of wood came from natural forest (50% of national production), while in 2004 this dropped to 50,000m^3 (6% of the national total). However natural forest area continues to decline and the number of THPs issued for trees on pasture land is increasing.
- *Failure to collect the forest tax.*
  The failure to charge the 3% forest tax from the industry puts the whole verification system under severe financial stress. The Costa Rican Forestry Chamber contested the charge of the forestry tax citing inconsistencies in the determination of the base amount

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[37] *A land possession can be prove by certification from the judiciary that the titling process in underway and the process has no conflicts or challenges, and also this implies that the property must have a plan of the property inscribed in the cadastral register.*

for the collection of the levy. Those inconsistencies could be legally solved by SINAC, however, there has been a lack of clear will in SINAC to make sure that the forest tax is collected again. On the other hand, the new fiscal code seeks to eliminate other taxes, and the forest tax will probably be eliminated (Morlio, 2005). New sources of revenue will therefore need to be prospected if the forest verification system is to function sustainably.

7. Recent developments

7.1. SINAC´s Strategy for Controlling Illegal Logging (ECTI) and the FAO project for strengthening ECTI implementation

MINAE has decided to develop and implement a Strategy for Control of Illegal Logging (ECTI) with the objective of integrating, strengthening and consolidating the administration, control, and protection of the use of forest resources at the National level. It aims to diminish illegal logging and related activities, and their negative environmental and social consequences, and promote wide participation of all sectors of civil society in all these processes. SINAC has a group of academic, environmental and forestry NGOs and professional organisations acting as an advisory group, to evaluate and design policies to improve the administration and control of forest resource use in the country.

In order to implement ECTI, SINAC needed deep and integral changes at different levels (policies, laws, financial instruments, information systems, civil society participation, and training for improving control and prevention activities. The proposed actions are also beyond the available financial resources of the State. SINAC has therefore established an alliance with FAO through a technical assistance programme that will allow technical and institutional constraints within the institution to be overcome.

7.2 Future options foreseen in Costa Rica

SINAC, with the aid of FUNDECOR, is in the process of creating a central unit that will integrates databases of Conservation Areas in a geographical information system. It will allow them to view changes in the forest cover, THP data (tree species and volumes), and areas of high logging occurrence. The information system can periodically update data to maintain a record of forest cover and different forest resource uses, and will also be able to measure different impacts at the ecosystem and landscape level. The scales of the information system will have to allow evaluations at the farm level in order to avoid giving harvesting licences in forests that have not completed their cutting cycle and verify whether there has been any type of land use change.

SINAC will use this system in controlling harvesting of forest on pasture land. Geo-referenced forest inventory data will be cross-checked against a geographical database of forest cover for the year 2000, to corroborate that there has not been a land use change and that the trees are within the forest user's property. Specifically, the forester will have to inventory all possible commercial trees. These will be geo-referenced using GPS (Global Positioning System) and incorporated into a GIS for corroboration of legal compliance, before they can be certified as coming from legal activities. Forest regents and SINAC officials will also have to use GPS during inspections, to corroborate the information on the inventory with the property map and the forest cover from 2000.

Finally, there are still conflicting initiatives to improve SFM in Costa Rica, coming from environmental and forestry perspectives. Environmental actors are trying to increase the cost of accessing legal use of the forest by advocating obligatory monitoring by the forest regent to certify the integrity of the forest. Other proposals would give the forest regents more obligations, such as the duty to denounce irregularities not only in the regency report but also to the judiciary. In addition, they are proposing criminal prosecution for forest regents, which would result in a more expensive regency fee. In terms of direct regulations for SFM in the field, there are still pressures to improve the list of endangered species that will be subject to a harvesting ban in management plans. Forestry NGOs and other pro-SFM stakeholders are proposing a

simplification of permit administration and new SFM standards that would recognise their economic impact on natural forest as a competitive land use.

8. Analysis and hypothesis

The analysis of the Costa Rican's SNCF suggests various conclusions with respect to the primary hypothesis: that effective systems of forest verification are a product of wider pressures and developments in the host society, and do not arise endogenously in the forest sector.

The main conclusion is that the hypothesis is not proven. The SNCF has always been a product of endogenous processes within the forest sector. This has made the control system more vulnerable to the attacks of strong stakeholders within the forest sector.

The SNCF's main weakness is its vulnerability to political undermining by intermediaries and industrial stakeholders who would like to avoid forest controls. These actors are a strong driving force in the development of policy and law. The lack of broad support from other sectors of society weakens the forest control and administration system. However, other strong actors, such as academic institutions and environmental and technical NGOs, have counter-balanced pressures from the loggers and industry, allowing the system to function with some effectiveness. The forest tax established 10 years ago has not been levied yet, however, other financial instruments of the AFE, FONAFIFO and the NPS, have been able to support the functioning of the system. The dynamic interaction between the two intra-sectoral groups has allowed the SNCF to evolve over the last 35 years to find a balanced position with respect to policy and law.

The Costa Rican SNCF is evolving into an integrated forest control and verification system, but still lacks adequate definitions of the roles and responsibilities of some actors. This is holding up improvement in the administration and control systems, and the set-up of cross-checks and balances systems. The SNCF is an endogenously driven process, which has proven to be very costly and ineffective in relation to the functions of some of its components such as the police, forest regent and COVIRENA. However there are some effective instruments, such as the forest incentive system, which help to compensate for these inefficiencies.

9. Conclusions

1. The National Forest Policy Process and the SNCF represent a 35 year process of evolution, which has been endogenous to the forest sector. It has had limited success, but a good level of stability thanks to the dynamics of its opponents and supporters. Generally, the SNCF has the support of environmental groups, a broad base of society, forest professionals and AFE officials, in dynamic balance with active opposition from the subjects of the control system: loggers, intermediaries and industrial actors.

2. Adequate financing of any verification instrument or body is crucial if it is to perform well. The forest tax has not been effective; however the SNCF has been able to survive with other sources of funding. Since conventional fiscal financing systems have failed to succeed, alternative ways to fund the forest control scheme need to be found.

3. Independence of financing of the different components of the system is crucial. Economic dependence of the forest regent on the logger threatens independence of action. In addition, the oversight and verification bodies such as CIA, the forestry controller, auditors and COVIRENAS lack the financial resources to operate efficiently.

4. When public forest administrations of the central government, including de-centralised ones, retain competences and activities with a high administrative and verification burden which they lack the capacity or resources to handle, delays occur for legal operators which increase their transaction costs and disincentivise legality.

5. The cost of managing natural forest turned out to be too restrictive, because of onerous direct management regulations for attaining legality and the need for heavy intermediation, decreasing the forest land value in comparison with other competitive land uses.

6. When the legal framework imposes restrictions on timber harvesting in natural forests which are to heavy to cope with, forest dwellers tend to bypass the forest administration and find other strategies to access the timber they want to harvest. These are often detrimental to the sustainable use and conservation of the forest.

7. Public competences can only be delegated to private or societal bodies if a government body retains oversight and control over the activities which are handed over. When administration and oversight of the forest regency was delegated to the CIA, functions started to be added to the forest regents' role such that they became overloaded with responsibilities other than forest control. Forest control became ineffective and was difficult for the AFE to coordinate.

8. The police, COVIRENAS, forest regents and the AFE do not have an information system for cross-checking the information they gather against THPs, making effective forest control difficult. A verification system ought to be based on an information system to which all actors in the system have access, in order to verify their information. Otherwise each verification or control effort impinges only on a very short segment in the production chain.

9. Administration-verification systems should contain systematic built-in cross checks and balances in which different actors are involved consecutively. Relying on individual actors and institutions, and sporadic action, makes the scheme vulnerable and inefficient.

10. The investiture of a police authority gives the forest authority much more power to enforce the law. Nevertheless the direct support and commitment of the police to the SNCF is still needed.

11. Costa Rica's strengths with regard to national and forest policies lie in its level of education, its history of social organisation and its relatively democratic governance systems.

12. Local governments and environmental regional committees are not playing an active role in the administration of forest harvesting permits and control of their forest resources. Nonetheless, national policies and forest laws are oriented to decentralisation and deconcentration of the administration of forest resources. This shift of responsibilities brings a cost that is rarely considered, as funds are required to create the capacity in these local and regional bodies to effectively own their forest resource administration and control.

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