



## **Rethinking Forest Regulations**

From simple rules to systems to promote best practices and compliance

Hans Gregersen and Arnoldo Contreras

## ABOUT THE AUTHORS

Hans Gregersen is Professor Emeritus, University of Minnesota, Departments of Forest Resources and Applied Economics. He consults widely with the major international organizations dealing with forest policy and development and served for a number of years as the chair of the CGIAR's Impact Assessment Group, housed in FAO, Rome.

Arnoldo Contreras-Hermosilla is a former Natural Resources Economist of the World Bank and served as the Principal Economist of the World Commission on Forests and Sustainable Development. He presently is a Forest Policy Consultant based in Italy.

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The mission of the Rights and Resources Initiative is to promote greater global action on pro-poor forest policy and market reforms to increase household and community ownership, control, and benefits from forests and trees. RRI is coordinated by the Rights and Resources Group, a non-profit organization based in Washington D.C. For more information, visit [www.rightsandresources.org](http://www.rightsandresources.org).

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HANS GREGERSEN AND ARNOLDO CONTRERAS

Rights and Resources Initiative

*Washington DC*

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# 1

## INTRODUCTION

In all countries with forests, governments establish regulations to control the use, management and harvesting of forest products, timber and non-timber alike – often very rigorously, rigidly, and in painstaking detail. The regulations typically are of the command-and-control kind, with the government dictating, for example, how forest products can be harvested and how land must be treated after harvest. Governments then try to enforce compliance by local community users, loggers, and private forest owners by threatening them with legal measures (e.g., fines, arrest).

There is growing recognition that this approach has, by and large, not worked – not in promoting sustainable forest management, not in halting illegal forest activity, and not in respecting local people's rights and forest livelihoods. For instance, the global deforestation rate is about 13 million hectares per year, mostly in tropical countries, and there are few signs that this trend is changing. In practically all forest-rich developing countries, wood, other forest products and wildlife are harvested, transported, industrially processed, and marketed in an illegal manner. Sometimes the illegal wood output exceeds the legal production. Timber-producing countries that are members of the International Timber Trade Organization committed to achieving sustainable management of their forests by the year 2000. However, only 5 percent of this natural forest was being managed in this way in 2005. In many countries local people who live in and around forests are often treated as criminals in using the forests they have tradition-

ally “owned” and managed, many for thousands of years.

The problem of illegal logging, in particular, has gained substantial attention over the last decade and resulted in a growing number of national and international efforts to combat it. Discussions and analyses originally focused on the need to enforce laws – and included for example efforts to strengthen government ability to identify and punish lawbreakers. Further analysis and experience led to the realization that many legal and regulatory frameworks were inappropriate in the first place – and that in many countries regulatory reform, along with broader governance reforms, rather than enforcement was the recommended option. The illegal logging dialogues have subsequently broadened to take on the governance issues of transparency, representation, accountability, property rights, institutional capacity, and the roles of the state and private actors in making and enforcing rules.

This paper returns to the particular issue of regulatory frameworks: the rules and systems put in place to encourage best practice and compliance with the official rules. It argues that in many countries the regulatory framework needs to be rethought, and rethought on the basis of today's political, social and market contexts; recognizing that today's world is much different than when the forest regulations were designed decades, or in some cases, centuries before. Fortunately, there are examples of redesigned, and successful regulatory approaches that are combined with incentives



and partnering approaches to create coherent systems for guiding and controlling forest activity. We can learn a lot from looking at the experiences gained with these systems.

The issues of property rights, regulatory frameworks and governance have more recently become much more urgent with the growing prospect of major resources being made available through different REDD (Reduced Emissions from Deforestation and forest Degradation) mechanisms, and the great expectations that developing country forests will be a major source of offsets for the developed world in the context of ongoing climate change debates. For these mechanisms to be successful in reducing emissions, as well as simultaneously protecting the rights, interests and livelihoods of forest owners and users, it is critical to understand the different sets of property rights held by the different groups of citizens who own and/or use the forest. These include groups as diverse as large scale forest industries and the forest dwellers and small farmers who depend mainly on public forest for their livelihoods and survival. It is also critical that any proposed REDD financial mechanism be thought through in the broader context of public goals of advancing human rights, poverty alleviation and development. It also will be important to assess how existing regulatory frameworks relate to REDD, and what reforms are needed from a climate mitigation and adaptation perspective. Successful REDD programs must consider all of these elements. This point is discussed further in the context of the examples used in this paper.

Our analysis starts by recognizing that there are different types of forest tenure in the world, and that the authorities of governments and the rights of forest users and owners differ according to each tenure type. The majority of forest lands today – about 73%, remain claimed by the state – and in this situation, what the state does not allocate to protected areas is either allocated to large-scale forest industry in the form of concessions, or to indigenous peoples or local communities. Or, in many cases governments allocate use rights to

both industry and local people – their rights to different uses overlapping in the same space. The second type of forest ownership is private – land that is owned either by communities, households or commercial ventures, such as forest industries, land holding companies, etc..

The issue of forest regulations pertains to all types of tenure, public, private and communal. Governments have regulations to control community, household and industrial use on lands that it claims as public, and governments also have regulations to control use and management on private and communal lands. The subcategory of industrial concessions on public lands is a separate case since they are long-term contractual arrangements – and not usually covered by the same regulations that address community or household use of public or private forest lands. This paper focuses on the regulatory frameworks that guide community, household or private industrial use of public or private forest lands.

Meticulous government regulation of public and private forests is typically justified by the desire to protect public interests – such as maintained forest cover, biodiversity, soil and water protection and increasingly, carbon storage. These “public goods” might be of little interest to private operators on public lands, or private forest owners because their production does not result in financial rewards or recognition. There are not yet regular, widespread markets to provide incentives for private forest owners to produce these publicly valuable services. Also, forests are of great importance to the poor, forming an integral part of their livelihood systems in many countries. However, forest products and cultural values of importance to the well-being of the poor also often fail to have a market expression and therefore are of little interest to private forest owners and would be under-produced or not produced at all by private companies that are motivated by the desire to profit from the production of marketable goods and services. Hence, there is a rationale for government intervention, not only in ensuring good management of the



lands it claims, but also of the private forest estate as well.

While government goals to ensure the provision of “non-market” goods and services from public and private forests are no doubt commendable, too frequently government rules have either failed or made matters worse. At times, regulations have been unrealistic, overly complex, inconsistent with other regulations, not enforceable, unfair, and sometimes responsible for a host of indirect effects that defeat their original purpose. They also often overlook the fact that many community and private owners share the same goals of sustained conservation and use, and have established histories of protecting their forest. Furthermore, their enforcement often severely taxes government institutions well beyond their capacity. Paradoxically, the most stringent forest regulations are normally found in countries that have the least capacity to enforce them.<sup>1</sup> Thus, the failures of the market often have been compounded by “policy and regulatory failures”. This has led to environmental degradation and has often hurt the poor and other vulnerable groups, such as those with insecure land tenure rights or those who find it difficult to understand and follow complex regulations.

The mounting social, political and environmental costs of illegal forest operations, continuing deforestation and forest degradation, entrenched rural poverty, social and political exclusion of forest dwellers, and the apparent ineffectiveness of government interventions to deal with these ills are matters of increasing frustration and concern. The lack of success leads many policy makers to think of innovative new ways to guide forest management and the harvest of forest products. Why are government policies not working? What are the key reforms that should be promoted? What do they look like?

This paper addresses policy designs that are alternatives to a strict command-and-control-dominated regulatory environment for forest management and harvesting. The suggestions for improvement offered here are based on a review of

the experiences of countries that are already moving down the path towards establishing innovative and more participatory policy approaches to reducing or eliminating the shortcomings of traditional regulatory frameworks.

The suggestions provided are based on four fundamental premises:

- Given the diversity of contexts between different countries and even within countries, there is no simple answer to the question of what features constitute a better regulatory environment.
- For forest regulations to be effective they must respect and reflect the great variety of property and use rights that exist, and if these rights are not clearly defined, or widely accepted, then sorting these issues out must precede the design or reform of regulatory systems.
- Self-interest dominates the behavior of private individuals, and, thus, incentives that channel self-interest in socially desirable directions can be an effective part of the mechanisms that guide and regulate private forest activity.
- Cooperative, rather than adversarial relationships between government, the private sector, and civil society can produce more effective and efficient systems of guidance and control for private logging and forest use.

While we now understand that it is the combination of policies and regulations that shape a good regulatory environment, we know much less about what specific combination of regulations will lead to desirable outcomes and how these regulatory packages can be put into practice in particular environments. However, general principles can be derived.

This paper is organized as follows: In the following section, we describe how the regulatory context has changed in the forest sector of forest-rich countries over the past couple of decades. Section 3 reviews specific experiences in some countries that have developed transitions from strict command-and-control approaches to more cooperative ones. Section 4 focuses on the elements of a strategic framework of interlinked elements that need to be considered in establishing

effective policies and a friendly, but bounded regulatory environment for encouraging best practices for private forest harvesting and management, and

for monitoring compliance in different contexts. Section 5 sums up the discussion and draws some conclusions.

# 2

## THE EVOLVING FOREST POLICY CONTEXT FOR GUIDING FOREST MANAGEMENT

Various shifts in the world and in national economies, the institutional frameworks of countries, and governance-thinking are shaping a forest

policy environment that is significantly different from that of the recent past.

### 2.1

#### DECENTRALIZATION AND THE RELATIVE DECLINE OF CENTRAL GOVERNMENT'S POWERS

The general drive for greater government efficiency and effectiveness has led almost everywhere to the implementation of decentralization initiatives. In many countries, the relative power and influence of central governments is decreasing in favor of sub-national, e.g., provincial, state, and local governments. More than three fourths of developing countries and many others in the industrialized world are undertaking decentralization processes with greater responsibilities and authority for forest regulation and forest management being passed on to decentralized institutions of government rather than the central ministry.<sup>3</sup> Further, urbanization trends and the rise of mega

cities, most of which will be in developing countries, are contributing to the general reduction of the relative importance of central governments and to the dispersion of national government authority and responsibility.<sup>3</sup>

As a result of these decentralization processes, the role of central government actions tends to become focused on a limited number of activities that no other entity can undertake, such as designing the overall policy framework, ensuring policy coherence across lower levels of government, inter-sector and cross-sector coordination, international representation, tax collection, and guidance for other players.<sup>4</sup>

### 2.2

#### THE RISE OF NON-STATE GOVERNANCE

There is a growing acceptance of the fact that public administration of resources is often inefficient. In parallel, the influence of independent

civil society and monitoring institutions in shaping decisions related to the management of forest resources is increasing. Particularly where environ-

mental and advocacy groups have good access to information, to the media, to political processes, and to the courts, forest regulatory design has tended to be more realistic and enforcement more strict.

Market-inspired schemes, such as certification, and other institutions and mechanisms that

closely scrutinize actions of government institutions and the quality of governance all contribute to reducing the discretionary power of government, the dispersal of central government authority, and the capacity of—and in certain cases, the need for—governments to regulate the forest sector.

### 2.3 FOREST LAND TENURE AND OWNERSHIP TRANSITIONS

In many countries, transitions in land tenure and ownership are notable for their magnitude, with governments recognizing the rights of formerly discriminated traditional communities to have control over their land and forest resources. These developments are already leading to major changes in forest-ownership patterns and access rights in many countries such as Bolivia, Brazil, Colombia, the Philippines, Tanzania, Mexico, and Mozambique. In developing countries, community reserves and community ownership of forestlands

now total at least 27 percent of all forests, which is equivalent to three times the area owned by private individuals and firms. This proportion has doubled in the last decade and a half, a trend that is expected to continue in the future and poses daunting policy and regulatory challenges to the governments of countries where these major transitions are taking place. It also creates major challenges in terms of legally securing the various rights associated with community management and ownership of forests.

### 2.4 THE SURGE OF ACCESS TO INFORMATION AND DEMANDS FOR GREATER TRANSPARENCY

In the recent past, there has been an explosive growth of information dissemination and facility of communication. It is estimated that currently more than 80 percent of people live near a major global network and that more than 25 percent own a mobile phone.<sup>5</sup> The growth in wireless telecommunications has spared no area of the world—not even regions that previously were affected by a lack of a terrestrial communication infrastructure. Access to information, including information about how forest resources are being utilized in different parts of the world, is now almost instantaneously available on the web at negligible cost. This, in

turn, has made the pressure for opening up access to government records a great deal more intense. It is no coincidence that more than 70 countries have implemented freedom of information legislation since 2006.<sup>6</sup> Some governments are also using public disclosure as a way to force producers to improve their practices.

Greater access to information has, especially in advanced economies with an active civil society, empowered environmental advocacy groups to have better linkages to the media, political processes, the public and the courts; it has also enabled them to increase the visibility of enforce-

ment and sue government agencies for non-compliance with regulations.<sup>7</sup> But even in other parts of the world, communication and information technology is expanding at an explosive pace. It is reported that, for example, in Africa, 10 percent of the population had mobile phone coverage in 1999, whereas today that proportion is 60 percent, and it is expected to reach 85 percent in 2010.<sup>8</sup>

In many cases, better information and public disclosure is resulting in a light-handed approach to governance, enriching the public discourse and empowering citizens. Increasingly, this is leading to greater government accountability and regu-

latory reform through greater transparency in government. Also, expanded access to information and facility of communication are giving power to marginalized groups that are now better able to face entrenched powerful interest groups.<sup>9</sup> A striking example of the potential of easily accessible information technology and its capacity to empower groups is the recent provision of GPS units as well as access to computers and Google Earth by Amazon Conservation Team to 26 indigenous tribes in the Amazon; it enabled these groups to assert their rights against invasions of their territories by loggers and miners.<sup>10</sup>

## 2.5 GROWING COMPLEXITY OF REGULATIONS

The policy environment is also being influenced by the realization that the improved management of forest resources depends on the appropriate management of the increasingly complex web of interactions associated with demands on forests. One example is the increasing pressure that results from the competing functions of forests, i.e., environmental, commercial, and poverty-alleviating functions. Another example is the increasing demand on forests from diverse developments in loosely

related areas of economic activity such as road building, soybean production, and cattle ranching. These competing demands often impose barriers to the adequate management of forests. Adequate regulation, therefore, is a much more complex undertaking than in the past and requires a deep understanding of the nature of individual and group rights to the forests and the associated institutional and governance challenges that need to be met in order to secure lasting positive impacts.

# 3

## PROMISING APPROACHES TO ENCOURAGING IMPROVED, SUSTAINABLE FOREST MANAGEMENT: SOME EXAMPLES

This section describes some of the specific regulatory changes related to forest management and harvesting that have taken place or are still evolving in various countries. Most of the approaches have proven successful in the circumstances in which they have been used. Their wide adoption depends on whether they can be adjusted to the specific contexts in which they are introduced. Most of the approaches are used in multifaceted, coordinated sets of regulatory and incentive mechanisms and involve active participation of and collaboration between government, the private sector, and civil society. The first requirement in nearly all cases is clear definition, clarification, and acceptance of the various rights of the involved actors.

We look at:

1. Using voluntary and mandatory certification programs, and monitoring and verification of forest activity by non-governmental or quasi-governmental entities;
2. Applying market-based mechanisms, including payments for environmental services;
3. Improving stakeholder communication and interactions through conferences, committees, boards, and other ways to improve mutual understanding and reach consensus;
4. Applying “best management practices” (BMPs) guidelines for timber harvesting and management;
5. Developing and adopting corporate codes of conduct, and purchasing and managing forest production lands by NGOs that already have a socially focused code of conduct.

### 3.1

#### INDEPENDENT CERTIFICATION PROGRAMS AND INDEPENDENT MONITORING AND VERIFICATION BY NON-GOVERNMENTAL “WATCHDOG” GROUPS

*“In recent years, transnational and domestic nongovernmental organizations have created non-state market-driven (NSMD) governance systems whose purpose is to develop and implement environmentally and socially responsible management practices. Eschewing traditional state authority, these systems and their supporters have turned to the market’s supply*

*chain to increase incentives and force companies to comply”.*<sup>11</sup>

#### FOREST CERTIFICATION

Forest products certification is a “soft” process by which an acknowledged, respected, and independent non-government third party inspects a product and provides written assurance that it

originates in a forest that is managed in compliance with predefined social and environmental standards or that uses best management practices (BMPs). Consumers can therefore exert an influence on demand by choosing wood that is certified. By favoring certified products, they limit the market for those products that cannot be proven to have been harvested in sustainable manner, or that have come from illegal sources. There are many certification schemes and today over 350 million ha of forest are certified throughout the world.<sup>32</sup> But despite the widespread uptake in some countries, in most forest-rich developing countries, the use of certification is not widespread.<sup>33</sup>

Although governments have no direct role in certification processes, they can encourage their adoption by loggers. Some governments have created incentives for the use of BMPs and wood certification by limiting their own purchases to certified products. The government of the United Kingdom, for example, is favoring procurement of imported wood that complies with laws and regulations of the country of origin. The Japanese Government, through its Green Purchasing Law, has put a similar strategy in place.<sup>34</sup> The government of Bolivia has introduced inducements by accepting third-party certification as equivalent to compliance with the government's Sustainable Forest Management regulations. Since most entrepreneurs find it easier and less cumbersome to deal with independent certifiers rather than with government officers and since they also have the prospect of better market access, they naturally have opted for certification, making the country one of the forest certification leaders in the tropical world.

For certification to be effective there must be a market demand for certified products; in addition, there must be accepted standards as well as criteria and indicators for certification and also a transparent enforcement mechanism to ensure that those standards are met. Compliance with certifying standards is generally harder for small landowners and loggers (because the front-end fixed costs are fairly significant and must be spread over fewer hectares or a lower volume of wood). Therefore, certification

schemes must be set up in a way that enables these groups to participate while also having access to the benefits of certification such as market access.

It has been suggested<sup>35</sup> that some form of performance bond approach might be workable along with certification, where the “good” operators would share in an incentive—for example, a favorable interest on the bonds that they deposit—and “bad” operators would pay penalties in the form of loss of interest and possibly part or all of their bond, in extreme cases.

### **NON-GOVERNMENTAL MONITORING AND VERIFICATION OF FOREST-HARVESTING PRACTICES**

Both nationally and internationally, independent NGOs monitor forest activity, particularly logging and commercial forestry activities. The knowledge generated by these groups can be very valuable for governments and can influence regulation in various ways. First, loggers' awareness that their operations are being monitored can impact their behavior and actions in a way that may make regulations unnecessary. Second, the increased knowledge about what is happening with forest resources helps to alert the public and the government. If undesirable practices are being used, political pressure to encourage corrective actions may ensue. Adequate, publicized independent monitoring can be an effective deterrent to evading the law. Some examples help to explain further the potential value of such monitoring efforts.

**Global Forest Watch (GFW).** Global Forest Watch is an international partnership of government institutions, non-governmental organizations, private sector companies, and research institutions that aims at developing and applying remote sensing technologies to track the evolution of priority forest resources in various countries. Comprehensive mapping of forests of high ecological value and monitoring changes makes available important information to identify threats and to plan regulations to improve the management of key forest



## BOX 1: MONITORING LAW COMPLIANCE LOGGING IN CAMEROON

In 1999 Global Forest Watch assessed law compliance in Cameroon. Results showed significant and widespread irregularities:

- 56 percent of logging licenses were operating irregularly during 1997-1998 when their logging rights had expired.
- Only one-fourth of the Forest Management Unit timber concessions allocations appeared to comply fully with the legal guidelines.
- At least 21 of 31 Forest Management Unit allocations had not been awarded to the highest bidder.
- By not allocating 14 concessions to the highest bidder, the government had foregone US\$2.5 million in revenues.
- Three companies held more than 200,000 ha of concessions in violation of the law.
- Local communities were not receiving the financial compensations that logging companies owed them.
- The log export ban was not being respected.

*Source: WRI 2000.*

resources. The information provided also increases public awareness (see Box 1 for an example in Cameroon).

Such a mechanism to improve logging practices and compliance with regulations will work better where the government collaborates with the independent monitoring institution, where the monitor has an effective capacity for examining the operations of private entrepreneurs, and where knowledge can lead to greater government awareness and public pressure for improving governance. However, there are only a few capable monitoring agencies and therefore this is probably not a mechanism that can be used extensively in a large number of countries. However, as capacity increases and interest in monitoring becomes broader, it is a potentially excellent low-cost tool.

**Surveillance of Illegal Logging by Independent Monitors.** The growing realization of the extent and negative effects of illegal logging operations prevalent in many forest-rich countries and the fact that government institutions barely control this problem has led some governments to establish

agreements with independent monitors for the surveillance of harvesting operations and for the verification that logging regulations are in fact followed by entrepreneurs.

Some institutions, such as the Overseas Development Institute's VERIFOR Project, are helping governments to put in place nationally and internationally credible, legal forest harvest verification mechanisms. Some NGOs, such as Global Witness and SGS, set up systems and operate independent forest harvest-monitoring systems in partnerships with central and local government institutions, and other partners of the civil society and the private sector.

**British Columbia (Canada) Forest Practices Board: An Independent "Watchdog."**<sup>36</sup> The Forest Practices Code (FPC) was introduced in British Columbia in 1995 and provided a process to make land-use plans legally binding, set out rules for planning prior to logging, set standards for how approved logging operations were to proceed, and also established a new monitoring and enforcement regime. Alongside the Code, the government introduced the For-

est Practices Board (FPB) to provide an independent third-party view of the compliance of licensees with the Code, the efficacy of the Code, and its administration by government.

The FPB carries out audits of companies, of the government agency responsible for developing and auctioning timber sales licenses, and of the government's compliance and enforcement branch. In addition, the FPB carries out thematic audits and special investigations of issues of general concern and investigates complaints. The independence of the FPB is assured by legislation, and it reports directly to the public without interference or vetting. It receives its funding from the Treasury to avoid any undue sectoral influence. Its eight members are appointed by the Cabinet and have a broad range of experience in the areas of forestry and the environment.

In 2004, the Forest Practices Code was replaced by the results-based Forest and Range Practices Act (FRPA). The shift opened the way for the FPB to push its mandate and to begin commenting on policy, as it talks to the expected 'results' rather than simply auditing compliance to prescribed rules.

The key to a successful use of such boards is the willingness of governments to make them completely independent of those stakeholders who might have something to gain from influencing decisions and recommendations of the boards. Another important factor is the existence of a solid legislative base and clear criteria and indicators that the board can use in its deliberations. This means that for the time being, this type of oversight and monitoring mechanism is possible mainly in developed countries where good information and communication technologies exist.

## 3.2

### PAYMENTS FOR ENVIRONMENTAL SERVICES

Control of non-market services from forests (e.g., watershed management, biodiversity protection, carbon sequestration and storage) often is a main reason for regulations imposed by governments. In such cases, the need for regulation could be significantly reduced, if markets and prices could be created for these services. Innovative schemes being implemented in various countries attempt to create mechanisms to ensure that those benefiting from environmental services of forests pay the producers of such services (Box 2). Most of the experiences are relatively recent and therefore evidence on the effectiveness of these mechanisms is still being acquired.

So far, there have been attempts to set up payments for ecosystem services (PES) for biodiversity conservation, carbon sequestration, watershed services, and scenic beauty. Governments have driven most large-scale schemes, but some local PES systems have developed locally on a project by project basis.

Until now, the magnitude of environmental markets has been relatively modest, mostly limited to niche services. The exception is the potentially large market for reducing carbon emissions. Some 18-25 percent of global emissions are caused by Land Use and Land Use Change and Forestry (LULUCF). Reduced Emissions from Deforestation and Degradation (REDD) is a cost-effective way to partially address climate change mitigation, and annual carbon payments could reach many billions of dollars per year.<sup>17</sup>

Governments can foster these markets by directly buying services, particularly in cases such as watershed protection, when the government has the main responsibility to provide the related supplies, in this case water. Governments can also create the enabling conditions for private sector transactions, for example, by regularizing and clearly securing ownership rights of private citizens, companies, and community groups.

## BOX 2: COSTA RICA ECOMARKETS

Costa Rica has led the way in using market-based instruments to address market failures, thereby aligning incentives for landholders with broader societal interests. The center piece of this effort has been the country's program of payments for environmental services.

The Ecomarkets initiative aims at supporting the creation of markets for biodiversity conservation in privately owned areas surrounding national parks and biological reserves, as well as water and soil protection services, and carbon sequestration by compensating owners of small- and medium-sized ecologically valuable parcels for the continuous provision of these services. By rewarding private landowners that protect natural ecosystems, the initiative acts as a "market" where incentives are provided to investors willing to "produce and sell" ecological services and values that are important at local, national, and global levels, services that arguably would not be produced in the absence of financial incentives. The magnitude of payments is established by law and is adjusted periodically.

By all accounts, this initiative has reached and exceeded its targets. For example, 130,000 hectares in priority areas of the Costa Rican portion of the Mesoamerican Biological Corridor have been incorporated into the program, exceeding the original 100,000 hectares target. The Costa Rican program is widely considered as the most successful program for payments for ecosystem services worldwide.

The success of these types of schemes depends on various factors. There is a need for long-term financing mechanisms, as environmental services provide long-term benefits as long as the financial incentives are present. PES schemes also require sound monitoring and evaluation mechanisms to accurately and reliably measure the magnitude of impacts. There is a degree of uncertainty regarding the environmental impacts of, for example, modified harvesting and logging technologies, which also applies to the amount of money that those benefiting from improved harvesting and logging practices should pay. For all these reasons, transaction costs of establishing and operating environmental markets can be relatively high. A growing concern is that PES schemes may have negative impacts on the poor if, for example, they must pay for a service such as clean water, which has been free so far. In cases where the poor are potential service providers, payments to them may prove to be insufficient to cover their short-term opportunity cost of, for example, sacrificing more intensive logging.<sup>18</sup>

The role of PES in guiding forest management and use is likely to change and increase drastically, when the post Kyoto 2012 international climate regime is finalized and agreed upon, since PES for carbon sequestration and storage in forests hopefully will feature prominently in such an agreement.

### **PUBLIC-PRIVATE PARTNERSHIPS**

In some cases, it becomes necessary for the government to partner with the private sector to help finance innovative environmentally friendly activities that might or might not be financially viable for the private sector. For example, in northern Ontario, Canada, it is common practice for the loggers to cooperate with the Ministry of Natural Resources in burning slash left over from logging operations. The Minister of Natural Resources asked his staff to search for better ways to dispose the slash, rather than just burning it, and the suggestion was made to convert it into biofuel.<sup>19</sup> With industry cooperation, the ministry invested a

### BOX 3: QUEENSLAND, AUSTRALIA TIMBER INDUSTRY PLANS TO HALT LOGGING OLD GROWTH

Some of the ways in which industry initiates and supports programs favorable to the environment are quite innovative. In the case of Queensland, the \$2.7 billion-(Australian) timber industry has proposed a 14-point plan to the Primary Industries Minister of Queensland that would end up halting all logging in old-growth forests. It hinges on a partnership with the government and other industries, where the government would back emissions trading so major polluters such as electricity producers and smelters would buy and plant out land as a trade-off to the carbon they emit into the atmosphere. The timber industry, in turn, would buy and harvest the logs produced on a rotational basis and would remove itself completely from old-growth logging.

If the government agrees to and implements the plan, it eventually would end decades of wrangling between politicians, conservationists, and loggers over access to wild forests and timber reserves. The industry recognizes that its future is in plantations and on private lands. At the same time, Rainforest Conservation Society President Aila Keto said the plan was Australia's best timber policy. "It recognizes the importance of protecting biodiversity, old-growth forests, areas of high conservation value, and alleviating impacts of climate change," Dr. Keto said.

*Source: Williams 2006.*

large sum into producing a prototype bio-refinery. The private company that was chosen to lead the project had a major challenge. As Hamilton reports, "The challenge when using forest slash as a raw material is that it's a low-density material typically located in remote areas. Bringing it to a central processing facility isn't economical, as the transportation costs wipe out any profit".<sup>20</sup> The private company working with the ministry subsequently suggested taking the plant to the slash. The bio-refinery converts the slash into oil products that are seven times denser, thus making the transporta-

tion economical. The hope, of course, is to make the struggling forest industry more financially viable by converting waste into cash. The amounts involved can be significant—as high as 15 percent or more of the total wood biomass being harvested.

Another example of public private partnership between logging firms and the relevant public sector agencies is reported for Australia (Box 3). These examples all show the potential to turn unprofitable or non-marketed goods and services into market-based activities with economic incentive.

### 3.3

## IMPROVING STAKEHOLDER INFORMATION AND COMMUNICATION: CONFERENCES, COMMITTEES AND OTHER INTERACTION VEHICLES

Some governments, strongly supported by a variety of other forest stakeholders, have established permanent or temporary task forces, advisory panels, commissions, committees, and conferences to bring together forest stakeholders,

so they can discuss and come to a consensus on issues related to logging and other forest functions. One such successful example comes from the state of Minnesota in the United States.

**MINNESOTA, USA: FOLLOW-UP ROUNDTABLE FOR IMPLEMENTATION OF THE GENERIC ENVIRONMENTAL IMPACT STUDY FOR TIMBER HARVESTING<sup>21</sup>**

Private landowners and forest industry own about 7 million acres of forest land in the state of Minnesota, with the state and county governments owning about the same amount. There are many conflicts among stakeholders over how the state's private and public forests should be used. Rising concerns over the rapid increases in harvest levels in the state led interested stakeholders to make a formal petition to the Environmental Quality Board (EQB) of Minnesota to undertake a generic environmental impact study (GEIS) of timber harvesting in Minnesota. The GEIS, completed in 1997, produced a number of recommendations (see Box 4).

A small group of interested parties, recognizing that implementation would be a challenge,

started meetings a year before the GEIS was completed and established a “GEIS Implementation Strategy Roundtable” which produced a set of implementation recommendations which were later integrated into the new Minnesota Sustainable Forest Management Act.<sup>22</sup> The success of the process is evident in Minnesota today (see Box 5).

In order for this type of roundtable or communication and interaction among stakeholders to be successful, there must be a basic willingness of all parties involved to be open to new suggestions, to choose the right stakeholders for the interactions, and to provide adequate backup support, including intense use of the various new information and communication technologies (ICTs) available to help facilitating the interactions. Availability of reliable information and data is another essential component.

**BOX 4: MINNESOTA GENERIC ENVIRONMENTAL IMPACT STUDY FOR TIMBER HARVESTING**

After spending nearly one million dollars, working for almost five years, and preparing 14 technical documents (totaling more than 4,000 pages), the Environmental Quality Board approved the Timber Harvesting GEIS (Minnesota Environmental Quality Board 1994). The GEIS recommended dozens of tactical guidelines for modifying land management practices—for example, buffer strips along streams, even distribution of tops and limbs across a site—as well as numerous strategic recommendations focused on four major policy areas. A forest practices program was recommended, through which management prescriptions needed to mitigate the adverse impacts of timber harvesting at the site level would be voluntarily delivered. Also recommended was a sustainable forestry program which would have monitoring and coordinating functions for the purpose of sustaining the integrity of large forest ecosystems involving multiple owners. Sensitive to resource information voids, the GEIS also recommended a forest-based research program that would provide the information required to successfully implement the forest practice and sustainable forestry programs. Finally, it recommended a forest resources board with non-regulatory program authority to secure broad stakeholder involvement in forest policy decision-making.

*Source: Ellefson et al. 1997.*

#### BOX 5: SUCCESS OF MINNESOTA GEIS ROUNDTABLE

Minnesota is recognized in many quarters to have one of the better balanced forest management programs. It has a number of innovative public and private actions in place to guide the substantial amount of private timber harvest that takes place in the state and ensures that it is in balance with the requirements for other uses of private and public timberland. Ellefson et al. (1997) have summed up additional evidence of the success of this process:

Important is the reality that the state legislature allocated more than US\$1.7 million to implement these programs. These two points (new programs and money invested) are especially significant at a time when government bureaucracies are being reduced in size and funding for new programs is being severely limited. Also, a major substantive success of the roundtable process was the establishment of institutions that are capable of dealing with future conflicts involving the use and management of forests in Minnesota. Via a governor-appointed Forest Resources Council, composed of representatives of major stakeholders, the state now has in place an organization to which aggrieved parties can bring major issues of forest policy for debate and possible resolution. Prior to the Council, there was no agreed-to and politically effective focal point for dealing with major issues of forest policy in the state government. Frustrated stakeholders and the potential for poorly defined policies and programs were often the result. Also of significance is that partnership arrangements involving public and private concerns have been established in response to the roundtable's recommendations, and the government is not the sole actor and implementer of the new policies and programs. For example, a privately established Forest Resources Partnership composed of major land managers and timber harvesters is now in place, as is a privately initiated educational and certification program for timber harvesters; a private certification program involving professional foresters is being developed and a center for the continuing education of natural resource professionals (ultimately to be privately supported) is operational. In a major way, the roundtable's recommendations have led to private initiatives that did not exist so far.

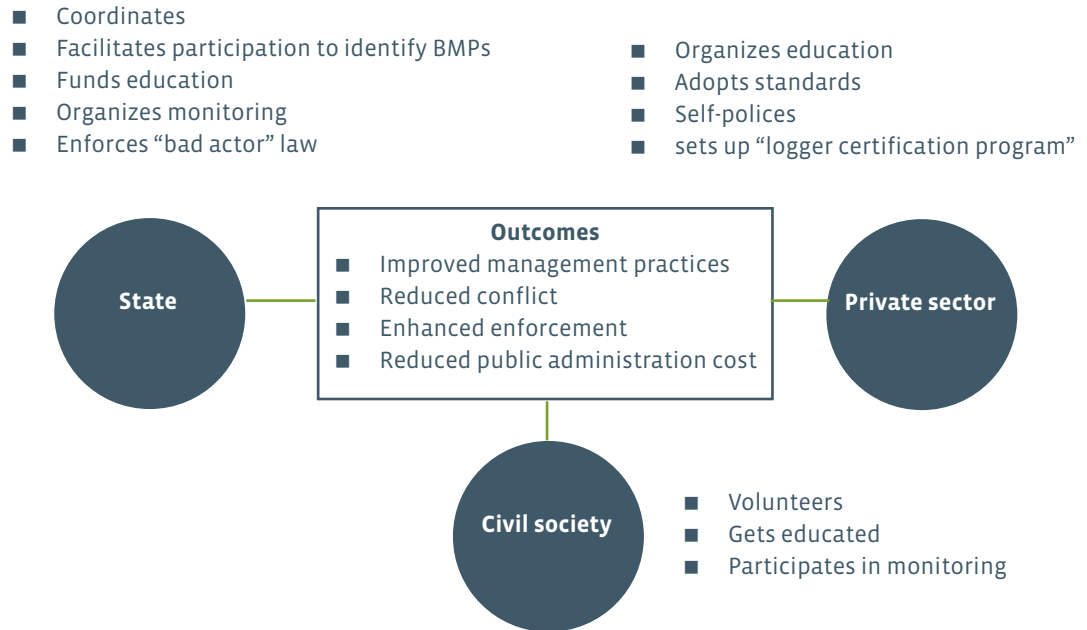
### 3.4

## BEST MANAGEMENT PRACTICES

The Best Management Practices Program (BMP)<sup>23</sup> of the state of Montana (USA) relies on education and outreach to encourage forest owners to adopt desirable forest-harvesting and -management practices. The Program provides guidance for timber harvesting, reforestation, and other related activities with the purpose of reducing negative environmental impacts and ensuring sustainability of wood production and of environmental services of forests (see Figure 1).

The BMP Notification Law requires forest landowners to contact the Department of Natural Resources and Conservation before harvesting their timber. The Department then provides information and technical assistance on how to apply BMP in logging operations. Compliance and effectiveness are audited every two years by a voluntary team of professionals covering various disciplines and coming from federal and state agencies, private industry, conservation organizations, and indepen-

FIGURE 1: MONTANA BEST MANAGEMENT PRACTICES



dent consultancies. Audits tend to focus on high-risk areas, where timber harvesting may produce greater damage to soil and water resources. Audit teams carry out quick—an average of two hours per site—and mainly qualitative visual assessments of private landowners’ compliance with the BMP and of the effectiveness of BMP in protecting soil and water resources. The program has been in operation since 1987 and the first audit took place in 1990.

2004 audits show that BMP have been applied in 97% of all cases and that BMP were, in fact, effective in protecting soil and water in 98% of all audited cases.

The example of Montana’s BMP program rests on voluntary compliance with minimum standards suggested by the government. Individual entrepreneurs, however, are still free to choose those harvesting technologies that they consider the most appropriate to comply with standards, thus foster-

ing flexibility, adaptation to local conditions, and innovation in organizing harvesting operations. Audits focus on results on the ground, rather than on how loggers achieve those results. The state government provides information and technical support to loggers and engages the participation of different disciplines and interest groups in carrying out the bi-annual audits. The Montana BMP is a good example of the innovative soft regulatory schemes described above.

The wide application of the BMP faces some limitations. The design of realistic as well as effective best harvesting practices is complicated. It took a multidisciplinary team two years to design the BMP and additional time to review experiences acquired in application and subsequent redesign. The application of BMP also requires the availability of technical experts to carry out visual audits in an objective and quick manner. Audits must be organized to have statistical validity and individu-



als carrying out the audits must be carefully selected. Given the voluntary nature of the program, individual landowners may refuse audit teams access to their operations. The audits themselves provide a snapshot of the condition of forest lands and the impact of harvesting operations, but they do not necessarily assess longer-term impacts. Even

so, the program has been successful in promoting voluntary adoption of best logging practices in an unobtrusive manner.

The recent proliferation of BMPs in other parts of the world is encouraging. For example, the FAO website<sup>24</sup> lists some 14 codes and some 35 “best practice” guidelines developed by FAO and others.

### 3.5 CORPORATE CODES OF CONDUCT

Progressive corporations are voluntarily adopting standards of corporate behavior, codes of conduct, which self-regulate the manner in which

they approach their logging operations to minimize their undesirable impacts (Box 6).

#### BOX 6: THE PRIVATE MANAGED FOREST LAND COUNCIL OF BRITISH COLUMBIA

The Private Managed Forest Land Council (the Council) is an independent agency established under the Private Managed Forest Land Act of 2004. It is accountable to the government, managed forest landowners, and the public. The Council was established to administer the forest practices component of the Managed Forest Program, which includes the protection of key public environmental values on private managed forest land; it is also responsible for the administration of private managed forest land legislation. This includes four broad functions:

- Strategic planning, reporting, program administration
- Set and monitor forest practices standards for managed forest land
- Enforce standards and perform audits
- Review landowner applications to enter the managed forest class

The Council encourages sound forest management practices on private managed forest land, taking into account the social, environmental, and economic benefits of those practices. Through application of a set of incentives, it encourages private wood producers and harvesters to adopt a set of obligations, which form a private code of conduct with regard to wood production on private lands. Benefits of managed forest class are:

- Property-assessed values are generally lower than for other classes, such as residential
- Owners are assured the right to harvest trees, unrestricted by local government bylaws

In return, the landowners must meet certain eligibility requirements and take on certain obligations. Essentially, they accept a code of conduct with regard to their forest-harvesting and -management activities.

*Source: Ellefson et al. 1997.*

## BOX 7: THE GLOBAL FOREST TRADE NETWORK

The GFTN is a WWF-initiative that supports responsible private corporations grouped in national and regional trade networks with the aim of eliminating illegal logging and improving the management of forest resources by creating favorable market conditions, supporting the exchange of information, and providing technical assistance. The trade network supports responsible forestry by working with producers and consumer companies in partnerships to eliminate illegal logging and trade through discriminating purchasing policies and certification. Currently, the participants have forest products sales that exceed US\$48 billion per year, manage almost 20 million hectares of forests committed to certification, buy or sell some 295 million cubic meters of forest products every year, and employ some 1.5 million workers. Thus, the volume of activity and impact of the Network is bound to be considerable, and it is growing.

Companies are likely to follow improved forest management practices because of several reasons. First, improved methods may make economic sense. In some conditions, additional initial costs are more than compensated by increases in productivity, particularly in the long run.<sup>25</sup> In other cases, even if there are net costs, these may have a negligible final impact on the profitability of integrated industrial operations. Second, public concerns about the impacts of poor forest management affect corporate reputation and brand loyalty, which are part of the intangible assets of a firm. Impacts on these assets cannot be dismissed lightly: research shows that intangible assets are key determinants of a corporation's share value, as much as 65% according to some assessments.<sup>26</sup> A recent report by the United Nations Environment Programme Finance Initiative (UNEPFI) indicates that analysts are beginning to see that social responsibility and environmental sensitivity are associated with a company's financial value.<sup>27</sup> As one corporate official says, "It's not social responsibility versus profitability; it's social responsibility *and* profitability."<sup>28</sup> Third, in many cases activist groups are effective in influencing government policy and forcing legislatures to pass regulations that would impose tighter forest management controls. It makes sense for corporations to adopt practices that avoid the risk of attracting

the attention of activist groups and possible ensuing costly regulations.

Governments can encourage the adoption of voluntary corporate or private codes of conduct by putting in place various incentives for self-regulation, paired with an appropriate checks-and-balances system to assure society that regulation is in fact taking place. This, in turn, can significantly reduce the regulatory burden for the government. Collaborative arrangements between government agencies and forest corporations that offer the possibility of taking advantage of both government and corporate relative strengths have proven useful in some countries in various functions such as monitoring, ensuring transparency of operations, and accountability. A range of incentives can be put in place, such as preferential treatment in government contracts, tax preferences, and the threat of penalties or increased government regulation, if corporations do not abide by the codes of conduct.

A good example is British Columbia's "Managed Forest" program, established in 1988 to encourage private landowners to manage their lands for long-term sustainable forest production (see Box 6). Another example is the Global Forest Trade Network that commits companies to trade products that have been legally harvested and that come from sustainably managed forests (Box 7).

## BOX 8: THE CONSERVATION FUND

The Conservation Fund, a 21-year-old organization that strives to balance natural resource protection with economic goals, recently bought 9,700 ha of previously logged but now regenerated redwood forest land and plans to selectively log areas of second-growth forest that are not in environmentally sensitive areas. Timber sale receipts will be used to pay for forest and watershed restoration and protection of fish population in the Garcia River as well as spotted owls that live in the forest. The Conservation Fund is in the process of purchasing an additional 6,500 ha of forest land and is hoping to purchase 67,000 more ha in the future. The key idea in this project is that it is impractical for the public to purchase large areas of forest and turn them into parks. This concept of establishing environmentally focused logging plans becomes the foundation of a broader plan to meet the financial needs of the Conservation Fund in relation to purchasing the land and managing it, the needs of people for timber, and a public interest in maintaining valuable habitat for wildlife and watershed values.

This project only started in 2004, so the success of this approach is still uncertain, both in terms of its economics and in terms of whether the permits to log, even if in a very environmentally friendly manner, can be obtained, given the strong voice of environmental groups. Companies are looking on to see, if this approach in fact can produce reasonable profits, given that it should drastically reduce the legal and waiting costs now incurred when companies try to fight government regulations and the influence of powerful environmental groups. Also, many environmental groups are realizing that logging cannot be banned and that they need to support the type of middle-of-the-road approach advocated by the Conservation Fund.

*Source: Reiterman 2006.*

Industry associations have also adopted codes that auto-regulate their operations by, for example, making sure that their sources of supply are legal. Thus, for example, The International Council of Forest and Paper Associations—comprising trade associations in 43 countries and accounting for more than 90 percent of the world’s paper production and more than 50 percent of the world’s wood production—and the Confederation of European Paper Industries, which includes more than 1,000 companies, have both committed themselves to principles of sustained forest management and strive to obtain their wood raw materials from legal sources. Another example is the Virginia-based Conservation Fund which aims at blending economic and environmental sustainability (see Box 8).

This type of institutional mechanisms tends to work better, where communities involved have

a long history of traditional rights and where forms of use of forest resources are recognized and accepted by all, where the state has a capable bureaucracy and inspires confidence that ownership or tenure rights will be in fact strictly and impartially enforced, and where communities have the capacity to make informed decisions on resource use.

Corporate codes of conduct will probably work better in cases where there is a well-informed public, as well as NGO and media scrutiny of the operations of private corporations and where consumers have alternative suppliers and therefore can shun firms that do not follow certain standards of forest management. They will also tend to be more effective when the threat of government regulation is effective in cases of non-compliance.

### 3.6 TRANSITIONS IN FOREST OWNERSHIP AND CONTROL

Governments in various countries are putting in place alternate governance models in the forest sector and changing their forest regulatory frameworks to transfer responsibilities and rights for owning and managing resources to other actors. Nowhere is this more notable than in the generalized trend to adopt policies to transfer a degree of control and ownership of forestlands to communities, particularly those that have established traditional rights, which had not been previously recognized by the state. Whether renegotiation of these institutional arrangements are generally motivated by various reasons (for example by a greater sense of fairness, realization of the institutional weakness of the state that precludes effective

regulation enforcement, or political expediency), an important one is the realization that often these arrangements have proven to be more effective than state regulation in securing enhanced forest management and conservation (Molnar, Scherr and Khare, 2004). Large transitions in forest ownership and control have taken place in the last two or three decades (White and Martin, 2002).

Greater ownership and control schemes create greater incentives and new opportunities to access financial instruments to launch investments in better forest management, particularly in the long term and discourage “cut and run” operations as now legally recognized owners have a greater certainty of reaping the future fruits of such investments.

### 3.7 THE COMBAT AGAINST ILLEGAL LOGGING AND TRADE

Illegal logging affects many countries, but it tends to concentrate in developing and transition economies. Some of the demand for wood originating in illegal sources is coming from advanced economies importing wood from the tropics and economies in transition. The Forest Law Enforcement, Governance and Trade (FLEGT) initiative of the European Union aims at using the power of the market to impose obstacles to the importation of wood from uncertain origins into the European market. In 2005, the EU Council approved a voluntary licensing scheme, agreed to by exporting countries and importing nations of the EU, to ensure that future imports into the EU would be legally sourced. Unlicensed products would be denied entry into the EU. This agreement provides for a set of actions including those needed to improve governance in forest-rich exporting countries, such as the reform of their policy frameworks, enhanced

monitoring and enforcement capabilities and capacity-building. This initiative relies on government action, but establishes an implementation platform based on actions by different agencies of governments, in both the EU and exporting countries, and also by private enterprises and civil society groups. Its power lies in its capacity to negate European market access to illegal loggers. Challenges that could be raised at the WTO are skirted by signing government-to-government voluntary agreements to work together in creating barriers to the trade of illegally sourced wood, rather than by imposing unilateral restrictions. The European Union and other partners support institutional and regulatory reforms that may be needed to put the initiative into operation in partner exporting countries.

This initiative is likely to grow in effectiveness, as the number of exporting countries and importing economies participating in the scheme

increases. Its effectiveness will depend, among other things, on the capacity of monitoring institutions to track wood from initial logging operations to its final delivery to consumer markets. Otherwise, much of the illegally sourced wood could be diverted to less discriminating economies that are not participating in the voluntary scheme and against which the European Union has little power to impose unilateral restrictions.

The FLEGT initiative is an interesting case of governments participating in a multi-stakeholder initiative and relying primarily on market forces to achieve desirable outcomes in exporting countries. From early on, it was understood that problems

created by the prevalence of illegal forest activities required solutions that involve much more than government action only. Various stakeholders—ranging from private logging, industrial and trading enterprises, to forest-dependent communities and various civil society institutions—are affected by illegal logging and could at the same time be contributing to it. Corrective measures needed therefore to be designed and implemented by coalitions of interested stakeholders rather than solely by governments. The participation of NGOs, civil society institutions, and the private sector was considered as essential to successfully tackling illegal logging and trade.

## 4

## AN EVOLVING STRATEGIC POLICY FRAMEWORK TO ENCOURAGE BEST FOREST MANAGEMENT PRACTICES

A continued reliance on conventional command-and-control approaches that set uniform standards for guiding forest management decisions has proven to be mostly ineffective and inefficient. Even when they are effectively enforced, uniform standards of forest management force all stakeholders, regardless of size or capacity, to share similar regulatory costs, and, as a result, tend to discriminate against small operations. In addition, command-and-control regulations tend to provide few incentives to innovation and also include no motivation to exceed regulatory performance standards.

The next generation of forest regulations will require innovative tools, as exemplified in some of the examples examined above, to meet future challenges in ensuring better management of forest resources. Regulatory contexts are very diverse and therefore it is not possible to identify a single set of regulatory instruments which would consistently ensure that desirable outcomes are achieved. Nevertheless, it is apparent that market-based instruments, shaping behavior through price signals rather than imposing and controlling explicit and uniform forest management standards, will in many cases provide useful and effective complements to (but not necessarily completely substitutes for) a command-and-control approach. A redesign of forest regulations will have to be based on a thorough understanding of institutional and regulatory contexts and also on a creative approach to what is theoretically desirable, feasible, and effective in each situation.

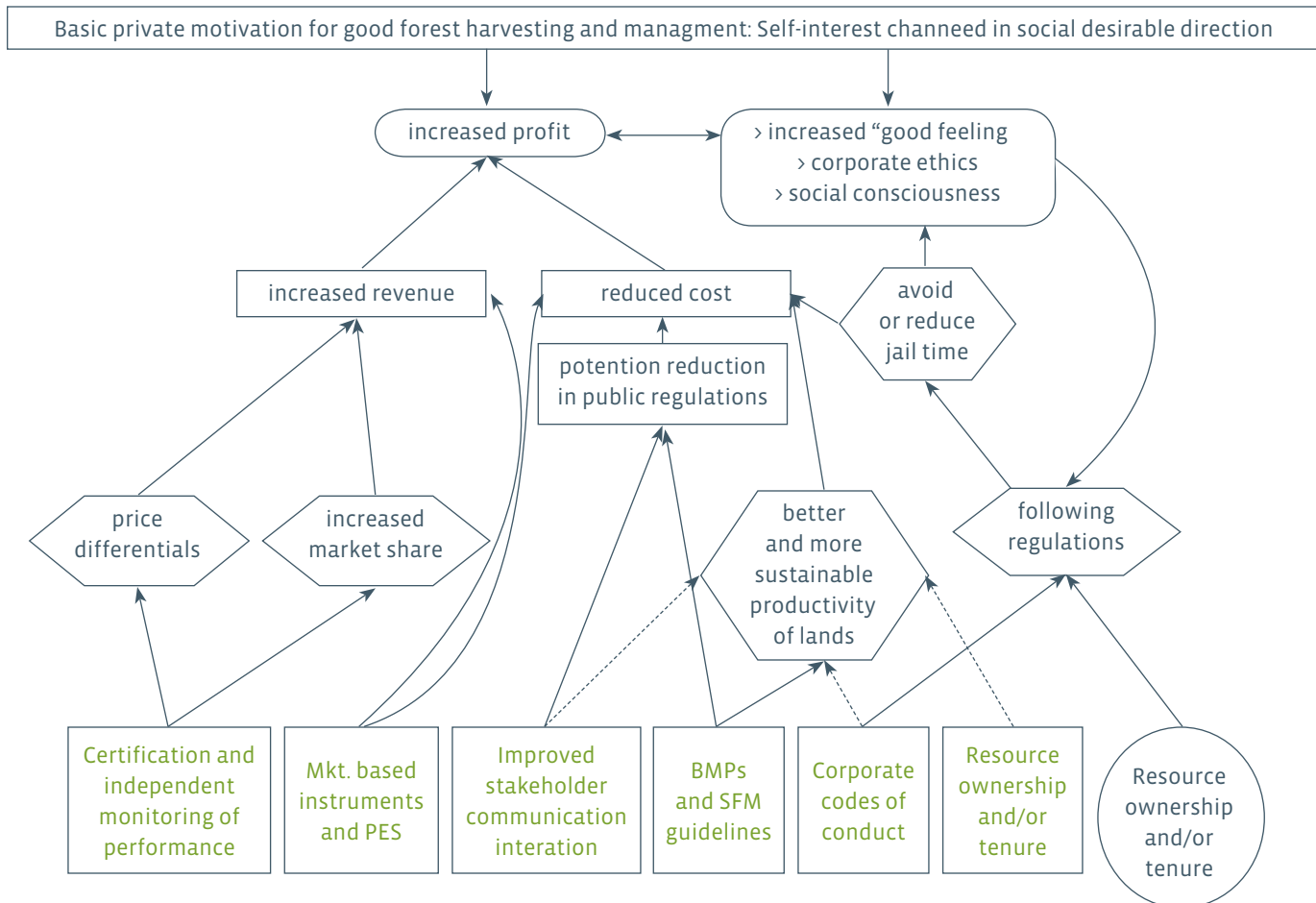
In the simplest sense, all successful market-based instruments that are complements or

alternatives to government regulations include two motivational factors for those involved—an interest in increased secure profits and an improved individual and corporate reputation as a result of contributions made to broader societal goals. Instruments described above involve an influence on profits, security of benefits and profits, and/or an impact on the well-being of private individuals and company leaders involved. Figure 2 lays out the six main categories of instruments considered in the last section and how they are related to these two basic motivational factors—private-sector financial gain and social consciousness.

The question is how these factors can be translated into other practical instruments in regulatory design that would encourage socially responsible forest-harvesting and -management. Based on the experiences described above, it becomes possible to sketch out a framework which allows us to assess the actual situations in different countries and identify the optimum set of policy reforms and tools needed. While there is no clear agreement on what is practical in any given situation, there is a consensus on the objectives that need to be achieved and the elements of improvement that will likely lead to improved forest harvesting methods on private lands, leaving aside the realities and limitations of individual political and forest governance situations.

The above overview of innovative regulatory approaches and complementary approaches to regulation suggests that systems of corresponding instruments should be used in a collaborative way by the government, the private sector, and civil society, and

FIGURE 2: THE ARRAY OF POLICY INSTRUMENTS AVAILABLE TO GUIDE PRIVATE FOREST HARVESTING AND MANAGEMENT



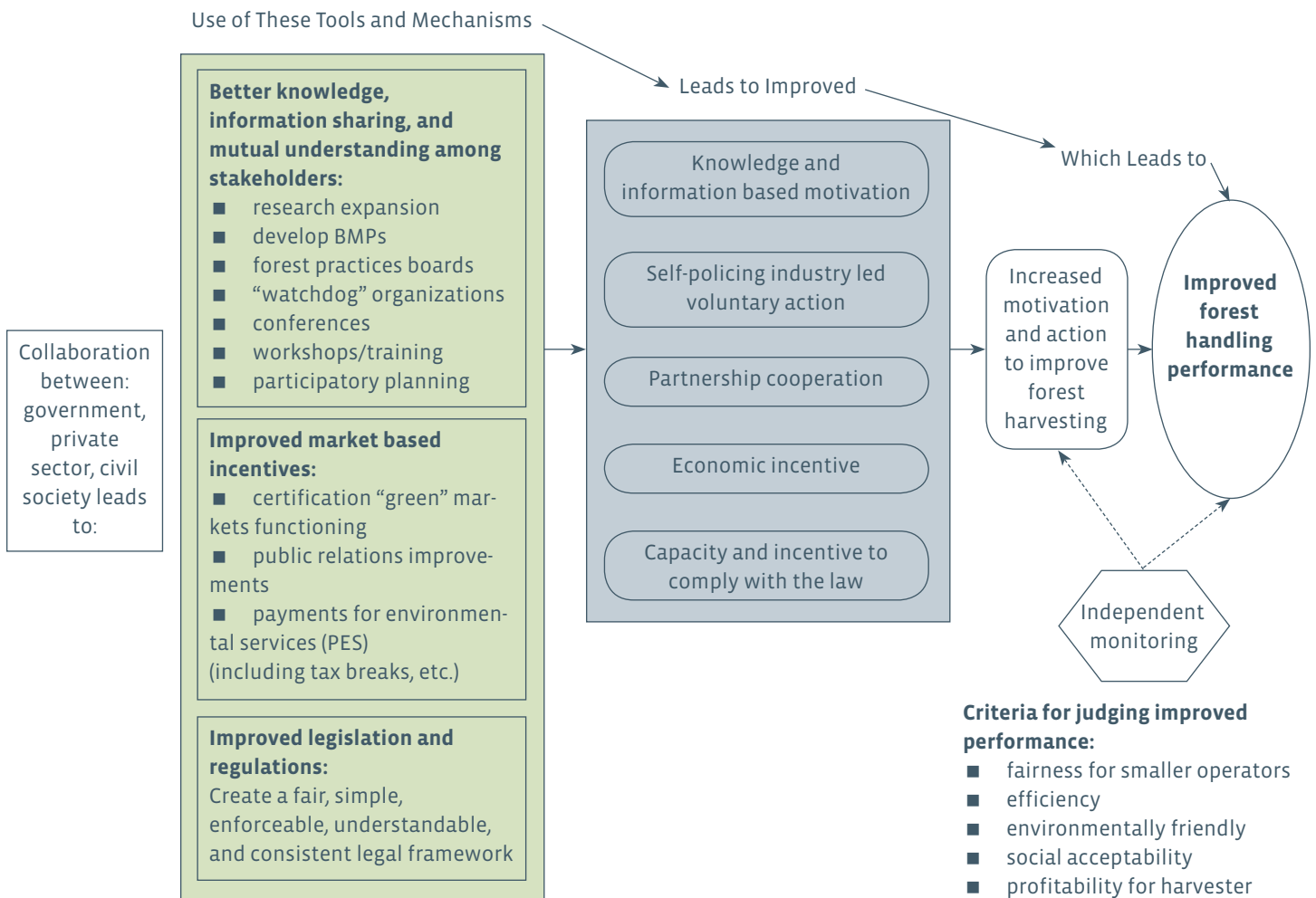
that they should include (a) improved knowledge and information-sharing, including mutual understanding of stakeholder objectives, (b) improved use of market or quasi-market mechanisms, and (c) and an improved, simplified, clearer, and enforceable legislative framework (see Figure 3). This is similar to the utilization of what has been called *sermons* (informational instruments, advice, and support for cooperation among forest actors), *carrots* (financial incentives to those that behave in the accordance with desirable objectives), and *sticks* (restrictions on the management of forest resources, imposed by law) in improving regulatory frameworks. Some studies show that the provision of adequate information on forest, forest management, and on the purpose

and nature of government regulations decisively increases the acceptance, and therefore the effectiveness, of regulatory instruments.<sup>29</sup>

It should be emphasized that while the context of regulatory reform clearly will be different from country to country, in general these three sets of tools or mechanisms should *not* be considered as independent dimensions but rather as integral and mutually supporting components that need to be combined—depending on the context, and to different degrees and with different emphases—into a coherent framework to guide private forest practices. Arguably, elements from each category are necessary for a successful overall framework for guiding private forest management.



FIGURE 3: IMPROVEMENTS IN FOREST HARVESTING: A FRAMEWORK FOR ASSESSING AND RETHINKING POLICIES AND REGULATIONS



## 4.1 IMPROVED KNOWLEDGE CREATION AND SHARING

It now is well accepted that expanding the education of private forest owners can make a marked difference in eliciting their voluntary cooperation in carrying out forest operations in a socially acceptable and desirable fashion. Governments spend public resources on doing research on forest management and harvesting, covering many

topics that are of direct interest to and relevant for private forestry and harvesting. Since the results of such research are in the public domain, and since the forest owner or harvester can profit from such knowledge but does not pay for it, it essentially constitutes a public subsidy. In addition, in some countries, public forest extension services provide

advice and information to the private sector for free or at low cost. However, to the extent that the research is focused on making socially/environmentally desirable forest practices more economically acceptable to the private sector and to the degree that results from such research are taken up by the private sector, the subsidy can be considered as part of a payment for environmental services (PES) provided by the private sector. For example, much of the research on low-impact logging falls into this category, although the uptake is still limited.<sup>30</sup> Thus, such subsidies also fit under our second category of instruments, market-based incentives, but also into the improved knowledge category.

Much of the impetus behind the development of Best Management Practices (BMPs) described in section 3 is based on the premise that people will do the right things, if they know what those things are. In other words, most people do have some degree of social consciousness. At the same time, there are limits to such consciousness, if it involves voluntary outlays of additional money, which can be the case if the private sector pursues BMPs. The public sector needs to be sensitive to that fact and determine whether PES are justified in such cases.

One of the strengths of the “Reinventing Government” initiative<sup>31</sup> that started a few years ago

in the USA was the notion of entrepreneurship in government and an enhanced availability of information and knowledge through transparency and accountability. Such characteristics are essential in order to forge effective partnerships between governments, the private sector, and civil society in the forest sector. One sees increasing evidence of effective public-private partnerships in many countries, but also partnerships between the private sector and civil society groups as well as various other environmentally focused non-governmental organizations, such as the partnership of the WWF and the World Bank, as well as the collaboration between the World Resources Institute and the private sector.

The key here is not the partnership as such, but rather the shared knowledge, mutual understanding, and synergies that are fostered by the interaction of various sectors. The key to an active and sustainable partnership is that both sides gain from it.

Further, one of the basic elements for the success of market-based instruments is that prices must be set correctly (see also below). A proper price, however, requires proper information. As a result, information programs can help foster market-based solutions to sustainable forest management.

## 4.2

### EXPANDED AND IMPROVED USE OF MARKET-BASED AND QUASI MARKET-BASED INSTRUMENTS

As mentioned, market-based instruments alter market signals and shape economic behavior by adjusting profitability opportunities and market shares. This is not to say that all operators in the forest sector work are exclusively motivated by profitability prospects, but rather that financial considerations are an important factor in influencing behavior, and that regulations that impose large financial outlays and meager returns are unlikely to be effective. Instruments such as government support to certification, corporate codes

of conduct, and the expanded and transparent dissemination of best practices all introduce financial incentives for the operations of private actors, with the government creating the conditions for these instruments to operate effectively.

The experience with market-based regulatory instruments in the forest sector has produced various lessons that should be taken into account. First, these instruments work better when they are simple. Whether the measures are regulations governing the allocation of forest concessions or forest fees

computations and taxes, they should be designed as simple as possible, with rules that are well defined from the outset and without ambiguity. For example, the official acceptance of independent certification as a proof of sustainable forest management—a regulation that was adopted by the Bolivian government—should clearly specify what minimum requirements of certification are acceptable. It is also important to identify the rules that determine what prices would be the base for calculating payments for environmental services. If rules are easy to contest or manipulate, market-based regulatory instruments are unlikely to be effective.

Second, experience also shows that it is desirable to have absolute rather than relative baselines for calculating compliance. Relative baselines are immensely complex to operate in practice. Recent initiatives for payments for avoided deforestation, for example, will have to depend on an unobservable and hypothetical scenario—what deforestation would have been in absence of payments—which is certain to create different and conflicting future scenarios and substantial transaction costs for the authority investigating facts and counter-facts. By contrast, regulations governing the import of legally sourced wood into Europe under the FLEGT initiative require an absolute proof of legality (and not just relative increases in the proportion of legally sourced wood) based on previously established standards of legality.

Third, and related to the above, the experience with market-based instruments reinforces the importance of effective and transparent monitoring and enforcement. For example, faulty certification of sustainable forest management and possible leakages in the system of monitoring logging practices create formidable monitoring challenges. Clear, effective, and independent monitors and sound tracking technologies need to be in place for these instruments to operate effectively.

Fourth, when assessing market-based instruments, experience indicates that better instruments from a theoretical point of view generally will not solve all problems because different contexts exist. One of the potential obstacles to in-

roducing new instruments is that many operators are not likely to be properly equipped to take full advantage of these tools. Some, such as certification, may exhibit economies of scale, thus in certain cases creating insurmountable cost barriers to participation by small operators.

Fifth, market-based instruments may be more desirable when regulations apply to widely heterogeneous conditions rather than to uniform situations, where command-and-control regulations may be advantageous. If forests were uniform in species composition and economic variables, such as distance to markets, establishing a uniform fee per cubic meter extracted from timber concessions would be an appropriate option for a command-and-control regulation. Transparency in the fee-setting process for such a uniform product would reduce the room for different interpretations, disagreements, and discretionary decisions so often linked to corruption. On the other hand, widely variable conditions involving a mix of species with different market value, different economic locations with widely variable costs of accessing markets etc. would make the application of fee setting through a command-and-control approach an enormously complex process that is open to discretionary decisions and much more susceptible to corruption. Most forest administrations are not well equipped to deal with such complexity. Transparent bidding based on widely available information and open access to all potential bidders may be a better option.

Sixth, regulatory designers must take into consideration transaction costs which are often substantial. The implementation of systems of payments for environmental services, for example, can bring with it considerable costs. Payments for watershed protection, particularly in watersheds that are occupied by numerous forest land owners, carry costs that are too frequently ignored by legislators. The implementation costs of titling programs that lead to the government selling publicly owned forest lands (overlapping with customarily owned lands) can also be substantial, when multiple claims on the same piece of land (various entities claiming tenure rights on a piece of land)

or on different uses of the same piece of land (such as hunting, extraction of non-wood forest products, and timber exploitation) are common.

Finally, the experience with the design and implementation of market-based regulatory instruments has several valuable lessons to offer in the political economy realm, which designers of forest regulations should take into account. Command-and-control measures are generally preferred by lawmakers, who tend to be trained in law and are predisposed to favoring legalistic approaches. Command-and-control measures also provide a greater opportunity for political posturing and for issuing strong political statements in support of sustainable forest management, knowing that they can eventually be combined with lax enforcement, if this is politically convenient. Further, command-and-control regulations tend to obscure the costs of implementation—a multitude of forest management regulations have been issued without due attention to the associated costs imposed on opera-

tors and on the government—while market-based instruments impose those costs in a more direct and visible manner. Forest bureaucracies also tend to prefer command-and-control regulations that allow them to keep their discretionary powers over the management of forest resources. Market-based regulations instead will shift decision-making powers from the forest bureaucracy to private markets and the private sector.

The above are possible explanations for why the political world has been slow in adopting market-based instruments for regulating forest management. There is also the realization that no particular form of government regulation, whether it is a market-based or a command-and-control approach, offers a superior solution to forest management regulation schemes. What instrument is best in a given situation depends on the institutional, regulatory, social, and political conditions of the environment being regulated. Evidently, there is no regulatory panacea.

### 4.3 IMPROVED REGULATORY FRAMEWORK

As mentioned above, a fair, clear, and enforceable legislative framework is important in any forest policy reform process, given the fact that some players in the private sector as well as in the public sector will inevitably strive for personal gain at the expense of society and social well-being. There is ample evidence that these motivations and proclivities are particularly strong in the forest sector, as evidenced by the magnitude and seriousness of illegal logging and other forest-related crimes.

Also, even for those private entities that generally respect the law, motivation depends very much on the stability and legal security of their property and other rights. If stakeholders in a given property feel that they are not treated fairly under the legal system or that their tenure rights are tenuous, then they will have very little motivation to do anything

other than reap short-term maximum personal gain from the property while they can. The same is true of actual and potential stakeholders in open-access property, if strong common property rules are not created and enforced. Short-term personal gain becomes the rule of the day when uncertainty reigns.

When considering how to best guide and control private logging and forest management, there is widespread debate on the role of legislation in securing superior outcomes.

#### PRINCIPLES OF A GOOD LEGISLATIVE FRAMEWORK FOR PRIVATE FOREST PRACTICES

The emerging view on a good legislative framework for guiding private forest practices has been summed up by Lindsay et al. as follows: “History has

demonstrated the fallacy of focusing exclusively on the ‘control’ functions of forestry law. Our thesis here is that law’s ability to influence behavior will depend less on the strength of its punitive provisions than on the extent to which it enables and encourages positive behavior.”<sup>32</sup> Lindsay et al. recommend principles for avoiding legislative traps that would unnecessarily complicate the design of regulatory frameworks in the forest sector. These are:

■ Principle 1: Avoid legislative overreaching.

The most important factors are to avoid going beyond (a) a country’s capacity to implement and enforce, (b) the efforts and costs needed to achieve the intended (and reasonable) outcomes, and/or (c) what is socially acceptable, i.e., what will not be widely accepted by society and thus will not have strong civil society support.

■ Principle 2: Avoid unnecessary, superfluous, or cumbersome licensing and approval requirements.

As discussed above, burdensome rules and licensing requirements have in some cases pushed people, e.g., poor rural forest owners, into harvesting wood illegally because they found it impossible to comply with the cumbersome and burdensome provisions of forest legislation.

■ Principle 3: Include provisions that enhance the transparency and accountability of decision-making processes.

As mentioned earlier, in some cases, a lack of fairness in legislation can be traced back to corrupt behavior on the part of government officials and those who supposedly are responsible for enforcing the law. By forcing officials to conduct their transactions, e.g., the granting of licenses and concession agreements for timberlands, in a transparent manner, some of the corruption can be curtailed, particularly, if civil society groups monitor what goes on in the sector. Public input on granting harvesting rights is another powerful force in reducing widespread corruption.

■ Principle 4: Enhance the stake of local non-governmental actors in the sustainable management of forests.

Enforcement and compliance with forest laws is made easier, if local communities benefit

from complying with such laws, e.g., they receive government revenues or obtain access to part of the output from the forests being managed. This was identified as a major factor in the productive performance of the highly successful Korean Samael Undong forestry program in the seventies.<sup>33</sup> Many existing cases show that motivation of local communities can be stimulated easily, if laws provide appropriate incentives. This is increasingly the case and is important, since in many cases the local forests are the main source of livelihood for the local population.

For market-based incentives to contribute to socially desirable, sustainable forest management there have to be secure tenure rights that are consistently enforced. In many countries, governments are legally recognizing traditional community forest land tenure and ownership rights, and are devolving legal responsibility for their administration to local communities.<sup>34</sup> While the purpose of these policy changes goes beyond that of improving logging practices, they often will lead to improved and sustainable forest management, in many cases without further support from government. In Mexico, as much as seven million ha are under community management. One project to support community management in Mexico enables communities to apply sustainable forest management practices in an area of 175,000 ha, generating new revenues for the government that are amounting to some US\$1.2 million per year, a similar amount as the same project invested at the state level. Studies show that, where legal tenure rights are secure, communities invest considerable resources, time, and effort in practicing sustainable forest management.<sup>35</sup> There are many other examples that document this, including in Canada, Bolivia, Colombia, the Philippines, Peru and Australia; and the potential of some of these efforts is substantial.<sup>36</sup>

While securing resource and tenure rights is not always a panacea for fostering alternatives to command- and-control regulation for better forest management, it can lead to good results in many contexts. Strong community traditions, governmental technical support, and the level of secure

ownership rights, which includes the capacity and willingness of the government to enforce them, are, among other things, necessary for the devolution of forest management responsibilities to work more effectively.

- Principle 5: The drafting of law needs to be a broadly participatory process.

This may be self-evident, but has been missing from many cases in the past. If laws are not widely accepted by the population, there will be little support for their enforcement and there may even be resentment and widespread attempts to undermine the laws. Widespread consultation is not always easy and tends to be very time-consuming, and there will always be issues associated with how the differing views of different constituencies can be considered fairly in the drafting of legislation and regulations. However, experience has shown that it is a necessary part of the process of establishing a more user-friendly legislative environment for guiding private forest activity, including harvesting and forest management after the harvest.

- Principle 6: There is a need to increase the effectiveness of direct law enforcement mechanisms set forth in forestry legislation.

This involves giving careful, systematic attention to the penalties for violation of legal provisions, i.e., to both the nature and the severity of penalties. Also, the process and procedures by which penalties are applied needs to be considered to make sure that they are impartial and fair, and that they actually can be implemented on the

ground. Once potential violators see that the law is not enforced in one case, there will be less incentive for others to follow the law.

More effective and efficient surveillance and monitoring of forest harvesting and management behavior is needed. For while a majority of firms and individuals may be in compliance, the few that are not can wreak havoc for the rest and for society in general. The search for new approaches needs to continue and promising ones need to be tried, tested, and revised until realistic ones emerge.

One study of the influence U.S. companies being punished under a given law had on other companies<sup>37</sup> concluded that because most firms already are in compliance (for a variety of other reasons), this form of explicit general deterrence-knowledge usually does not enhance the perceived *threat* of legal punishment but serves as *reassurance* that compliance is not foolish and as a *reminder* to check on the reliability of existing compliance routines and monitoring mechanisms. Brody et al. (2006) also found that there is an industry perception that practicing ecosystem management for private forest estates “...is an attractive alternative to litigation” and thus also is an important incentive. Both the above studies make a key point: most firms quite willingly comply with existing laws and regulations related to harvest on private lands. When this is the case—when there is widespread, willing participation in good practices—then moving towards a more user-friendly, participatory and user-driven regulatory environment becomes easier.

## 5

## LOOKING FORWARD

The failure of regulatory structures, the rapidly changing conditions affecting the relative roles of governments, the private sector and civil society, and technological changes are all fast increasing the pressure to redesign regulatory structures for forest management in most countries. Appropriate forest regulatory systems in the future are likely to go beyond simply “getting the prices right” or just “getting policies right” and will include a greater array of reforms that include broader governance dimensions, such as institutional capacity, legislative rationalization, expanded transparency in design and implementation, as well as greater reliance on market-based instruments.

All countries need strong, fair, implementable regulations that can help the government control illegal and anti-social behavior related to forest management and use. However, at the same time, there is ample evidence by now that the vast majority of private citizens, communities, companies, industrial entities, and other civil society groups will act in the interest of society, if given the opportunity, the knowledge, and the incentive to do so. Increasingly, it is becoming evident that partnerships or other kinds of alliances between government, civil society groups, and the private sector can lead to improved forest management, and socially and environmentally responsible forest use; and this, in turn, can lead to a reduced need for expensive command-and-control activities of the government. The saved government resources can be put to use in creating positive benefits for society instead of being spent on con-

trol measures that frequently are not needed; and the overall process of guiding forest management and use can become more effective and efficient by encouraging all partners to focus on what they do best:

- Governments can coordinate and facilitate participatory processes to identify BMPs, provide and/or fund education and research, offer incentives, organize monitoring, and enforce “bad actor” laws.
- Civil society can volunteer, get educated, and promote education, provide indigenous knowledge, participate in monitoring, apply peer pressure and act as a “watchdog” in identifying anti-social behavior.
- The private sector responds to market incentives that encourage efficient commercial activity that generates revenue and profits, and also supports both government and civil society groups; and it organizes education programs, and develops, adopts, and self-polices certification programs and corporate codes of conduct.

At the same time, we stress that making the transition from command-and-control to a partnership mode generally is not an easy process for any of the participants, nor is it one that can be implemented rapidly, nor simply by prescription. Proper incentives are key ingredients for success.

In considering the principles and processes described above, it is important to keep in mind the need to sequence the transition from one or often several command-and-control systems to the broader partnership approach. Clear priori-

ties need to be agreed upon, including the priority public goods that a society desires from its forests. Ultimately, the partnership approach should be an iterative process of successive approximations, as the partners move towards a framework of incentives and controls that best meets the collective needs of the partners, stresses the role of private incentives and self-interest in meeting social goals, is efficient in bringing about consensus where the need for formal regulation stops and the potential for collaboration and self-policing starts, and is effective and fair in channeling private action into producing a sustainable forest management system that meets societal goals.

In moving ahead with such a partnership process, we cannot stress enough the importance of understanding this challenge and designing reforms from a *systems* perspective. Rather than just considering a new rule or regulation, designers should think of designing *systems* of interconnected mechanisms—incentives (market and other), regulations, educational mechanisms—for guiding private action toward public goals. The resulting system entails different roles and different contributions from the different stakeholders: building on, and taking advantage of, their private incentives and interests. The aggregate result of the combined system of mechanisms, roles and contributions is the promotion of best practice and compliance.

Nor can we stress enough that effective regulatory systems can only be established when there is a sound, clear, and enforceable legal framework in place that defines unequivocally the rights and tenure of individuals and groups involved in forest management and forest use. If these rights and tenure issues are in socially or politically disputed then attempts at regulation are likely to fail. In addition, participation of all partners in the design of new systems is a condition for success, and such participation depends on all parties being fully informed and fully involved in the development of the ultimate system of mechanisms that results, and all parties being treated fairly and equitably in terms of who pays and who gains from the changes that take place.

Finally, we stress again that governments should be prepared as far as finances and human resources are concerned to implement whatever system of mechanisms results. The main role of the government should be to support the actions of others in moving towards the desired set of public goals. Thus, government should be fully prepared to undertake the needed investments in public education and technical support for forest landowners and users who are expected to be members in the new partnerships for improved forest management and use. At the same time, government needs to be capable of and willing to enforce laws that control the “bad actors” that invariably exist in any society.



## ANNEX

### CRITERIA FOR PUBLIC REGULATION OF PRIVATE FOREST PRACTICES<sup>38</sup>

#### REPRESENTATIVE GOVERNANCE

- Forest practice regulations should be authorized by entities that represent the public interest, private ownership interests, and the full range of forest users. The effectiveness of regulations requires their acceptance by the diverse interests they are intended to protect and influence. To the extent that regulations are not developed through processes that represent these interests, they are vulnerable to conflict, to increasing costs of implementation and enforcement, and to a weakening of the authorities for regulation.
- Forest practice regulations should embody the interests of all citizens they are likely to affect. Forestland owners, resource-dependent communities and industries, farmers, members of water districts, environmentalists, anglers, and hunters, for example, should feel that regulatory boards or commissions welcome their participation in rule-making activities.

#### KNOWLEDGEABLE DESIGN

- Forest practice regulations should be based on the application of scientific knowledge, forest management principles, and their impacts on landowners' objectives and rights. The effectiveness of forest practice regulations depends on how well they affect objectives in a manner that fulfills the regulatory intent.<sup>39</sup>
- Forest practices embodied in regulations should clearly state the goal(s) they are attempting to achieve. Regulations should address a legitimate state interest in private forest property, and any substantive standards should be rationally related to meeting those identifiable state interests. Arbitrary or capricious practice standards should be avoided at all times.<sup>40</sup> Regeneration of stands of trees should be part of all forest practice regulations.
- Forest practice regulations should assure the productivity of forest lands and prevent environmental harm. Careful application of forest management practices can increase tree growth, maintain water quality, preserve soil productivity, and provide for wildlife habitat and recreational opportunities. Regulatory schemes, however, should avoid establishing legally mandated goals or forest management objectives. Such decisions remain with landowners. Any such regulations should instead focus on ensuring landowner compliance with minimum forest management standards such as preventing water quality degradation.
- An effective regulatory system should include means to obtain and incorporate the best information about its effects. These means may include the involvement of forestry professionals in rule-making, enforcement, and monitoring procedures; techniques for monitoring physical impacts and public responses; and research on relationships between forest practices and their consequences.

#### FLEXIBILITY

- Forest practices regulations should recognize variations in forest conditions and forest-derived values within a state. Forest land conditions as well as landowner interests and uses vary greatly over even short distances, and conditions under which forest ownerships are managed change significantly over time, so that inflexible or inappropriately rigid regulations are unlikely to achieve or maintain their stated objec-

tives. Laws and regulations should establish minimum standards, but encourage innovation and professional judgment to ensure compliance. Regulations should avoid prescribing specific ways to meet the standards.

- To be adaptable, a regulatory system should emphasize rule-making rather than legislative functions. This emphasis increases the responsiveness of regulatory standards to new and diverse information about actual regulatory impacts.<sup>41</sup> However, frequent amendments of regulatory standards should be avoided, as they can produce an unpredictable regulatory environment, thus reducing incentives for long-term management and undermining confidence in the regulatory approach.
- A regulatory system should place rule-making responsibilities in representative bodies that have direct access to the information they require. For example, many states establish separate forest districts to develop rules that suit their conditions and constituencies, and virtually all states have administrative bodies implementing existing forest practices laws.<sup>42</sup>
- When several means can achieve the same regulatory goal, a landowner should have the discretion to choose the means that best suits his or her particular circumstances.

### **PREDICTABLE APPLICATION AND EFFECTIVE ENFORCEMENT**

- Forest practice regulations should be enforced with respect to (1) the lands and practices to which they apply, (2) the governmental jurisdictions that exercise authority for them, and (3) the processes through which this authority is exercised and appealed. Sound forest management requires long-term commitments by landowners. An unpredictable policy environment discourages such commitments. This is a particularly crucial component as the modern trend is towards increasing numbers of local county and municipal forest regulations. Ambiguous and inconsistent standards, application and enforcement erode the security of owners' commitments to the future quality and productivity of their forests, and diminish public confidence in regulatory standards and processes.
- Forest practice laws and rules should clearly define the land they cover, the terms used, and the standards for acceptable practices.
- Any enactment of forest practice laws and rules should occur at the highest possible level of state government to maximize uniformity and consistency across geo-political boundaries.
- If overlapping levels of governmental jurisdiction enact regulations, the precedence among jurisdictions should be clearly established.
- Enforcement must be consistent among ownerships with similar characteristics and for the same ownerships at different times.

### **CLARITY AND SIMPLICITY**

- A regulatory system should inform those it affects. Timely notification is important for informing landowners, timber operators, foresters, and the public about regulatory objectives they are asked to satisfy, the means they may apply to do so, and processes through which they can adjust these provisions. Accountability of enforcement agencies to those they regulate should be apparent and consistent.
- Authority and responsibility for forest practice regulations should be clearly defined and as uncomplicated as possible. The best regulations are ineffective if owners and other public interests in forest resources misunderstand the processes through which regulations are designed, appealed, and modified. Similar problems arise, if it is too complicated for owners and other public interests, to appeal or modify its provisions.

- The processes of rule-making and appeal should be readily accessible, responsive, and equitable for all who may wish to use them.

### **INCENTIVES**

- Forest practice regulations and related programs should provide incentives that both promote desired private practices and support the viability of the ownerships the regulations are intended to affect. Regulations should enhance landowners' incentives to improve forest practices, directly or through associated programs, cost-shared investments, research and technology development, taxation, or education. Regulations have the potential to discourage improvements and even reduce management quality, if they impose costs or sources of insecurity that owners cannot afford. Overly restrictive regulations may cause landowners to forego opportunities for long-term management and utilization of their forest resources. It may also make desirable management practices uneconomical. Such effects may greatly reduce the productivity of forest lands and the environmental services that productive and viable forest ownerships provide.<sup>43</sup>
- A regulatory system should be designed and administered to produce incentives that have the greatest net beneficial effect on forest resources. The system's capacity to do so should be evaluated in terms of (1) the physical impacts and public responses it produces, and (2) the compatibility of other forest policies and programs with regulatory intent.

### **AUTHORITY CONSISTENT WITH GOVERNMENTAL SUPPORT**

- Forest practice regulations should not exceed a government's capacity to provide adequate financing and staffing in order to satisfy the preceding criteria. Enforcement of regulations requires time, data, and funding, and the effectiveness of forest practice regulations depends not only on their development, but also on the resources that support them. Excessive or inadequate authority or financial support can cause unpredictable application, inequitable treatment, and conflict. These effects may reduce private investments in forest productivity and environmental protection or may increase the public expense of attaining a particular standard.
- A regulatory system should provide clear information to the public about the legal and financial costs that regulations of private forest management may entail. To minimize the threat of legal challenges and complications, diminutions in the value of private forest land as a result of regulations should be avoided when possible,<sup>44</sup> and laws and ordinances should be closely tailored to legitimate state interests in forest regulation.<sup>45</sup>

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## ENDNOTES

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- <sup>2</sup> Colfer and Capistrano 2005.
- <sup>3</sup> Rights and Resources Initiative 2007.
- <sup>4</sup> Gregersen et al. 2005.
- <sup>5</sup> Quoted in Rights and Resources Initiative 2007.
- <sup>6</sup> Rights and Resources Initiative 2007.
- <sup>7</sup> Cashore and McDermott 2004.
- <sup>8</sup> The Economist, Jan 25, 2007.
- <sup>9</sup> Fung et al. 2007.
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- <sup>11</sup> Cashore 2002.
- <sup>12</sup> Cashore et al. 2006.
- <sup>13</sup> Cashore et al. 2006.
- <sup>14</sup> Scheyvens 2006.
- <sup>15</sup> Karsenty 2002.
- <sup>16</sup> See <http://www.fpb.gov.bc.ca/>; Schreckenber 2006.
- <sup>17</sup> Stern 2007. Angelsen 2008.
- <sup>18</sup> Scherr et al. 2004.
- <sup>19</sup> Hamilton 2006.
- <sup>20</sup> Hamilton 2006.
- <sup>21</sup> Based on a study by Ellefson et al. 1997.
- <sup>22</sup> Ellefson et al. 1997.
- <sup>23</sup> BMP can be found in <http://dnrc.mt.gov/Forestry/Assistance/Practices/Documents/BMP04.pdf>
- <sup>24</sup> <http://www.fao.org/forestry/site/32807/en>
- <sup>25</sup> Bull et al. 2001.
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- <sup>27</sup> UNEP Finance Initiative, June 2004.
- <sup>28</sup> O'Sullivan 2006.
- <sup>29</sup> Serbruyns and Luysaert 2006.
- <sup>30</sup> See foreword and introduction to Enters et al. 2002.
- <sup>31</sup> Osborne and Gaebler 1993.
- <sup>32</sup> Lindsay et al. 2002.
- <sup>33</sup> Gregersen 1982.
- <sup>34</sup> White and Martin 2002.
- <sup>35</sup> White et al. 2004.
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<sup>41</sup> Kerwin 1999; Ellefson et al. 1997.

<sup>42</sup> Cabbage et al. 1993.

<sup>43</sup> Mortimer et al. 2003; USDA Forest Service 2002.

<sup>44</sup> Ellefson et al. 1995.

<sup>45</sup> Mortimer et al. 2003; Ellefson et al. 1995.



1238 Wisconsin Ave NW, Suite 204  
Washington DC 20007  
[www.rightsandresources.org](http://www.rightsandresources.org)