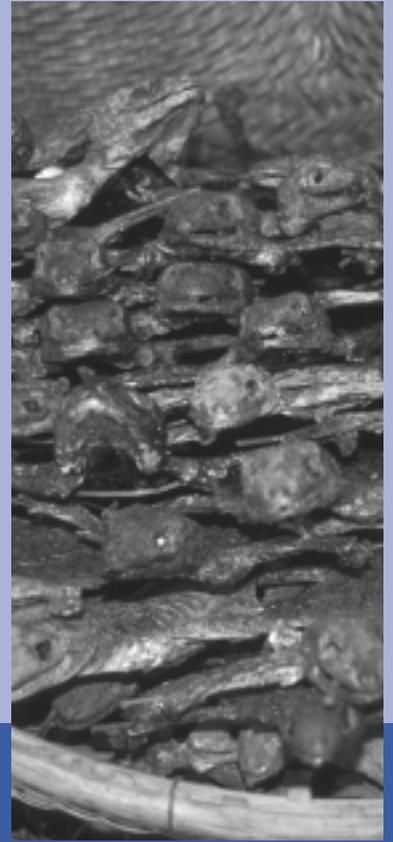


CCG REPORT



Strengthening the Weakest Links Strategies for Improving the Enforcement of Environmental Laws Globally

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About the Center for Conservation and Government

The mission of the Center for Conservation and Government at Conservation International is to catalyze effective public sector responses to the crisis of biodiversity loss by engaging governments and related public institutions in seeking conservation solutions.

About Conservation International

CI believes that the Earth's natural heritage must be maintained if future generations are to thrive spiritually, culturally, and economically. Our mission is to conserve the Earth's living heritage, our global biodiversity, and to demonstrate that human societies are able to live harmoniously with nature.



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Foreword

Effective conservation defies simplistic solutions. Despite decades of effort and significant financial investment from governments, nongovernmental organizations (NGOs), and others, the illegal exploitation of natural resources remains a driving cause of biodiversity loss.

Today, conservation organizations rightly recognize that a multifaceted response—one that engages local communities, supports alternative livelihoods, promotes sustainable resource management, and educates consumers—is necessary. A core problem, however, continues to be weak enforcement of laws that were designed to safeguard wildlife and protected areas.

As valuable supplies of timber, fish, and other natural resources diminish, the pressure increases on those resources that remain. Frequently, creating protected areas and hiring people to guard them are perceived as adequate enforcement responses. Although those steps are essential, the true challenge is far greater.

Enforcement systems are holistic in nature and must be conceived of and dealt with accordingly. Strong enforcement requires not only good detection but also effective investigation, prosecution, conviction, and application of penalties. For this reason, investments that strengthen only one part of this “chain” will not succeed as long as other pronounced weaknesses exist. Because enforcement systems in many countries are often deficient in all those areas, current systems do not effectively deter environmental crime.

This report from Conservation International examines and draws lessons from intensive enforcement research in four biodiversity-rich countries. Using an innovative analytical framework, it quantifies the risks and rewards of illegal activity, underscoring how weak enforcement actually is. The analysis also synthesizes results from those countries to identify a set of common enforcement weaknesses. It concludes by recommending three priority areas for global investment to strengthen enforcement.

Conservation International hopes that this report helps governments, donors, NGOs, and others better conceptualize the enforcement challenge. We believe that reframing the challenge is vital to ensuring that investments in strengthening enforcement are made in a strategic and targeted way. This approach will help ensure that resources deployed to guarantee the survival of natural landscapes and the species that inhabit them are used to the best possible effect.

We look forward to your comments and to further discussion on this important topic.

Nicholas P. Lapham
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Poor enforcement in the environmental realm affects a diverse range of victims. Entire societies are affected when countries lose important sources of revenue that would have accrued from legitimate commerce in natural resources, or when overall governance is undermined by lawlessness in the natural resources sector. The livelihoods of traditional resource users are destroyed by illegal loggers and fishers. Those lawbreakers exploit forests and oceans with no regard for future productivity. Downstream communities are devastated by flash floods from debris coming out of illegally logged forests that protect watersheds, with the poor often being affected disproportionately.

Biodiversity conservation efforts are also severely compromised by poor enforcement. In the absence of enforcement, both traditional and more innovative solutions for countering biodiversity loss may not be successful. Creation of protected areas, measures to protect endangered species, tradable development rights, and ecosystem services markets alike may fail if people cannot be held to the agreements they make. Despite the efforts of conservationists over time, the quality and effectiveness of enforcement still fall far short of where they need to be.

Although weak enforcement is generally acknowledged as a widespread and significant problem, the full complexity of the underlying causes of this weakness is often not understood. Consequently, the most commonly applied solutions are overly simplistic. If systematic analysis is not done, then raising fines, investing in more cars, or hiring more detection agents may seem appropriate strategies for improving enforcement performance. However, those investments may not be the most effective or cost-effective strategies. Identical investments in another aspect of enforcement—for instance, offering specialized training to prosecutors who argue environmental cases in court—might yield a stronger deterrent against environmental crime. Even where investments in stronger detection are needed—as is often the case—such investments may underperform unless other weaknesses in the enforcement system are addressed at the same time.

Identifying weaknesses in an enforcement regime and devising investments that yield the best returns in enforcement performance can be challenging. Enforcement economics¹ provides a simple, yet elegant, theoretical framework for analyzing each component of the “enforcement chain” so that weaknesses can be pinpointed and addressed. This holistic approach is rooted in the understanding that enforcement does not consist of detection alone. Rather, enforcement is a “chain” that also includes the subsequent steps of arrest, prosecution, and conviction. For an enforcement system to effectively deter environmental crime, each of those steps must happen efficiently. The system is only as strong as the weakest link in this chain.

In 2000, with support from the U.S. Agency for International Development (USAID), we at Conservation International (CI) began analyzing the quality of enforcement in four priority biodiversity-rich countries. In each country, our objective was to determine why enforcement was not working, and then to contribute to development of cost-effective investment strategies for strengthening enforcement

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performance. Our adaptation of an enforcement economics methodology that had been developed for the fisheries context² proved a useful analytical tool for this work.

In each country, our work resulted in developing strategic action plans that would improve enforcement performance and were tailored to suit each site. Those plans were designed in collaboration with enforcement agency officials, civil society representatives, and other key stakeholders.

For multiple reasons, the enforcement economics analyses were carried out in close dialogue with enforcement agencies in each site. First, this collaboration allowed us improved access to sensitive enforcement data. Second, by incorporating the agencies into our efforts, we hoped to build awareness of key enforcement problems in the agencies, and to increase their understanding of how the system worked as a whole. Third, working with multiple agencies allowed us to facilitate and encourage interagency dialogue. Fourth, the relationships with senior enforcement agency officials provided researchers with additional personal protection as they did their field work. Finally, through our collaboration, we ensured that the agencies themselves helped lead the process of developing the enforcement-strengthening action plans, thereby increasing ownership and the likelihood that the plans would be implemented.

Key actors and decisionmakers in enforcement agencies and government are most effectively drawn into a discussion about improving an enforcement system when the arguments are presented clearly and rigorously and are complemented by supporting evidence about where and why weaknesses exist. When robust proposals for investments that can increase the system's effectiveness are proffered and when the proposals use a clear analytical framework, opportunities for collaboration with agencies to design, finance, and implement improvement strategies become evident.

While this approach has many advantages and makes a useful contribution, it also suffers the drawback that it emphasizes the technical reasons for weak enforcement. However, this is valuable since enforcement agencies are generally dealing with symptoms, and rarely analyze or concern themselves with addressing the root causes for illegal activities. This approach may also downplay the importance of factors such as unfair laws, lack of alternative legal incomes, corruption, and lack of political will. However, carrying out parallel investigations of and responses to the other issues can neutralize that drawback. The common understanding and trust built up by using this approach to strengthen enforcement also provides a sound basis for more difficult and delicate political and governance discussions regarding corruption and political will.

In this study, synthesizing the problems identified in each site will allow us to develop a set of overall lessons learned. The synthesis will reveal a number of enforcement challenges that were common across countries. The lessons learned will point to a set of priority investment areas for improving enforcement performance. This piece will briefly discuss site-level results, but it will focus primarily on the common themes that emerged from synthesis of the results that have been drawn from the participatory site-level work. We believe that the lessons learned can contribute significantly to efforts toward developing a global agenda of priority actions that will strengthen implementation of both natural resource legislation and protected area boundaries.

This report will begin by putting the discussion of enforcement in its proper context. After describing the enforcement economics methodology, we will present an overview of results from the four country case studies. We will then identify and discuss common weaknesses that are prevalent across sites. Finally, we will detail a clear set of technical investment priorities for enforcement.

Enforcement in Context

SECTION II

For the purposes of this paper, “enforcement” is defined as the system comprising detection, apprehension, prosecution, and conviction of lawbreakers. Strengthening enforcement is a means to an end, not an end in itself. The end goal of improving enforcement is to eliminate illegal activities or to reduce them to tolerable levels—in other words, to improve compliance. Enforcement contributes to that goal by directly suppressing criminal activity and by creating a deterrent effect.

Enforcement strengthening is only one of a number of ways of contributing to the end goal of improving compliance. Other ways include preventative measures such as developing alternative legal sources of income, improving public awareness and support for the laws, reducing the opportunity to break the law, lowering the demand for illegal products, reducing the profits of illegal activities relative to legal ones, and reforming the law to legalize hitherto illegal activities.

Ways to Improve Compliance

Considerable debate takes place over the best ways to improve compliance with particular natural resource and environmental laws. The answer will vary according to the type and scale of crime, the market for the product, the identity of the perpetrators, and the reasons for which they act illegally. For instance, traditional hunting of endangered and newly protected species by indigenous peoples requires a response different from that for professional wildlife poaching or commercial-scale illegal logging by organized criminal gangs. Co-management approaches may often be the most just and efficient approach for the former type of illegal activity, but the assistance of government enforcement agencies is likely required for the latter. Co-management approaches involve local communities in enforcement activities in a way highly tailored to local issues. Whether illegal activities are practiced for cultural reasons or are key to livelihoods, co-management approaches often combine enforcement with developing alternative activities that are culturally acceptable.

The best way to improve compliance will also vary depending on why enforcement against a particular crime is inadequate. Some causes, such as inadequate financial or human resources, or poor training, can be relatively easier to rectify. Others—particularly those where the solution may lie outside the control of enforcement agencies—are far harder to rectify. Problematic causes include lack of support for laws widely viewed as unjust, political uncertainty, lack of political support for stronger enforcement, and ingrained corruption.

Compliance is usually best improved by implementing a mix of preventative and enforcement-strengthening measures together. It is generally accepted that stand-alone efforts to strengthen enforcement are rarely the most effective way forward. However, this actuality does not mean enforcement strengthening can be ignored. A certain level of increased enforcement is necessary to improve compliance in most situations and will be a crucial element, for instance, when combating organized, commercial-scale illegal activities.

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Unjust Laws and Unfair Enforcement

A key concern over strengthening enforcement in isolation is the risk of enforcing unjust or counterproductive laws. For instance, traditional users may be unfairly criminalized when government forest policy and laws fail to respect the rights and concerns of indigenous peoples or local communities, as has often occurred during the creation of logging concessions or protected areas by colonial or central governments. The answer to unfair or counterproductive laws is legal reform and—depending on the circumstances—compensation for “regulatory takings” by government. The answer is not weak enforcement. In general, enforcement-strengthening efforts should not be applied to disputed laws that are undergoing reform, although such thinking has been exploited, for instance, in Papua, by illegal loggers, who argue that they are acting in community interests so they can escape enforcement efforts.

Enforcing disputed laws will likely rouse opposition to enforcement strengthening, particularly from essentially pro-reform allies. This opposition would be unfortunate, because weak enforcement of other, undisputed laws is often identified as one of the reasons that local and indigenous groups are harmed by illegal activities. One way forward is to focus initial enforcement-strengthening efforts on noncontentious laws that are generally seen as legitimate. Ideally, those laws would be the ones governing crimes that have the largest economic, social, and environmental effect. Reinforcing enforcement to combat crimes that are having direct negative effects on local populations could also help build local confidence in and support for law enforcement. Strengthening environmental and natural resource laws that protect the rights and livelihoods of the poor is also a key element of poverty-reduction strategies.

In some cases, the laws may not be at issue, but their application is viewed as illegitimate by local stakeholders because the stakeholders are not adequately involved in decisionmaking. In such situations, co-management approaches—for instance, of natural resources or protected areas—may be necessary to build local support.

In other cases, the laws may be generally accepted as appropriate and fair, but enforcement may be applied unequally, with the rich and powerful—or the enforcement agency staff members themselves—avoiding justice. Again, this circumstance is not a reason for weak enforcement but rather for increased

efforts to ensure that laws are enforced more fairly. Unequal application of enforcement may simply indicate that the rich can afford better lawyers. In such cases, the main need may be for legal assistance for those who are unable to afford lawyers themselves. However, unequal application of the law may also be a symptom of corruption.

Ways to Reduce Corruption

The different types of corruption—petty or grand, collusive or noncollusive—pose many challenges to the various approaches for improving compliance. Enforcement strengthening itself can help reduce corruption, both directly by detecting it and indirectly because better enforcement makes corruption more expensive and more difficult. Corruption itself undermines all parts of the enforcement system, and efforts to combat corruption, therefore, need to be integral to enforcement-strengthening programs. Enforcement-strengthening efforts should start by cleaning up the enforcement and licensing agencies themselves. Greater confidence and trust in government agencies is necessary as a base for strengthening broader public respect for the law and its institutions. Anticorruption efforts include supporting nongovernmental organization (NGO) or civil society watchdogs, as well as various efforts within the enforcement system, such as introducing appropriate checks and balances, ensuring pay and bonus structures to create appropriate incentives, revising staffing procedures, and making public the enforcement information needed to evaluate performance. Those efforts must include the judiciary. A clean and effective judiciary that hears cases fairly will encourage well-intentioned enforcement agents and prosecutors so they know there is a point to doing their jobs well. A clean and effective judiciary can also lead reform efforts within the enforcement system, thereby rooting out and punishing corrupt officials.

In extreme cases, high levels of corruption can call into question whether investing in stronger enforcement is really worthwhile until corruption is brought under some semblance of control. While it is likely that corruption will reduce the effectiveness of investments in enforcement strengthening, it is unlikely that the benefits will be nullified completely. In fact, strengthening the rule of law is generally viewed as an essential part of anticorruption efforts. As a special case, the rigorous analyses of enforcement systems of the type described here promote transparency and understanding and are generally considered a useful component of efforts to reduce corruption.

Another issue generally linked to corruption is military involvement in illegal activities. The commonly accepted long-term answer is to “get the soldiers back in the barracks” and create a “modern” army, meaning one that is fully funded by central government, is under its full control, and fulfills only regular military functions. In the short term, the answer may be to seek agreement that some questionable parts of the military’s busi-

A clean and effective judiciary that hears cases fairly will encourage well-intentioned enforcement agents and prosecutors....

ness operations be legalized. However, the agreement would be conditional on not engaging in any illegal activities such as resource extraction in particular areas, particularly protected areas and indigenous lands. While some parts of the military may often be engaged in illegal activities, either directly or through corrupt practices, the military in general may need to be engaged directly in finding solutions. In many countries, for instance, the cooperation of the military is required to combat illegal logging carried out on a large scale by organized crime, particularly when elements in the military are involved in the illegal logging.

Ways to Raise Public Awareness

In other cases, both the laws and their implementation may be fair, but public understanding and support for the laws may be low. Under those circumstances, awareness raising and education efforts are a priority. In other cases, a law may be fair in theory, but the absence of other livelihood options may make its application extremely punishing in practice. The answer is not weak enforcement, but additional assistance and support to develop alternative income opportunities, along with possible legal reform.

Legal and procedural reform, compensation, legal aid, public outreach, innovative co-management, anticorruption efforts, and support for alternative legal livelihoods can improve

compliance directly and can ease the enforcement challenge. Balanced compliance-improvement efforts that include such measures and enforcement strengthening are likely to be more cost-effective than efforts that overemphasize one measure at the expense of investments in the others.

Efforts that recognize and address the legitimate concerns of various stakeholders are also likely to be most successful in building and maintaining political will for action. Opposition from elites defending their entrenched interests is often blamed for lack of political will for enforcement strengthening. However, unless laws are seen to be fair and to be applied fairly, then opposition from those supporting community rights and grassroots reform may undermine the political will for stronger enforcement. Building and maintaining the political will for improving compliance will generally require building and maintaining a broad pro-reform alliance.

For many good reasons, therefore, enforcement-strengthening efforts should not proceed as stand-alone activities. Rather, their success is augmented if they are carried out together with a package of activities that fall into two general classes: (1) preventative activities that directly improve compliance while reducing enforcement challenge and (2) activities designed to ensure that the laws and their enforcement are workable and fair. The most effective package of activities will vary from place to place and should be developed by local experts and stakeholders.

Enforcement Economics: Theoretical Underpinnings

[A]n enforcement system can be considered “effective” only if it generates an enforcement disincentive that is larger than the financial incentives motivating the illegal behavior.

Description of the Quantitative Model

Economists focusing on the question of enforcement have suggested that the economic deterrent “value” of an enforcement regime can be determined as follows:

$$\text{Enforcement Disincentive} = P_d \times P_{a|d} \times P_{p|a} \times P_{c|p} \times \text{Fine} \times e^{-rt}$$

Where:

P = probability

d = detection

$a|d$ = arrest given detection

$p|a$ = prosecution given arrest

$c|p$ = conviction given prosecution

e = a mathematical constant, the exponential function of 1

r = interest rate

t = time from detection to fine

In this model,³ the frequency and intensity of illegal behavior are assumed to be proportional to the net profits from illegal behavior. If the gross profits of illegal behavior are greater than the expected value of the enforcement disincentive—that is, if violators of environmental laws believe that their profit will be greater than what they will have to pay for breaking the law—then the net profits of illegal activity are positive, and violators will choose to commit the crime. By the same token, if the expected value of the enforcement disincentive is high enough to make the net profits of illegal activity negative, they will decide not to commit the crime.

As shown in the equation above, the value of the disincentive to commit an environmental crime is equivalent to the probabilities of each step in the legal process happening, multiplied by the amount of the fine, and discounted for the time between detection and paying the fine. According to this logic, an enforcement system can be considered “effective” only if it generates an enforcement disincentive (ED) that is larger than the financial incentives (profit) motivating the illegal behavior. For this analysis, “effectiveness” will be defined as such.

The assumptions underpinning this economic framework are closest to reality in the case of commercial illegal activities that are being run on a rational profit-making basis. The underlying assumptions are less well suited to illegal activities that occur as part of subsistence livelihoods or that are driven by cultural objectives. Nonetheless, the model structure is still a useful framework for analyzing the performance of enforcement of noncommercial crimes.

This model offers four particularly interesting insights into enforcement systems:

1. If the probability—or even the perceived probability—of any one of the elements in the enforcement chain is zero, then the value of the entire chain is

reduced to zero. The enforcement regime presents no disincentive to breaking environmental laws.

2. By this logic, enforcement systems are holistic in nature and must be conceived of and dealt with as such. The disincentive value generated by an enforcement regime relies not only on how well the agencies responsible for each element of the enforcement chain do their individual piece but also on how well those agencies work together as a system. The system is only as strong as its weakest link.
3. An element-by-element examination of the enforcement system will help pinpoint exactly where in the process—and within which agencies—weaknesses are being generated.
4. The time element is an important one, because discounting⁴ for each year between detection and payment of the fine will significantly reduce (a) the value of the fine to the violator, (b) the overall value of the disincentive provided by the enforcement regime, and (c) the disincentive to commit an environmental crime.

Determining the disincentive created by an enforcement regime, therefore, requires calculation of the probabilities of detection, arrest, prosecution, and conviction. Either observed probabilities or perceived probabilities can be used in this determination—using the former gives an actual value to the enforcement disincentive, while using the latter tells us what the expected value of the enforcement disincentive is to the violator. Observed probabilities can be determined by collecting data from official records on incidence of detection and so forth. Perceived probabilities are determined through the use of socioeconomic surveys or questionnaires.

Perceived probabilities may be a better indication of disincentive value than observed probabilities, because violators of the law act on their perception of how effective an enforcement system is. In other words, the deterrent effect of an enforcement system will vary depending on how its effectiveness is communicated to violators and to the public at large.

As experience with and information about the enforcement system develops, transparency increases. Thus, observed and perceived values might be expected to become closely correlated or to converge. Having both pieces of information is ideal, because it facilitates analysis of both where the weaknesses in the enforcement chain lie and how people's perceptions of the enforcement regime will affect their behavior. Furthermore, in instances in which a lack of data precludes the calculation of an observed probability, perceived probability can reasonably be used as a proxy. Only rarely, however, are both pieces of information available.

[E]nforcement systems are holistic in nature and must be conceived of and dealt with as such.

In many instances, getting the data necessary to run the quantitative model may be difficult. Enforcement agencies may prohibit access to official enforcement records because those records are seen as sensitive, potentially embarrassing, or even damaging to the agencies. Or official enforcement records may be so poorly maintained that collecting accurate data that can be used to calculate observed probabilities is virtually impossible. The difficulty of designing surveys and questionnaires that accurately capture information for calculation of perceived probabilities makes that alternative equally challenging.

Nonetheless, even where the collection of quantitative data is not possible, the enforcement economics model can provide an excellent analytical framework. The underlying premise of the model—that the overall success or failure of the enforcement system relies on the effective execution of each step in the enforcement chain—can guide a process of gathering expert opinion and anecdotal evidence for a qualitative analysis. A methodical examination of the performance of each step in the system—using information from key informants such as field agents, prosecutors, and other experts—will not yield a numeric calculation of the enforcement disincentive but will provide precise insights into how effective an enforcement regime is in deterring environmental crime.

Determinants of the Quality of Enforcement

Although the quantitative enforcement economics model identifies which probabilities in the enforcement chain are low, it does not answer the question of why probabilities are low. The determinants of the quality of enforcement are factors that influence how efficiently enforcement activities are carried out and, therefore, affect the probabilities of detection, arrest, prosecution, conviction, and penalty. For instance, the probability of detection is determined not only by obvious factors such as numbers of park guards or availability of equipment but also by less-obvious factors such as pay and reward structures to environmental protection agents.

Each successive link in the enforcement chain can be analyzed similarly to identify factors that are contributing to poor performance for that aspect of the chain. By way of example, a partial listing of the determinants of the quality of enforcement, as applied specifically to each link in the enforcement chain, follows:

- Probability of detection is correlated to the incentives given to park guards, rangers, and forest and fishery environmental protection agents (e.g., pay levels and other rewards); to availability of equipment; to number of personnel charged with detecting environmental crimes; and to technical knowledge and skill of personnel.
- Probability of arrest given detection is correlated to police pay and reward structure, to availability of equipment, to quality of evidence, and to social perceptions about the crime.
- Probability of prosecution given arrest is correlated to rewards for prosecutors, to capacity of the justice system and those in it to prosecute environmental crimes, to whether the illegal act is a criminal or civil offense,

to social attitudes toward the crime, and to quality of evidence.

- Probability of conviction given prosecution is correlated to rewards for judges and magistrates, to capacity of the justice system, to nature of the crime, to social attitudes toward the crime, and to quality of evidence.

Weaknesses that often undermine all steps in the enforcement chain are generated when enforcement agents, police officers, prosecutors, or judges fear negative repercussions from doing their jobs properly or when they are intimidated or co-opted by those breaking the law. Analysis of the determinants of the quality of enforcement clarifies why enforcement is weak, thus complementing quantitative analysis of where weaknesses exist in the enforcement chain.

Overview of Country Case Study Results

SECTION IV

From 2000 to 2004 the Center for Conservation and Government (CCG) used the enforcement economics methodology as an analytical framework for assessing the effectiveness of enforcement in four countries: Brazil, Indonesia, Mexico, and the Philippines. In each country, we examined enforcement of a specific crime in a part of the country where biodiversity was under substantial threat. To make the analyses site specific, we modified the generalized form of the ED model to accurately reflect the steps composing the enforcement chain in each country. The type of environmental crime examined varied in each site, thereby reflecting the most pressing threat identified in each country or region. Finally, depending on the handling of the crimes studied in each country, we determined whether to analyze administrative or judicial enforcement processes.⁵

In each site, the analysis of enforcement effectiveness was used to develop strategic action plans for strengthening key weaknesses in partnership with local enforcement agency⁶ officials and other stakeholders.⁷

Because we worked closely with enforcement agencies in executing the site-level analyses, we intentionally did not focus on the issue of corruption. In interviews and other discussions, corruption was identified as an important factor contributing to weak enforcement in all four countries. However, we did not further examine this issue in all case studies. Therefore, although corruption was a major challenge in each site, we will offer no specific commentary on corruption.

In this section, we will present a short background on each site, as well as the quantitative results and some key points of interest about the results from each site. This overview of site-level quantitative findings is limited and is not a full reflection of the very detailed systemic analysis done in each site. However, the overview will serve as the basis for in-depth exploration of lessons learned from the synthesis of results across those sites.

As a group, the case studies gave quantitative validation of one thing that most conservationists already know: Enforcement of natural resource and biodiversity laws and regulations is abysmal in these biodiversity-rich countries. The existing enforcement regimes in the countries we studied are weak, and not one of them provides an adequate disincentive to offset the incentives that are driving illegal environmental activities. While some of their failings are caused by resource limitations, myriad other factors contribute significantly to the agencies' poor performance. The issues that make enforcement ineffective do not lie in any one step of the enforcement chain or in any single agency, but are pervasive throughout the systems.

The existing enforcement regimes in the countries we studied are weak, and not one of them provides an adequate disincentive to offset the incentives that are driving illegal environmental activities.

Case Study 1: Bahia, Brazil— The Atlantic Forest

* * *

Environmental Violation Analyzed: Illegal logging and deforestation

Scale of Crime: Small-scale extraction of logs, or clearing for agricultural purposes

Administrative or Judicial: Judicial

Components of the Enforcement Chain: Detection, citation, prosecution, conviction, and penalty

Agencies Analyzed: Brazilian Institute for the Environment and Renewable Resources (Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis—IBAMA) (detection and citation), Ministério Público (prosecution), judiciary (conviction and penalty)

* * *

The Atlantic Forest is one of the world’s hotspots of plant and animal endemism and diversity. Currently, less than 8 percent of the original Atlantic Forest is still standing (Galindo-Leal and Câmara 2003). The fragments of primary forest found in a roughly 14,000-square-kilometer area of Southern Bahia make it one of the richest centers of endemism in the Atlantic Forest. It is also the only remaining habitat for a variety of plant and animal species, including the endangered primates *Leontopithecus chrysomelas* (golden-headed lion tamarind) and *Cebus xantosternos* (golden-breasted capuchin).

This ecosystem has long been under threat from a variety of actors. Originally, cocoa farmers were the primary engine of ecosystem degradation. More than 400,000 hectares of this region were converted from forest to cocoa between 1960 and 1980 (Alger and Caldas 1994). As cocoa production has declined, beginning in the early 1990s, the degradation of primary and secondary forest fragments in Southern Bahia has intensified. With the decline, cocoa farmers have switched into even more destructive economic activities like raising full-sun coffee, cattle ranching, and logging (their perennial fallback activity). Deforestation of forested areas on private lands or in protected areas has also risen because of the increased numbers of landless peasants who were formerly employed on cocoa plantations. The combined factors have contributed to the ongoing high-level threat to Southern Bahia’s remaining forest fragments.

Logs illegally extracted from this region are generally processed in local sawmills and are used domestically—in Bahia itself and in states such as Rio de Janeiro and Minas Gerais, where demand for wood is high (Mesquita 1997). Deforested areas are generally converted to other uses—poor farmers may use the land for subsistence farming, whereas larger farmers often convert it to one of the more destructive activities described earlier.

In Southern Bahia, our analysis focused on cases of illegal logging and deforestation that had occurred in a 72-municipality region between the years of 1995 and 2002. While there are state agencies charged with detection, our effort focused on cases originating with detection by IBAMA, the federal environmental agency that has had the longest-standing responsibility for enforcement in the region. The enforcement

Case Study 1 Table: Atlantic Forest, Bahia, Brazil

Probability		Value ⁸	Cumulative Probability
Probability of detection given illegal logging/deforestation	P_d	1	
Probability of citation given detection	$P_{a d}$	1	
Probability of prosecution given citation	$P_{p a}$	0.51	0.51
Probability of conviction given prosecution	$P_{c p}$	0.16	0.082
Average value of penalty		\$100.91	
Average time elapsed (days)	t	451	
Enforcement disincentive	ED	\$6.44	
Profits to illegal logging/deforestation		\$75.00	

process analyzed in this case was a judicial process, so we also tracked the cases through the hands of public prosecutors and into the courts.

According to research done by the Instituto de Estudos Socioambientais do Sul da Bahia (Institute for Social and Environmental Studies of Southern Bahia—IESB), the profits to illegal logging from harvesting as little as one tree in the biodiversity-rich forests of this region are \$75.⁹ Using the enforcement economics methodology, we found the value of the disincentive generated by the enforcement system in this region was only \$6.44.

Qualitative analysis demonstrates that the primary factors contributing to ineffective enforcement in Southern Bahia¹⁰ are the following:

- Budgetary constraints
- Jurisdictional confusion
- Procedural inefficiencies
- Low technical capacity
- Lack of interagency cooperation

In calculating the ED for Southern Bahia, we had to make two generous assumptions. Data limitations¹¹ precluded the calculation of precise quantitative values for probability of detection and probability of citation upon detection. For this analysis, therefore, we assumed both those probabilities to be 100 percent. However, detailed qualitative analysis previously conducted in the region (Akella, Orlando, Araujo, and Cannon 2004) has clearly demonstrated that the probabilities are not that high in either case. The probability of detection is quite low owing to a number of factors including lack of public willingness to report environmental crimes, jurisdictional confusion, and lack of equipment and personnel. Likewise, probability of citation upon detection is low because detection agents often give warnings rather than writing up citations and, in some instances, may be bribed into “overlooking” a detected illegal act. If calculated using the true probabilities of detection and citation upon detection, the ED would undoubtedly be much lower than the already paltry \$6.44 calculated through this work.

These data show that the cumulative probability of an illegal act being penalized is only 0.082. However, this cumulative probability is also artificially high because we assumed the probabilities of detection and citation upon detection were both 1. In reality, the ultimate probability of a crime being penalized is far less than 0.082.

In this case, even with (assumed) 100 percent detection, the enforcement system is ineffectual at countering the incentives to log or deforest. In Bahia, only half of all detected offenses are prosecuted, and an even lower percentage of offenders are

In Bahia, only half of all detected offenses are prosecuted, and an even lower percentage of offenders are convicted.

convicted. Penalties are relatively low, and the slow functioning of the system ensures that violators, even if sanctioned, do not “pay” for their offenses until well after a year has passed—during which time they can continue to violate the law. In such circumstances, having outstanding detection would make very little difference. This case study validates the assertion that detection alone is not enforcement and that investments across the enforcement chain are necessary to make the system more effective.

The government’s instinct has often been to spend any enforcement-strengthening money that becomes available on acquiring more cars and hiring more people for detection efforts. While those additions are undoubtedly important, our analysis suggests that the Bahian system’s effectiveness would improve more through concurrent investments in other elements of the enforcement chain—training prosecutors and judges, for instance.

Case Study 2: Chiapas, Mexico— The Selva Maya

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Environmental Violation Analyzed: Illegal wildlife hunting and trade

Scale of Crime: Subsistence-level hunting

Administrative or Judicial: Administrative

Components of the Enforcement Chain: Detection, inquiry, processing, sanction, and penalty

Agency Analyzed: Federal Prosecutorial Service for Environmental Protection (Procuraduría Federal de Protección Ambiental—PROFEPA) (administrative process encompassing all steps)

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The Mesoamerica Hotspot is the second richest global hotspot, in part because of its geographic position at the interface between North America and South and Central America and the Caribbean. The Selva Maya forms the northern part of the Mesoamerica Hotspot, occupying southeastern Mexico, northern Guatemala, and Belize. The Selva Maya is a unique mosaic of tropical ecosystems resulting from hundreds of

years of management by the ancient Mayans. Its biodiversity significance stems from the presence of two major classes of tropical ecosystems: montane tropical forests and lowland rain forests. Those ecosystems incorporate populations of key endangered species, including the major remaining populations of *Tapirus bairdii* (Baird’s tapir), the *Ara macao cyanoptera* (scarlet macaw), the *Agriocharis ocellata* (ocellated turkey), and a subspecies of the *Tayassu pecari ringens* (white-lipped peccary).

Wildlife biodiversity in the Selva Maya (including the above-named species) is severely threatened by hunting for bush meat and commercial trade. Mexico has an active internal trade in native wild parrots and other species. Mexican reptile and bird species are often exported illegally. Intense demographic pressure and poverty in the region are the primary underlying causes of wildlife hunting. The main focus of current conservation strategies in Selva Maya is on habitat conservation. However, hunting levels are giving rise to increasing concerns about the emergence of “empty forests.”

In the Selva Maya, we hoped to focus on the activities of both small- and large-scale wildlife hunters and traders, using data on violations detected between 1999 and 2001. However, the records we found of wildlife hunting and trading cases that were initiated by PROFEPA during this time period were only for small-scale, subsistence-level hunting. Although large-scale commercial hunters and traders are quite active in the region, case records for commercial-scale wildlife hunting and trading activities were not found in local PROFEPA offices.

PROFEPA, a federal agency, is the primary authority dealing with wildlife violations in the Selva Maya. Mexican law allows for environmental violations to be handled through either a judicial process or an administrative process. In the judicial process, PROFEPA does the initial detection and inquiry and

then passes the case on to the prosecutors of the Ministerio Público (MP), who process it and try it in court. However, our analysis found that the local PROFEPA office sends only 2 percent of wildlife hunting and trade cases on to the MP (i.e., the probability of prosecution¹³ given detection is only 0.02). The reason, PROFEPA personnel suggest, is that the majority of the cases they handle have insufficient evidence to be useful to the MP (Conservation International—Selva Maya 2003).

Given the low percentage of cases that go through the judicial process, we focused our analysis on the administrative process instead. This administrative process—from detection through sanction—occurs wholly within PROFEPA, through its Judicial Area Sub-Delegation. Because PROFEPA chose to process the bulk of the wildlife violations in our sample administratively, this process was the most relevant one to analyze.

Averaging PROFEPA’s data on the value of confiscations, we estimated the profits to illegal wildlife hunting and trade in the Selva Maya at \$191.57 per trip. On the basis of available data, we found that the value of the enforcement disincentive generated by PROFEPA’s administrative system is only \$5.66.

Qualitative analysis showed that the main causes of ineffective enforcement in Selva Maya are the following:

- Inadequate and unclear laws governing wildlife hunting and trade
- Lack of technical capacity
- Scarcity of necessary equipment
- Poor collaboration among environmental enforcement agencies

Case Study 2 Table: Selva Maya, Chiapas, Mexico

Probability		Value ¹²	Cumulative Probability
Probability of detection given illegal wildlife hunting/trade	P_d	1	
Probability of inquiry given detection	$P_{i/d}$	0.58	0.58
Probability of processing given inquiry	$P_{p/i}$	0.69	0.4
Probability of sanctions given processing	$P_{s/p}$	0.03	0.012
Average value of penalty		\$545.47	
Average time elapsed (days)	t	263	
Enforcement disincentive	ED	\$5.66	
Profits to illegal wildlife hunting/trade		\$191.57	

Given the data constraints, we again made the generous assumption in this case that the probability of detection was 1. Again, qualitative research has demonstrated that this probability is most likely very low. The single fact that no files for cases of large-scale commercial wildlife hunting and trade were found exemplifies this. Even assuming perfect detection, analysis shows that the system does a very poor job of offsetting the incentives driving illegal hunting and trade.

Sadly, this assumption of perfect detection also means that the very low 0.012 cumulative probability of a crime resulting in sanctions is artificially high. In reality, given that the probability of detection is not really 1, the probability of sanction is even lower than 0.012.

It is evident that the most serious problems are at the point of sanctioning violators and imposing penalties. Only 0.03 of the cases that make it through the processing stage results in any sanction. When offenders know that—even if they are detected, investigated, and processed—the chances of their being sanctioned is so low, they are unlikely to take the threat of enforcement very seriously.

The particularly low probability of sanction given processing in this case may reflect a deliberate policy of weak enforcement, given the fact that those responsible for small-scale subsistence hunting are the poor and disadvantaged people who have few alternatives.

However, if this probability also applies in more serious cases, it is very troubling. The limitations of PROFEPA's data made it impossible to determine whether this same low rate of sanctions is prevalent in cases of commercial-scale wildlife hunting and

trade. The low rate of detection of large-scale wildlife operations, combined with a low rate of sanctions, could mean that this system presents virtually no deterrent to lucrative commercial wildlife hunting and trade.

Case Study 3: Indonesia— Papua Province

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Environmental Violation Analyzed: Mostly the shipment of illegal logs

Scale of Crime: Average nearly 2,000 m³ of logs per crime

Administrative or Judicial: Judicial

Components of the Enforcement Chain: Detection, investigation, police review, prosecution, conviction, and penalty

Agencies Analyzed: Provincial Office for Natural Resources Conservation (Balai Konservasi Sumber Daya Alam—BKSDA) (detection and investigation); Provincial Forestry Service (Dinas Kehutanan) (detection and investigation); military (detection); customs (detection); police (detection, investigation, and review); Ministry of Forestry (detection, investigation); Attorney General (prosecution); Ministry of Justice (conviction and penalty)

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Papua Province, Indonesia, is the western half of the island of New Guinea. The island forms one of the world's last three mega-diversity tropical wildernesses and, as such, is a global

Case Study 3 Table: Papua Province, Indonesia

Probability		Value ¹⁴	Cumulative Probability
Probability of detection given illegal logging	P_d	0.032	
Probability of investigation given detection	P_{id}	0.68	0.022
Probability of police review given investigation	P_{ri}	0.84	0.018
Probability of prosecution given police review	P_{pr}	0.41	0.007
Probability of conviction given prosecution ¹⁵	P_{cp}	0.85	0.006
Average value of penalty		\$1,197.00 ¹⁶	
Average time elapsed (days)	t	269	
Enforcement disincentive	ED	\$6.47 ¹⁷	
Profits to illegal logging		\$91,967.36	

priority for biodiversity conservation. Papua Province also has the largest remaining forest areas in Indonesia and is the source of an increasingly significant amount of Indonesia's logs and timber products. However, it is now one of the major areas of commercial-scale illegal logging in Indonesia.

Commercial-scale illegal logging comes in various forms and is carried out by a variety of actors. The illegal activity of greatest concern occurs in areas where logging is not permitted (e.g., watershed protection forests, protected areas) and is linked to companies with licenses to log areas nearby. Those companies may carry out the logging themselves, subcontract to smaller local companies, or simply buy logs without obtaining appropriate papers to demonstrate legality.

Although large-scale illegal logging is taking place, little evidence was found of enforcement efforts in the forest. This absence is largely because of the low numbers of rangers available to carry out patrols. Instead, most enforcement efforts are targeted at interdicting large shipments of logs that are not accompanied by the correct paperwork (either because the logs were illegally cut or because they were being smuggled out to avoid taxes and fees). Hence, the example presented here generally concerns the enforcement of shipping large quantities of illegal timber out of Papua on large ships.¹⁸ Because of the large volumes involved, the values in this example are a few orders of magnitude larger than those in earlier examples. Although such illegal acts can be considered either crimes or administrative violations, most were treated as criminal cases. Our analysis shows that although the profits to logging in this case are close to \$100,000, the value of the disincentive presented by the enforcement regime is under \$7. Put one way, if only the fine is considered, the incentives are approximately 14,000 times larger than the disincentives to illegally log in Papua.¹⁹

Qualitative analysis demonstrated that ineffective enforcement in Papua can be largely attributed to the following:

- Overlapping and inconsistent laws governing logging
- Lack of coordination between agencies and between local, provincial, and central offices of single agencies
- Inadequate budgetary resources
- Insufficient numbers of trained forest investigators
- Lack of incentives for effective performance

While corruption and lack of political will are major reasons for poor compliance with forestry and nature conservation laws in Indonesia, this study focused on the technical reasons for poor enforcement (for reasons explained earlier).

The cumulative probability of being convicted of illegal timber shipping in Papua is only 0.006. This number is more realistic than the cumulative probabilities calculated for the Bahia and

Selva Maya sites, because the probability of detection was not assumed to be 1 in this site.

The probability of detection in this case appears extraordinarily low in comparison to the other probabilities associated with steps in the enforcement system. If our estimate of total quantity of illegal logging is correct, then improving detection is the topmost priority in this case.²⁰ Detection is low because of the lack of rangers, as noted previously, but also because few people are willing to appear as witnesses or inform enforcement authorities when they detect forest crime. People are hesitant to come forward because enforcement agencies do not do enough to protect witnesses and informants from suspects. Furthermore, people believe the enforcement agencies are corrupt or incompetent and will not use the information properly or effectively.

Relatively speaking, investigation, police review, prosecution, and conviction are being done well, although there is still room for improvement. It is important to remember that the other probabilities, while higher, are still too low for the system to function effectively even if detection is improved significantly, given the size of penalties imposed. Hence, it is not appropriate to focus all available resources on improving detection alone. Raising the probability of detection to 1 in this case would bring the enforcement disincentive²¹ only up to roughly \$200—larger than the current disincentive, but still an inadequate deterrent. Without larger penalties, confiscation of logs and equipment, and improvements in the other enforcement steps, illegal logging will continue to be lucrative.

It is commonly suggested that raising fines can fix poor compliance, because it is thought that if the fine is higher, violators will be deterred from breaking the law. While it is true that higher penalties do present a greater deterrent, the effects of increasing penalty size are diminished by the low probability of actually being penalized. Three findings emerge from this observation. First, weaknesses in the enforcement system need to be fixed if large penalties are to translate into effective deterrents. Second, when the probability of actually being penalized is low, the size of the penalty required to create a deterrent becomes very large (in this case the penalty would need to be raised to many millions of dollars). Third, the required size of penalty can quickly exceed what is politically or culturally viable, meaning other enforcement steps must be strengthened for realistically sized penalties to create an effective deterrent.

Case Study 4: Palawan, Philippines— The Calamianes Islands

* * *

Environmental Violation Analyzed: Illegal fishing with dynamite and cyanide

Scale of Crime: Small-scale illegal fishing by local communities and seasonal fishermen in municipal waters and areas of ancestral domain

Administrative or Judicial: Judicial

Components of the Enforcement Chain: Detection, arrest, filing, prosecution, conviction, and penalty

Agencies Analyzed: Philippines National Police (PNP) Maritime Unit (detection, arrest, filing, sometimes prosecution); Philippines National Coast Guard (detection, arrest, filing); public prosecutors (prosecution); municipal and regional courts (conviction and penalty)

* * *

Northern Palawan’s marine environment is particularly rich in biodiversity. The region’s Calamianes Islands form part of the “coral triangle,” which supports the world’s richest coastal marine biodiversity. The productivity of the waters of Northern Palawan was once incredibly high. However, those fishing grounds are now considered depleted because of overfishing. With the reported dwindling catches and high international demand for the live reef fish trade (LRFT), many fishers have shifted to more destructive methods.

Cyanide and dynamite fishing for the LRFT have resulted in the deterioration of critical coral reef habitat. Illegal trade of live fish species such as the *Cheilinus undulatus* (Napoleon wrasse) and the *Cromileptes altivelis* (barramundi cod) seriously threatens their survival. Although fisheries jurisprudence in the Philippines is considered good, effective

enforcement of fisheries laws has remained a pronounced challenge.

While local villagers often identify seasonal fishermen and neighboring villages for illegal fishing, interviews with key informants have revealed that community members also participate in cyanide and dynamite fishing. High international demand for live fish makes destructive fishing a lucrative source of income for fishermen (Mayo-Anda, Dalabajan, and Lasmarias 2004).

In Palawan, CI worked closely with a local partner, the Environmental Legal Assistance Center (ELAC).²³ Our work focused on cyanide and dynamite fishing cases that had occurred between 1999 and 2002. Thus, we examined the effectiveness of the judicial process that began with detection by the PNP Maritime Unit or the Coast Guard,²⁴ then passed through the public prosecutors or chiefs of police acting as prosecutors, and ended with final resolution in the courts system.

Detailed economic and livelihood analysis of the LRFT conducted by Conservation International (Conservation International—Philippines 2002) calculated the profits to cyanide and dynamite fishing at \$70.57 per trip. The enforcement economics analysis demonstrates that the value of the disincentive generated by the enforcement regime is only \$0.09, or virtually zero.

Qualitative analysis identified the following factors as being the primary causes of ineffective enforcement in the Calamianes:

- Low infrastructure capacity
- Low technical capacity

Case Study 4 Table: Calamianes Islands, Palawan, Philippines

Probability		Value ²²	Cumulative Probability
Probability of detection given cyanide/dynamite fishing	P_d	0.062	
Probability of arrest given detection	$P_{a d}$	0.003	0.00019
Probability of filing given arrest	$P_{f a}$	0.85	0.00016
Probability of prosecution given filing	$P_{p f}$	0.62	0.0001
Probability of conviction given prosecution	$P_{c p}$	0.24	0.00002
Average value of penalty		\$4,463.32	
Average time elapsed (days)	t	210	
Enforcement disincentive	ED	\$0.09	
Profits to cyanide/dynamite fishing		\$70.57	

[W]e decided to invest in helping establish detection, apprehension, and adjudication functions within the municipalities.

- Procedural inefficiencies
- Lack of interagency coordination
- Lack of incentives for effective performance

The cumulative probability of someone being convicted of illegal dynamite or cyanide fishing in the Calamianes is very low at only 0.00002. As in the Papua case, the fact that no assumption was made about the probability of detection makes this cumulative probability more realistic.

The numbers for probability of arrest given detection and probability of filing given arrest merit some specific attention, because they are particularly interesting. Examination of the two probabilities demonstrates the importance of gathering qualitative information that can help interpret and judge the accuracy of the quantitative results. The very low probability of arrest upon detection is troubling not only because it is so low but also because the system's corruption appears to be embedded in this low probability. Many detection records indicated that a violator had been caught at sea and his equipment and catch had been confiscated but that the violator had escaped before an arrest could be made. Given the confiscation of equipment—including the boat—escape would seem implausible. It seems more likely that this low rate of arrest reflects bribery of arresting officers by dynamite and cyanide fishers. If we consider this information, the relatively high probability of filing given arrest, seems less impressive. While the 0.85 probability calculated from our sample may lead to the conclusion that filing does happen a majority of the time, the number of cases making it past arrest to the filing stage is minimal. Furthermore, qualitative data indicate that the filing process is so rife with issues that filing generally does not happen within the time frame prescribed by law.

One of the enforcement-strengthening strategies developed in the Palawan case is worth mentioning, because it is different from the strategies developed through our work in other places. In the rest of our sites, we focused on fixing the existing enforcement system. In the Philippines, this was not our focus. In our discussions with enforcement personnel from PNP Maritime Unit and the Coast Guard, as well as with prosecutors, it became clear that enforcement of illegal fishing was not viewed as a top priority for those agencies. Their multiple responsibilities—which encompass not only environmental issues but also customs and immigration issues, as well as generally maintaining peace and order—made it

difficult to justify devoting additional personnel and resources to enforcement against destructive fishing in local waters.²⁵ In that situation, it was questionable whether funneling resources into those agencies would improve the enforcement system.

However, we found that local governments and communities had a strong interest in ensuring that illegal fishing rules were enforced in municipal waters or in areas of ancestral domain. Therefore, it seemed that dedicating resources to developing a co-management approach to fisheries enforcement would be a more appropriate and successful means of achieving better enforcement in the Calamianes.

Philippines federal law allows for (1) citizens' arrest of environmental violators and (2) establishment of administrative adjudication bodies at the municipal level, which are empowered to handle such violations administratively—confiscating equipment, holding offenders, and charging small fines. In the fishing municipalities of the Calamianes, politicians and citizens alike have an interest in seeing the productivity of their waters protected. They also share an interest in seeing outsiders and other violators punished for destructive fishing practices.

Rather than trying to improve the judicial process that has handled these cases to date, we decided to invest in helping establish detection, apprehension, and adjudication functions within the municipalities. Our partner ELAC is currently working with local authorities in three municipalities to write and pass municipal fishing ordinances; training community members and citizens groups in detection and apprehension; and working with municipal authorities, civil society groups, NGOs, and community leaders to form municipal adjudication bodies comprising representatives from each of those sectors.

National-level policy work will also be necessary to ensure the effectiveness of the adjudication bodies. For instance, current laws dictate that the maximum monetary penalty that a municipal adjudication body can charge is PhP 2,500 (US\$50). Furthermore, the law mandates that any fines collected by the adjudication bodies are not remitted to the municipality but rather go into the Philippines National Treasury. The effectiveness of municipal adjudication bodies will be augmented if (1) they are allowed to assign higher administrative penalties to offenders, and (2) if collected penalties, or some percentage of them, are retained locally to finance municipal-level enforcement efforts.

The value of this example is that it suggests that in some instances—when enforcement performance is poor and there is little support for fixing it—it may be useful to explore the viability of alternative enforcement systems.

Synthesis of Results and Global Lessons Learned

SECTION V

A number of site-specific problems were found in each country where the enforcement economics analysis was conducted. Site-specific action plans were developed to address them. Those action plans are currently being used to help implement enforcement-strengthening activities in those countries.

Another contribution of the enforcement economics case studies—and the one discussed here—was that they allowed us to identify five key weaknesses that were present across the four sites. Our discussions with global enforcement experts have confirmed that the common challenges identified in our work exist in many countries of biodiversity importance. Understanding the lessons learned in a generalized sense can be a useful way to begin incorporating enforcement strengthening into global conservation strategies.

This section will present the five most important common challenges that we found in our sites:

1. Poor interagency cooperation
2. Inadequate budgetary resources
3. Technical deficiencies in laws, agency policies, and procedures
4. Insufficient technical skills and knowledge
5. Lack of performance monitoring and adaptive management systems

As noted earlier, carrying out this work in close partnership with the enforcement agencies themselves has resulted in a focus on largely technical measures. However, successfully tackling the challenges will have a positive effect on other challenges not explicitly listed, such as corruption (e.g., through improving agency resources, streamlining procedures, promoting interagency cooperation and supervision). While not all necessary enforcement-strengthening activities are captured, the ones discussed here are all essential if enforcement is to be strengthened successfully.

Each issue will be described in detail and discussed as we draw on site-level examples, as well as on information gathered by talking to global enforcement experts.

Challenge 1: Poor Interagency Cooperation

In the countries studied, we found that the multiple agencies charged with enforcement rarely communicate nor are they mandated (by policy or law) to do so. This lack of integration is both horizontal and vertical—that is to say, the various agencies involved in a single step of the enforcement chain do not coordinate with one another, much less with agencies responsible for other steps of the enforcement chain. For instance, prosecutors make little effort to work with detection agents in building cases, even when their own understanding of environmental law or detection agency procedures is limited. And judges do not consult with any other agencies to gather information on damages caused that might help assess appropriate penalties.

Our discussions with global enforcement experts have confirmed that the common challenges identified in our work exist in many countries of biodiversity importance.

[E]fforts to reduce some time-consuming procedural inefficiencies have been compromised by agency politics.

This poor coordination occurs in part because individual agencies have little incentive to work more closely together. Individual agencies most often perform their function in the enforcement chain in isolation. If their performance is checked at all, it is also in isolation. The effectiveness of the enforcement system as a whole is rarely considered. Although overall performance is greatly enhanced when agencies collaborate and act as a system, this collaboration rarely happens. Getting agencies to collaborate in this way may often require formal instructions to do so from local and national political leaders. Even when individual agencies fully understand the holistic nature of enforcement or their role in the system, their authority is limited to their own function. The inefficiencies that result from poor coordination are significant, as the following examples demonstrate. For this reason, persuading agencies to think and act holistically, as a system, is a useful step forward.²⁶

Jurisdictional Confusion

The enforcement economics analyses revealed that jurisdictional confusion is common among detection agencies, prosecutorial services, and even courts. With respect to detection, this jurisdictional confusion often results in important areas having no routine detection activities. In Southern Bahia, the federal and state detection agencies were unclear on which areas and which types of crimes were within whose jurisdiction. As a result, each agency tended to decide that the other agency was most likely responsible. Thus, some of the most important repositories of biodiversity in the region were largely ignored.²⁷

The same failure happened in Palawan, where both the Philippines National Police Maritime Unit and the Coast Guard insisted that the same areas fell under the jurisdiction of the other agency. The failure of detection agencies to clarify jurisdictional confusion and coordinate activities so that priority areas are patrolled has a substantial effect on quality of detection. Detection is weak for many reasons, but the contribution of jurisdictional confusion between detection agencies is often overlooked.

Similar problems exist in prosecutorial services and courts. Because detection agencies have a limited understanding of how prosecutors are organized, citations or case files are often misdirected. In Brazil, for instance, we found that case files that should have gone to state prosecutors were being sent to federal prosecutors, and vice versa. Because federal and state prosecutors have little interaction, no efficient procedure existed for getting case files to the right prosecutor. The result was

that case files would remain in limbo and unprocessed for long periods of time, sometimes exceeding the statute of limitations.

In the Philippines, this same type of situation occurred because detection agents and prosecutors were uncertain as to which courts should handle which cases,²⁸ and they would frequently file cases in the wrong courts. This misfiling either would delay prosecution of the case or would result in files being mishandled or lost.

Jurisdictional confusion causes poor detection, failure to prosecute, and lengthy delays in the time it takes for cases to get through the system. This lack of clarity is not the result of some great complexity in how jurisdiction is assigned; it comes from a simple lack of information. It seems likely that such situations could be easily resolved if agencies communicated better and reached a working consensus on questions of jurisdiction and collaboration.

Procedural Inefficiencies

The lack of interagency cooperation generates procedural inefficiencies that undermine the effectiveness of enforcement. Agencies that rarely interact cannot develop strategies for streamlining their handling of environmental violations. As a consequence, procedural issues can compromise the proper and timely functioning of the enforcement system.

In Papua Province, Indonesia, the political processes of decentralization and special autonomy have reorganized the reporting lines that used to connect local-level forestry services to the Ministry of Forestry. Regardless of the merits of such a process, one unintended result has been the breakdown of information flows between regency (local), provincial, and central forestry units. The result is that the provincial forestry department is often unaware of many of the cases being handled at the regency level, and the Ministry of Forestry is unaware of many of the cases of illegal logging that have been detected in Papua. This lack of information can greatly impede the probability of arrest in cases of, for instance, illegal log shipments, given that the Ministry of Forestry still finances joint operations with the navy and needs information to decide where to carry out operations. In a few cases, local enforcement agencies were not aware of the illegal logging cases that were identified by the Ministry of Forestry.

Also in Papua Province, efforts to reduce some time-consuming procedural inefficiencies have been compromised by agency politics. Standard forest rangers are not qualified to carry out investigations and must call in the police. For all crimes, the police are the primary investigation agents who collect the evidence and present it to prosecutors. Given the workload of the police, there are often delays in investigating forest crime cases. In the interest of improved efficiency, a mechanism was set up whereby forest rangers could undertake investigations as Forest Civil Investigators (FCIs). To become an FCI, a

forest ranger must undergo special training from the police in carrying out investigations, must get a decree that is from the Ministry of Forestry and is endorsed by both the police and attorney general headquarters in Jakarta, and must submit that decree to the Ministry of Justice in order to receive an FCI license. A ranger qualified as an FCI can, in theory, investigate forest crimes under the supervision of regency police and can work directly with prosecutors. However, the police have not been entirely comfortable with the new arrangements and have sought to retain their role as primary investigators and intermediaries between forest rangers and prosecutors. Although many rangers have received training to become an FCI, few have successfully gotten their license from the Ministry of Justice. If the FCI mechanism cannot be made to work, then some alternative is needed for reducing delays in investigations.

The situation in Southern Bahia provides another example of procedural inefficiency. In that region, upon detecting a violation and writing up a citation, the detection agency IBAMA—rather than directly handing over the case to the prosecutor in the locale of the crime—would send the citation to IBAMA’s nearest regional office. The regional office would, in turn, send the file to IBAMA’s state headquarters in the capital, Salvador. IBAMA in Salvador would then send it to the MP’s state headquarters in Salvador, who would send it to the appropriate regional MP office,²⁹ who would then pass it on to the prosecutor in the locale of the crime. The case began in the locale of the crime and ended there—yet, in between, it would pass through as many as six offices in three cities. The results of this time-consuming voyage were significant—cases would get “lost” (unintentionally or intentionally); prosecution would be delayed; and, in some instances, the three-year statute of limitations was exceeded, making prosecution impossible.

Again, the convoluted or unclear procedures are not necessary; they simply have not been clarified or improved upon. Simple discussion among upper management of agencies across the enforcement chain could result in more efficient procedures that would improve the effectiveness and timeliness of the enforcement system.

Weak Cases

Poor collaboration between agencies charged with different enforcement functions often precludes prosecutors from building effective cases and prosecuting them successfully. Analysis showed that often prosecutors—even those with little understanding of environmental law and environmental crime—would not consult with detection agents or inspectors to inform themselves of the details of the case. For their part, detection agents and investigators, if they fail to consult with prosecutors, are often unaware of what information or evidence is necessary for building strong cases. Weak cases are unlikely to result in convictions and present a serious obstacle to enforcement effectiveness.

In Brazil, we found that many cases are never prosecuted for lack of adequate evidence to support the charge being made. In issuing citations, detection agents are required to record name of the offender, locale of the crime, and nature of the crime. However, they often fail to provide important supporting information—reports from witnesses, photographic evidence, and the like—making it difficult or even impossible for prosecutors to argue cases successfully. In both Indonesia and Mexico, inadequate quality of evidence was commonly cited as a reason for police not sending cases to prosecutors or for prosecutors deciding not to submit cases to court. Although lack of technical capacity (training in quality of evidence) is certainly partly to blame, so too is the lack of interagency communication, which means detection and investigation agencies are not aware what the next agency up the “chain” is looking for.

Lack of information on the prosecutor’s part can lead to poorly argued cases. In one case from the south of Bahia, IBAMA agents detected trucks that were illegally transporting logs, confiscated the equipment and timber, and filed citations with the appropriate prosecutor’s office. Unfortunately, the public prosecutor allegedly did not know that a notice of equipment confiscation is usually accompanied by a citation for an environmental violation. The defense attorneys appeared in court with only the confiscation notices, the prosecutor did not link the confiscation to an environmental violation, and the judge returned the trucks with no penalty.

The anecdotal evidence from all four countries and from people working on enforcement globally is full of stories of cases that were unsuccessful because of insufficient evidence or poor prosecution. Many cases might have turned out differently had the detection agents or investigators known what evidence a prosecutor would need, and had the prosecutor understood what information the detection agency could provide. But in the countries we studied, this type of consultation is not required and is unlikely to happen organically. As a result, cases that may have otherwise served as enforcement success stories have ended up being examples of what not to do.

Challenge 2: Inadequate Budgetary Resources

In each of the case study sites, inadequate resources compromise the ability of detection and investigation agencies, prosecutorial services, and the judiciary to fulfill their enforcement responsibilities effectively. The personnel and infrastructure issues generated by persistently low levels of funding can be observed across the enforcement chain.

Low salaries for detection and investigation positions make them unappealing to highly qualified applicants. As a result, the education level of many agents is quite low. While limited schooling does not necessarily preclude them from being excellent field agents, it may lead to inefficiencies in the handling

Perhaps the most important overarching consequence of inadequate budget resources is that the shortfall makes implementing new strategies to improve enforcement performance very difficult.

of paperwork or the preparation of cases. The low salaries, combined with a lack of recognition or reward structures, may also contribute to high incidence of corruption or bribe-taking among field agents. As described, the enforcement economics analyses did not explicitly address corruption. However, anecdotal evidence from all four sites indicates that corruption is considered a major obstacle to effective enforcement.

The personnel and equipment shortages that result from budget limitations also affect enforcement quality. A lack of human resources makes it difficult for detection and investigation agencies to adequately cover critical ecosystems. In Bahia, for instance, two detection agents with one car between them were charged with all detection activities in a critical 72-municipality, 200-square-kilometer area at the time of our study.

In Papua Province, the police are the lead agency charged with investigating forest crimes. The police are overworked and do not have the necessary training in forestry law to be able to investigate the more technical infringements effectively. The advent of forest rangers trained as investigators could remedy both capacity and training problems, but too few such trained FCIs are currently in Papua. During the time this research was being carried out, there were only three FCIs in the whole province (approximately 1 for every 15 million hectares).

This issue affects the likelihood and success of prosecution and conviction. In Palawan, biodiversity-rich municipalities—by virtue of being remote—do not have full-time prosecutors or judges. Proceeding with a case, therefore, implies filing cases with the prosecutor in Puerto Princesa. Because reaching Puerto Princesa requires either a lengthy boat journey or an expensive plane journey, we found that many cases were not being filed at all. Detection agencies, already low on equipment, could not spare their limited boats, and financial resources for flying were unavailable. As a result, cases either were falling out of the system altogether or were being poorly handled by undertrained chiefs of police acting as prosecutors.

In Southern Bahia, budget shortfalls have led to the closure of many rural prosecutorial offices and courts in municipalities of conservation importance. Consequently, environmental cases from those municipalities cannot be processed or judged until substitute prosecutors and judges pass through once every six

months or longer. Because substitutes must handle all types of cases when they arrive, environmental cases are often not prioritized and go unprocessed during the substitute's rotation. If this omission happens more than once, the likelihood is high that the three-year statute of limitation will be exceeded so that the case can no longer be prosecuted. In the rural offices and courts that have remained open, the lack of basic infrastructure such as computers has complicated efforts to handle and track cases efficiently. In the Selva Maya, PROFEPA reports that its limited number of PROFEPA prosecutors are severely overworked, each handling an insurmountable number of case files. According to the agency, this major factor contributes to the poor performance of prosecutors in building and presenting cases.

Another important consequence of insufficient budgets is that enforcement agencies are unable to provide the specific environmental training or ongoing capacity-building programs that could significantly improve enforcement performance of their personnel. The effects of poor capacity, as well as field-based examples of those effects, are more amply discussed in subsequent sections.

Perhaps the most important overarching consequence of inadequate budget resources is that shortfalls make implementing new strategies to improve enforcement performance very difficult. While it is certainly true that the resources available to enforcement agencies are not always being used efficiently, it is equally true that any concerted overhaul of enforcement performance will require far more funding than what is currently available. Without greater financial resources, therefore, it seems unlikely that lasting change in enforcement systems will be possible.

Challenge 3: Technical Deficiencies in Laws, Agency Policies, and Procedures

The legitimacy of environmental laws and the fairness of their enforcement are key factors that affect the weakness of enforcement and the success of strengthening activities, as discussed previously. This study, however, did not assess the legitimacy or fairness of laws. Rather, it focused on technical failings of the laws themselves (i.e., lack of clarity in the laws being enforced, disproportionately low penalties, or ambiguity in sentencing guidance). This study also examined technical weaknesses in the laws and procedures governing how the enforcement system operates.

Effective enforcement is undermined when the laws the system is meant to uphold are unclear. Likewise, when internal enforcement agency policies do not support effective enforcement, the action of those agencies is bound to be less than optimal. Analysis of the enforcement systems in our case study sites demonstrates that although clear laws and good policies

are fundamental to guaranteeing the deterrent value of an enforcement regime, these laws and policies are often lacking.

Legal Framework

Weak legislation can take many forms. In some instances, the law may not clearly define what constitutes an environmental crime, or it may be inconsistent in its treatment of comparable violations (illegal hunting vs. illegal fishing, for instance). The Selva Maya case study provides a telling example of this type of weakness. “[Mexico’s] General Law on Ecological Balance and Environmental Protection (LGEEPA) defines wild flora and fauna, in sections XVII and XVIII. However, due to the lack of definition of wild flora and fauna in the constitution and the fact that no clear definition of species exists, their legal standing is not clear. This lack of clarity is important given that clearly defined concepts indicating to which goods the regulations apply are key ... [to determining the] appropriation and [use] of these resources. If this clarity does not exist, there is room for diverse interpretations of the law and regulations, which creates legal loopholes that make enforcement efforts difficult” (Reuter and Habel 2004).

Brazil’s progressive Law of Environmental Crime of 1998, although poorly implemented, provides a positive example of a strong national environmental law. This law consolidates legislation regarding most environmental violations—which had previously been scattered in diverse special laws—under one legal statute, thereby ensuring internally consistent treatment of diverse violations. Furthermore, because this federal law explicitly characterizes which acts constitute “environmental crimes,” it provides a much stronger basis for legal action than the prior penal structure.

Clear roles and mandates for agencies charged with enforcement of environmental legislation may not be established in the law. This situation can compromise the enforcement agencies’ ability to execute their functions or, to the contrary, can provide them with legal cover to avoid their responsibilities. In Bahia, for instance, the division of enforcement responsibilities between federal and state detection agencies was established in a “Federative Pact.” Although the pact was agreed to by all parties, it did not carry the weight of law. As a result, when the federal and state agencies—whose activities it was meant to govern—did not deliver on their enforcement responsibilities, they did so without facing any substantial penalty or sanctions. The successful use of the Philippines’ law allowing for citizens’ arrests of environmental violators provides a positive example of how a clear mandate can empower agencies or even civil society to enforce natural resource regulations.

Laws established at different levels (i.e., federal, state, and local) may be overlapping or contradictory, thereby undoing one another. In Papua Province, Indonesia, the political legislative processes of decentralization and special autonomy handed the

Laws established at different levels ... may be overlapping or contradictory, thereby undoing one another.

powers over production forests to the provincial and regency (local) governments. Although the law decentralizing power did require that local laws conform with various national laws, the Ministry of Forestry did not do enough to make local authorities fully aware of all aspects of the new laws. Consequently, the newly empowered local officials drafted legislation and issued permits largely as they saw fit, often failing to comply with the requirements of national laws. The result is logging operations that are legal according to local permits, but illegal under national law. This confusion creates a significant “gray area” in the law that must be reformed (Patlis 2002).

Either the penalty structures for environmental crimes may not be clearly defined by law or the penalties prescribed by law may be so low that they neither compensate for damages nor contribute to a credible deterrent. Weaknesses in the penalty prescriptions were found across the countries studied. As described earlier, Philippines law allows for establishing municipal-level adjudication bodies to handle environmental violations administratively. But it then limits the effectiveness of those administrative adjudication bodies by setting the maximum fine they can charge at PhP 2,500, or US\$50. Brazil’s Law of Environmental Crime is explicit in describing the appropriate penalties for violations of different magnitudes. However, it also allows judges to apply “alternative sentences,” but it provides no clear guidelines for how alternative sentences should be set. In Bahia, that lack of clarity results in judges applying extremely low alternative penalties or penalties that are not commensurate with the level of damage done to the environment.

Internal Agency Policies

Of course, even strong laws cannot be effectively enforced when internal enforcement agency policies do not support good performance.

For instance, budget allocation policies contribute significantly to weaknesses in overall enforcement. The effects of persistent low levels of funding on the performance by detection and investigation agencies, prosecutors, and judges have already been described. In the sites studied, the lack of good policies regarding periodic training, interagency collaboration, or performance monitoring was also troubling. The absence of such policies underscores the point that enforcement agencies fail to incorporate these important components of effective enforcement into their operations.

Challenge 4: Insufficient Technical Skills and Knowledge

One factor hampering the effectiveness of the enforcement regimes studied was inadequate technical capacity across the enforcement chain. Although personnel shortages caused by budget shortfalls were often lamented, enforcement agencies in the sites studied were relatively less concerned with the technical skills of existing personnel. As noted earlier, greater budgetary resources might permit more training or salaries high enough to attract higher-caliber employees. However, when the training offered to staff members is insufficient, having more insufficiently trained staffers is unlikely to improve performance. Although having more enforcement agency staff members would no doubt help, increasing their individual technical skills and knowledge is also critical.

Detection agents, investigators, prosecutors, and judges in the study sites all had limitations in their individual skills and knowledge that might have been remedied through periodic or even one-time intensive training, but had not been. Instead, detection agents receive limited training at the beginning of their careers, if at all, and prosecutors and judges are rarely up-to-date on environmental law or policy. If and when some training was given, each agency generally trained its own, without the benefit of cross-fertilization that incorporating other enforcement agencies in the capacity-building process might have provided. The effect of this weak capacity is self-evident—when the enforcement actors do their jobs poorly because they lack the skills they need, the enforcement system cannot function effectively.

Detection Agents and Investigators

Effective detection requires a variety of skills, and the job of a detection agent or investigator can be challenging. Individual agents must know enough law to identify an environmental violation, must be able to accurately assess the nature of a crime as well as the species and ecosystems involved, and must be adept at collecting evidence and doing paperwork so that prosecutors are well equipped in court. The detection and investigation agencies must also know how to plan patrols, mount proactive investigations, and help prosecutors build strong cases.

Sadly, because of a lack of investment in human capital, detection agents and investigators in the countries we studied lacked many skills. In Bahia, we found various citations on which detection agents had made errors—for instance, in describing the crime or assessing the nature of the crime—that made prosecution impossible. In Selva Maya, detection agents had difficulty telling the difference between endangered and not endangered wildlife, and they could not identify violations as a consequence. This limitation affected success in latter steps of the enforcement chain. For instance, PROFEPA investigators

work primarily on forest crime but have limited understanding of wildlife issues. Even though wildlife hunting and trafficking are major threats, very few capacity-building opportunities are offered for these themes. Interviews revealed that PROFEPA inspectors who had been working five to seven years had received at most two training courses in that time, not necessarily on these topics. Because there is inadequate wildlife expertise, when specialists' reports on wildlife are requested by the MP, they are often written by forestry experts. In many instances, the resulting reports either are poorly formulated or incorrectly identify species, making their utility to MP prosecutors negligible.

In many instances, quality of evidence gathered initially was very poor. By the time a case got to prosecution, there was no longer any way to prove the crime. In Bahia, public prosecutors recounted instances in which the evidence submitted by IBAMA was insufficient, but it could not be improved by the time of prosecution because, for instance, (1) a deforested virgin forest patch would already be grown over with secondary vegetation, or (2) a sawmill would have been dismantled and moved elsewhere, leaving no evidence.

Detection agents often lacked the skills to think strategically about optimizing use of limited resources to ensure targeted efforts focused on priority areas and threats. For instance, the fact that PROFEPA in the Selva Maya shows a number of subsistence hunting cases but no wildlife trafficking cases, when wildlife trafficking is known to be a major problem in the region, is telling. Unless PROFEPA agents are able to act strategically to make linkages from the “subsistence” hunters they encounter to the real drivers of the wildlife trade, their work will be ineffectual in stemming biodiversity loss. This study indicates that they currently lack the technical skills necessary to work at this level and, consequently, are having little effect on the most damaging problem.

Detection and investigation agencies are not giving their personnel the training that they need to be highly effective in their jobs. Clearly, there are many reasons: limited financial resources, restricted internal technical expertise, and so on. When people think about fixing detection of illegal forest clearing, for example, they most often argue for high-tech solutions involving satellites and remote sensing capabilities. While remote sensing can be a cost-effective way of detecting infringements across large regions (and of special value when the areas are remote and not patrolled), it is not sufficient for strengthening enforcement unless the resources and capabilities to use the information effectively are available. Our work indicates that complementary investments are needed to build the capacity of enforcement agencies' human capital. In some—perhaps most—situations, investments in training the existing staff members could have an equally impressive effect on quality of detection. Furthermore, the work of capacitated detection agents and investigators would surely guarantee better

success in the latter steps of the enforcement system, further contributing to systemic effectiveness.

Prosecutors

Capacity issues compromise the quality of environmental crime prosecution. In most of the countries we studied, there are no specific prosecutors for the environment. Rather, prosecutors are expected to handle all types of cases—from heinous crimes to petty theft to environmental violations. They receive little training in environmental law and are, therefore, unable to handle environmental cases well. To be effective, prosecutors require more than just a sound understanding of environmental law and its advances. They must also be knowledgeable about detection agency procedures and capabilities, so that they can maximize the information they have to work with. Furthermore, they must be able to determine what evidence is needed to make a strong argument in an environmental crime case, so that they can instruct detection agents and investigators who are helping build the case. Finally, they must understand the concept of compensation of environmental damages, so that they can make appropriate penalty recommendations to judges.

Examples demonstrating that prosecutors neither understand detection agency procedure nor have the skills necessary to guide the process of evidence collection have already been presented. The effect of prosecutors' limited capacity to build and present strong cases is clearly demonstrated by results from the case study sites. For instance, in Selva Maya, one of the major factors contributing to lengthy processing times in PROFEPA's administrative process is poor prosecutorial performance. Even though PROFEPA assigns specific prosecutors to handle environmental cases exclusively, they are responsible for all different types of environmental crimes. They also lack the environmental law training necessary to execute this responsibility effectively.

Analysis shows that case arguments and penalty recommendations sent by PROFEPA prosecutors to the Judicial Area Subdelegate for final approval are frequently returned to the prosecutors without approval because of inadequacies in how the cases are presented. In many instances, cases were returned because the subdelegate felt that the arguments written were not well founded in legislation, that the cases had been poorly drawn up, or that suggested sanctions were inadequate. When a case would be returned to the prosecutors, their excessive workload would result in those cases falling to the bottom of the list of priorities, delaying proper presentation and final approval of the sanction by the subdelegate.

Poor training and lack of prosecutorial technical capacity significantly undermine the performance of an enforcement regime. In the prevailing climate in the countries studied—where prosecutors have limited training on environmental law and are responsible for handling cases related to every type of

Poor training and lack of prosecutorial technical capacity significantly undermine the performance of an enforcement regime.

crime—improving prosecutor performance will prove difficult. However, dedicating specific effort to building a core base of capacitated prosecutors who can work with detection agencies to build strong cases, and who can present compelling cases and appropriate sentencing recommendations to judges, could measurably improve the performance of enforcement overall.

Judges

Like the other agencies involved in the enforcement system, the judiciary's capacity deficit on environmental issues compromises the quality of enforcement performance. In part, this weakness results from the fact that, like prosecutors, judges are responsible for hearing all types of cases, and they receive no special training in environmental law. This issue may even be more pronounced among the members of the judiciary than among prosecutors. In Brazil, for instance, while the Ministério Público (the ministry that houses public prosecutors) has made some effort in recent years to draw attention to environmental law issues, the magistracy has made no such strides. As a result, a judge is unlikely to improve his or her environmental knowledge through institutional means and can do so only through personal interest (Tessler 2001). The outcome of this lack of capacity is predictable—judges often consider environmental crime to be less serious than other forms of crime, fail to convict environmental offenders, and frequently apply penalties that do not compensate for damages when they do convict. While specific environmental courts presided over by judges with specific environmental training might be more effective, such systems rarely exist in practice.

In Brazil, our work showed that the penalties being applied by judges were insufficient and were not in keeping with the spirit of that country's Law of Environmental Crime. Although the law is fairly explicit about what types of penalties (including jail time) are allowable for environmental crimes of different magnitudes, it also allows for the application of alternative penalties that can keep offenders from spending time in jail. Even in the case of alternative penalties, penalties should be commensurate with the severity of the crime. However, our sample showed that in many instances, major cases of deforestation were being punished with very light penalties—such as (1) volunteering with the local university's parks and garden corps or (2) donating a basket of food to a charitable institution. Whether those penalties were the result of judges either underestimating the importance of environmental crime or not understanding the penalty prescriptions of the law is unclear. With better training

in environmental law, however, both issues might have been resolved.

The role of the judge in the enforcement process is extremely important. Appropriate sentencing and penalties are critical to the effectiveness of an enforcement regime. Even when detection and prosecution are done perfectly, a judge whose understanding of environmental law is limited and who sentences and applies penalties inappropriately may easily undo the good work of the agencies that handled the case earlier in the enforcement chain. Even when detection and prosecution are weak, an effective and fair judge may prove to be a catalyst in encouraging those agencies to improve their performance. But in the absence of specific training on environmental law and on application of penalties in environmental cases, judges are more likely to contribute to a system's failure to present a substantial deterrent to environmental violations.

As this section demonstrates, capacity issues are not limited to one agency or one component of the enforcement chain. Rather, they permeate the system, creating inefficiencies and compromising effectiveness across the system. Efforts must be made to build the technical knowledge and skills of personnel in agencies throughout the enforcement system, if low technical capacity is to be removed as an obstacle to weak enforcement.

Challenge 5: Lack of Performance Monitoring and Adaptive Management Systems

An overarching problem found consistently across sites and across agencies was the failure to monitor performance or to make any systematic, routine efforts to measure effectiveness and to develop action plans for improving performance. In each site, we found that the enforcement agencies had never done the type of systematic analysis of their performance that we have presented here.

The complexity of gathering data for the quantitative case study analyses highlighted the fact that agencies involved in

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the enforcement chain—detection agencies, prosecutorial services, and the judiciary—do not maintain uniform case tracking systems and do not calculate performance data or monitor their performance in any systematic fashion. No individual agency appears to monitor its own performance or even manage its case data in a way that would be conducive to doing such monitoring. Perhaps more important, the agencies as a group do not work together to monitor the overall effectiveness of the system, which comprises all of them. As a result, those agencies are unable to adapt their enforcement activities to improve effectiveness—either individually or as a system.

Although most agencies do keep some records, there is little consistency in the content or quality of the records that are kept. Electronic case files are rare; when paper case files do exist, they are not managed or organized in any systematic way. Tracking the progress of a case from the early stages of detection through conviction and penalty can be virtually impossible, because each agency that handles a case file numbers it differently.

This weak system of data collection and management demonstrates that no effective efforts to review past performance are made by the detection agencies. Because they do not assess their own performance, those agencies are unable to identify where the weaknesses in their overall system may lie. As a result, they do not understand the complex causes of those weaknesses and are unable to work jointly to develop adaptive management strategies to improve performance.

Investment Priorities for Strengthening Enforcement Performance

SECTION VI

The preceding synthesized analysis demonstrates how numerous and complex the problems are that plague enforcement systems. However, the analysis also shows how methodical examination of an enforcement system can make understanding the problems easier. Once the problems and their diverse causes are understood, some very commonsense solutions for strengthening enforcement performance become obvious.

Efforts to improve enforcement of environmental laws have frequently relied on making large investments in detection. In the few places where weak detection is the only major problem in the enforcement system, such investments will be highly effective. However, the holistic vision of the enforcement economics framework makes one thing clear. Solutions that focus on only one step of the enforcement chain, or that fail to address the many issues contributing to a weak step, will have little effect on the overall quality of enforcement in situations where enforcement is weak for a number of reasons. To be most effective, investments must be directed at improving multiple facets of the problem simultaneously. In that way, scarce conservation dollars spent on enforcement will be spent wisely.

Numerous organizations provide international technical assistance on environmental enforcement issues to biodiversity-rich countries. Many offer highly specialized training in one component of the enforcement system. Such organizations can greatly increase their effect by ensuring that their technical assistance packages are part of a broader comprehensive strategy for strengthening enforcement performance.

Using the findings of our enforcement work in the four case study sites, we have identified three technical enforcement-strengthening priorities that we think should be part of a global conservationist strategy for strengthening enforcement of natural resource legislation and protected areas. The priorities, which are aimed at strengthening specific enforcement weaknesses, are also intended to serve the additional purpose of augmenting interagency collaboration.

These recommendations are made at a fairly general level. The full potential breadth of the recommendations is best defined through broader consultation with international experts in environmental legislation, in monitoring enforcement performance, and others. Similarly, site-specific enforcement-strengthening programs should be designed in consultation with local experts and enforcement practitioners.

All the recommendations are derived from the work described here and, hence, are technical in nature (as noted earlier). However, as previously described, technical enforcement-strengthening efforts should not proceed as stand-alone activities. Rather, it is essential for success that they be carried out as part of a package of activities that fall into two general classes: (1) preventative activities that directly improve compliance and reduce the enforcement challenge and (2) activities designed to ensure that the laws and their enforcement are workable and fair. The most effective package of activities will vary from place to place and should be developed by local experts and stakeholders.

Solutions that focus on only one step of the enforcement chain, or that fail to address the many issues contributing to a weak step, will have little effect on the overall quality of enforcement....

Investment Priority 1: Reform Enforcement Policy

Without an underlying framework of environmental legislation that is consistent and clear, an enforcement system cannot be effective. When laws are weak in their language, or limited in their coverage, they become open to interpretation and legal loopholes, making them difficult to enforce. Similarly, in the absence of internal policies that promote good performance, the activities of enforcement agencies are unlikely to be optimal.

Any global effort to strengthen enforcement of environmental laws must dedicate substantial resources to improving the quality of environmental legislation and of enforcement agency policies. Specifically, the efforts should focus on the following reforms, among others:

- Increase budget allocations to agencies across the environmental enforcement chain. Funding should be earmarked within the agencies' budgets for specific enforcement-strengthening activities.
- Strengthen, clarify, and consolidate legislation. Particular attention should be paid to clearly defining environmental violations, developing guidelines for applying penalties, and ensuring that penalties prescribed by law are internally consistent and sufficient to compensate for environmental damages.
- Establish guidelines for interagency cooperation and annual performance reporting. Building the provisions into either law or internal agency policies not only will allow enforcement agencies to be more mindful of their performance but also will force them to think like a system.
- Create the legal framework for alternative enforcement systems to operate. Because official enforcement systems may be ineffective, establishing the legal bases for community-based or other supplementary systems can augment the likelihood of a credible deterrent.

Investment Priority 2: Build Enforcement Capacity

The poor capacity of detection and investigation agents, prosecutors, and judges presents a daunting challenge to effective enforcement. When enforcement personnel lack the training necessary to perform their duties, all elements of the enforcement chain, and hence the deterrent value of the overall enforcement regime, are compromised.

Any global effort to improve enforcement performance in countries of high biodiversity importance must devote substantial resources to building the capacity of these enforcement

actors. Providing comprehensive training programs that can be adapted to different sites, as well as running those programs, is likely one of the most cost-effective ways to improve performance across the enforcement chain. Capacity-building efforts should incorporate the following elements, among others:

- Improve performance of detection agents, prosecutors, and judges through periodic training. Given the fact that legislation and agency policies and procedures are consistently being updated or modified, it is critical that training—both in the classroom and through on-the-job training—be offered to those audiences on a continuing basis.
- Involve all agencies in the enforcement chain in the process of designing curricula for each audience. Although each agency responsible for a component of the enforcement chain claims that it can train its own personnel, efforts to date have been either insufficient or of limited availability. If representatives from across these agencies worked together to determine what training each set of actors needs, training programs could be much more effective. Integrated training programs would provide trainees with a clearer vision of how the overall system works. By so doing, they could ensure that the efforts of one agency or institution would bolster the efforts of the later agencies and institutions that handle environmental cases.
- Take advantage of existing technical assistance partnerships with donor government agencies. A number of international aid agencies have existing technical assistance and capacity-building programs with enforcement agencies in biodiversity-rich countries. For instance, U.S. agencies, including the Forest Service, State Department, Environmental Protection Agency, and Fish and Wildlife Service, often have bilateral capacity-building activities in countries of biodiversity importance. Intergovernmental agencies such as the United Nations, Organization for Economic Cooperation and Development, and World Conservation Union also have some capacity to provide this type of support. Consolidating the ongoing work of multiple agencies into strategically designed capacity-building efforts can increase their impact. Furthermore, maximizing the use of existing means of capacity building can substantially reduce the additional costs of expanded training programs.
- Incorporate specialized local NGOs, think tanks, and institutes in capacity-building efforts. Enforcement training programs should not be developed only with government enforcement agencies. Many countries have strong local organizations or institutes whose expertise in the fields of environmental legislation, biological priority setting, and capacity building is very strong and can

help make training efforts locally relevant. Such groups should be incorporated into the process of designing and executing training programs.

Investment Priority 3: Implement Performance Monitoring and Adaptive Management Systems

When enforcement agencies do not monitor their individual performance or do not work together to assess the whole system's effectiveness in deterring environmental violations, they cannot implement the changes vital to improving the system. In many developed countries, enforcement agencies are required to periodically calculate performance indicators, which are made publicly available. But the poor collection and management of data by enforcement agencies in biodiversity-rich countries makes this type of regular performance evaluation very difficult and expensive.

Investments in other enforcement-strengthening efforts must be complemented by investments in developing enforcement performance monitoring and adaptive management systems. It is only with such systems that the success or failure of the other investments can be gauged. The design of performance monitoring and adaptive management systems should incorporate the following elements:

- Develop standardized data management systems for use across agencies. Integration of case-tracking databases makes observing the progress of cases as they move through the enforcement chain feasible, which it currently is not in many places. Tracking cases from beginning to end is a basic use of information—but even that information can be used to calculate basic performance indicators such as the enforcement economics model's probabilities. Developing a simple multiagency case-tracking system can lay the groundwork for future interagency efforts to develop more complicated systems

for managing data and calculating performance statistics.

- Reach agreement on enforcement statistics (indicators) to be produced annually. Given the variety of enforcement statistics and the different purposes they serve, it is important for enforcement agencies across the chain to agree to a set of indicators to be produced annually. The process of developing indicators agreed to by all agencies can be complicated and may take a few years. While that process is under way, the enforcement economics model's probabilities, which measure the success rate of each step in the enforcement chain, can serve as basic indicators of enforcement performance.
- Train key staff members in data collection and management, analysis of enforcement statistics, and development of strategic enforcement-strengthening plans. To successfully implement performance monitoring and adaptive management systems, an integrated corps of technical staff members with the capacity to develop, generate, and interpret enforcement indicators must be created. To be highly effective, this group's members must understand both the broad enforcement system and the operations of individual agencies. This knowledge will allow members to work with senior management of the enforcement agencies to understand the reasons behind identified weaknesses and to develop strategic solutions.
- Require annual publication and public disclosure of enforcement performance reports. Informed civil society can be a strong engine for reform. Evaluating performance of individual agencies and the overall system annually, in addition to making evaluation results transparently available, is critical to ensuring that enforcement agencies continually work to perform effectively.

This finding does not bode well for biodiversity conservation efforts, because many innovative approaches to conservation require adequate enforcement if they are to be effective.

The poor enforcement of natural resource laws in countries of high biodiversity importance is widely acknowledged, but its underlying causes are often poorly understood. The primary innovation of the enforcement economics analyses detailed here is that they present a rare quantitative measure of exactly how bad enforcement is. In sites where a probability of detection could be estimated, the cumulative probability of a case resulting in a conviction was less than 0.01. In other words, less than 1 percent of environmental crimes result in a conviction.

What the numbers reveal is stunning. In all sites studied, the deterrent generated by the enforcement regime was grossly insufficient to offset the incentives that drive illegal environmental activity. We believe that this result is not particular to the countries that we analyzed, but rather that enforcement of environmental laws is abysmal in most countries of biodiversity importance.³⁰ This finding does not bode well for biodiversity conservation efforts, because many innovative approaches to conservation require adequate enforcement if they are to be effective.

Clearly, enforcement of environmental laws should not be seen as an end unto itself. Ultimately, improving enforcement is only one of the elements necessary to ensure compliance. For enforcement strengthening to contribute to increasing compliance, the laws to be enforced must be just and equitable. Furthermore, enforcement must be part of a package that also includes two other types of actions: (1) preventative activities that directly improve compliance and reduce the enforcement challenge and (2) activities designed to ensure that the laws and their enforcement are workable and fair.

The underlying causes of poor enforcement are many, and problems often permeate every step of the enforcement chain. Our work in the field points to five common challenges that impede effective enforcement. First, poor interagency cooperation makes it difficult for the enforcement system to run smoothly and to work effectively as a system. Second, inadequate budgetary resources cause personnel and infrastructure weaknesses that compromise quality of enforcement. Furthermore, this lack of budget makes any concerted overhaul of the enforcement system impossible and makes lasting change difficult. Third, technical deficiencies in the laws and agency policies that support effective enforcement—which are fundamental for the system's proper functioning—make performance less than optimal. Fourth, insufficient technical skills and knowledge of personnel from across the enforcement chain lead to poor execution of enforcement responsibilities, thus reducing the likelihood that violators will be sanctioned. Finally, the lack of performance monitoring and adaptive management systems means that neither enforcement agencies nor the public at large have any concrete indication of how effective the system is in deterring environmental crime. Without a precise understanding of where the system's weaknesses are and why they exist, strategic plans to improve performance cannot be designed and implemented.

Because enforcement systems are holistic in nature, a system can be only as strong as the weakest element in the chain. That being the case, investments in improving one element in the chain will be ineffective if other elements remain weak. While raising fines and investing in detection capacity are common solutions to weak enforcement, the enforcement economics logic clearly demonstrates that such investments in

isolation are unlikely to be effective in most cases. However, the investment priorities presented in this analysis fit the profile of the type of efforts that are likely to result in significant improvement of enforcement performance. Improving the quality of environmental legislation and enforcement agency policies is critical to ensuring that the foundation for enforcement efforts is solid. Building capacity of personnel across the enforcement chain is vital to effective enforcement, because lack of capacity frequently contributes to inefficiencies in the functioning of the system. Capacity-building efforts should be implemented using jointly developed training programs that are executed in partnership with local expert institutions and with those international technical assistance providers that are already working with enforcement agencies. Finally, investments in other enforcement-strengthening efforts must be complemented

by investments in developing enforcement performance monitoring and adaptive management systems. Such systems will allow the success or failure of the other investments to be gauged.

If scarce conservation dollars are to be spent on strengthening enforcement, they must be spent in ways that will guarantee the maximum improvement in performance. The challenges noted here demonstrate that while the factors contributing to weak enforcement are complex, understanding those factors is simple if the right analytical framework is used. Once they are understood, effective and efficient solutions for addressing the challenges become apparent. Strengthening the weakest links in this way is an indispensable part of any package whose aim is to successfully achieve biodiversity conservation.

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Endnotes

- 1 Defined as a vein of behavioral economics that sprang from efforts to understand the factors influencing the decision whether or not to commit a crime (Becker 1968).
- 2 Sutinen 1987.
- 3 Developed from Sutinen 1987.
- 4 The quantitative analyses that are presented here used a 20 percent discount rate.
- 5 An administrative process occurs entirely within the detection agency generally, does not involve appearing in court, and can result in sanctions like confiscation or a fine. A judicial process begins in the detection agency and ultimately ends up in the courts system, where sentence is assigned by a judge.
- 6 For this report, “enforcement agency” refers not only to detection agencies and investigators but also to prosecutorial services and the judiciary—namely, all the agencies involved in the enforcement chain.
- 7 The detailed findings on factors affecting performance in each site, as well as the strategic action plans developed to improve performance, are published separately.
- 8 Note that these probabilities translate into likelihoods of 100, 100, 51, and 16 percent.
- 9 This value is based on 1997 data from IESB (Mesquita 1997), corrected to calculate an equivalent 2004 value.
- 10 Although corruption was also identified as a contributing factor, no specific analysis of corruption was conducted.
- 11 Per IBAMA procedure, records of complaints and overall detections are not kept, and the first record of a case is the citation that is filled out by IBAMA.
- 12 Note that these probabilities translate into likelihoods of 100, 58, 69, and 3 percent.
- 13 Please note that probability of prosecution is different from probability of processing; the former refers to the judicial process and the latter refers to the administrative process that was the focus of this study.
- 14 Note that these probabilities translate into likelihoods of 3.2, 6.8, 84, 41, and 85 percent.
- 15 Probability of conviction is for cases heard in regency (local) courts. The probability of conviction presented here does not include the results of appeals to higher courts.
- 16 The average value of the penalty and confiscated timber is \$164,706 (rupiah to US\$ exchange rate of 9.383 rupiah to US\$1 for the period of 2001–2003. Source: Pacific Exchange Rate Service at the Sauder School of Business, University of British Columbia).
- 17 The enforcement disincentive including the value of confiscated timber is \$890.43.
- 18 There were a few cases of logging without a permit.
- 19 All information is from Suryadi, Cannon, and Widjayanto (2004). The value of the disincentive climbs to nearly \$1,000 when the value of confiscated timber is included.
- 20 The probability of detection was obtained by dividing the quantity of illegal timber by the estimated total quantity of illegal logging. The quantity of illegal timber detected was obtained from the case information. The estimated total quantity of illegal logging was based on information from the Provincial Forestry Service.
- 21 Considering the penalty alone.
- 22 Note that these probabilities translate into likelihoods of 6.2, 0.3, 85, 62, and 24 percent.
- 23 Local data collection in the Calamianes was done by ELAC. Analysis was done jointly.
- 24 Both of which are provincial branches of a federal agency.
- 25 For instance, the Philippines Coast Guard is mandated to enforce “all applicable laws upon the high seas and territorial waters of the Philippines including all ports, custom zones, waterways, and other inland waters” (Mayo-Anda, et al. 2004).
- 26 Analyzing and explaining the performance of the whole enforcement system can also provide incentive to cooperate more closely—a point that will be explored in subsequent sections.
- 27 Ironically, when licensing powers are unclear, agencies are more likely to fight for the right to do the licensing—because the licensing agency receives licensing fees.
- 28 Municipal Trial Court, Municipal Circuit Trial Court, or Regional Trial Court.
- 29 Either the state prosecutor’s or federal prosecutor’s office, but files often would be sent to the wrong one.
- 30 These often are developing countries. Although enforcement is often poor in developed countries, the lower opportunity cost of not acting illegally in these richer countries makes environmental rule-breaking less pervasive.

Glossary of Abbreviations

BKSDA	Provincial Office for Natural Resources Conservation
CCG	Center for Conservation and Government
CI	Conservation International
ED	enforcement disincentive
ELAC	Environmental Legal Assistance Center
FCI	Forest Civil Investigators
IBAMA	Brazilian Institute for the Environment and Renewable Natural Resources
IESB	Institute for Social and Environmental Studies of Southern Bahia
LRFT	live reef fish trade
MP	Ministério Público
NGO	nongovernmental organization
PNP	Philippines National Police
PROFEPA	Federal Prosecutorial Service for Environmental Protection
LGEEPA	General Law on Ecological Balance and Environmental Protection
USAID	U.S. Agency for International Development



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