

Designing Fiscal Instruments for Sustainable Forests



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Forestry Fiscal Reforms and the Informal Sector

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Introduction

Environmental fiscal policy is currently underused in the forest sector. This is partly due to the difficulty in taxing forest-dependent activities and peoples. Of the utmost concern is the impact of environmental taxation on poverty and distribution, but feasibility is also a concern, as a large share of forest production is informal in many countries. While informal production delivers many key benefits to local economies and in particular to vulnerable communities (Loayza and Rigolini 2011; Alatas and Newhouse 2010), it is also seen as a significant barrier to the achievement of sustainable management of tropical forests (Kishor 2012).

Environmental fiscal policies to reduce deforestation and forest degradation will interact with informal sector operations in various ways. Higher taxes or more stringent environmental regulations are usually associated with formal sector exit, as operators avoid higher costs. However, through careful design of specific fiscal instruments (and the use of complementary policies), this impact can be minimized and the incentives to improve environmentally friendly practices can be provided along with other benefits. Given data limitations and the dependence of policy recommendations on the individual characteristics of a given jurisdiction (including the structural reasons for informality and barriers to formalization), more research is needed on this topic before specific policy recommendations can be developed.

Environmental fiscal policy should thus be implemented within a comprehensive policy approach. Environmental fiscal policy is not a silver bullet, especially when considering the mobilization of resources needed for national sustainability objectives. A comprehensive policy package that encourages poverty reduction, industry formalization, and sustainable forest management will be needed to ensure economically, socially, and environmentally sustainable forests.

The Informal Forest Sector

The informal sector includes various kinds of economic activity (like home-based work, self-employment, and casual or seasonal work, among others) that is neither taxed nor monitored by the government.¹ In the forest sector, informal production is largely undertaken by small-scale chainsaw

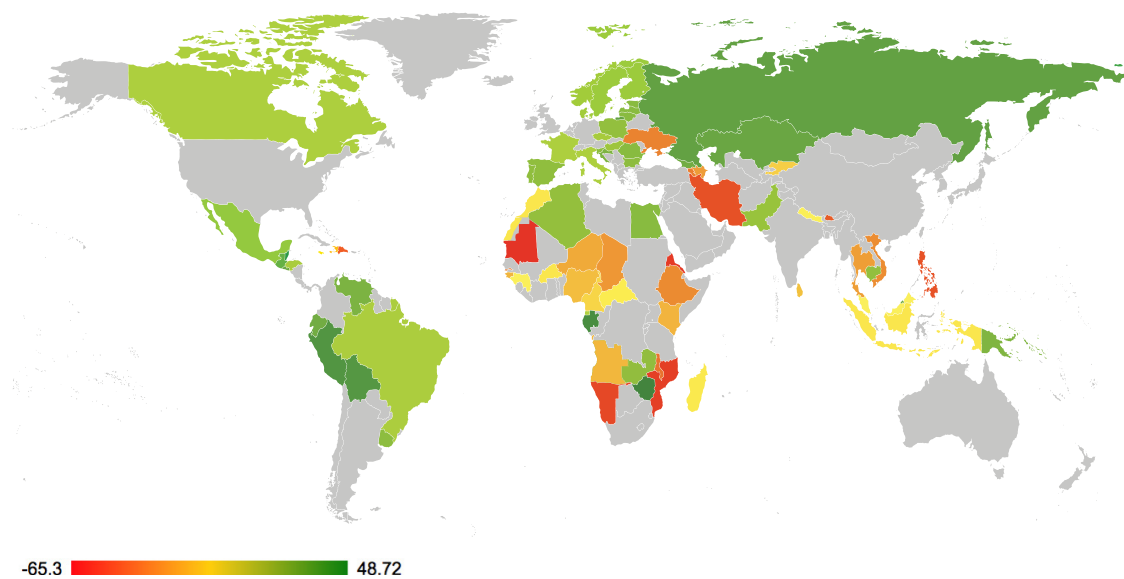
¹ Here, we do not address the various approaches to defining informality, and instead refer the reader to Henley, Arabsheibani, and Carneiro (2009) and Perry et al. (2007). It is also important to note that formal sector operations are necessarily always legal.

millers.² Informal forest producers may also participate in illegal practices, like illegal logging or harvesting. While informal operations are not always “illegal,” in some countries the informal sector is also the biggest driver of illegal logging, as in Cameroon (Alemagi and Kozak 2010).

Informal sector activity is undertaken for various reasons. Often it is linked to forest dependency (Benson et al. 2014; FAO 2018), and it is a survival strategy for people with limited human capital or various other constraints. However, informal production is also a way for individuals and firms to avoid regulations, taxes, and other costs associated with formal production (Bacchetta, Ernst, and Bustamante 2009).

Large informal forest sectors are prevalent around the world, especially in developing countries (Whiteman, Wickramasinghe, and Piña 2015). The informal share of the forest sector tends to decline with a country’s level of development, with some outliers. Figure 2.1 compares the share of informality in the economy overall with that of the forestry sector. In general, developed countries with large forest sectors have a smaller informal share within that sector than in the wider economy.³ On the other hand, many developing countries have larger informal forest sectors than their overall economy’s level of informal activity. Particularly large differences are found in Eritrea, Iran, Mauritania, Mozambique, Namibia, and the Philippines.

FIGURE 2.1
COUNTRIES WHERE THE FORMAL FOREST SECTOR IS MUCH SMALLER OR MUCH LARGER THAN THE FORMAL SECTOR OF THE ECONOMY AS A WHOLE



Sources: FAO 2014; Medina and Schneider 2018.

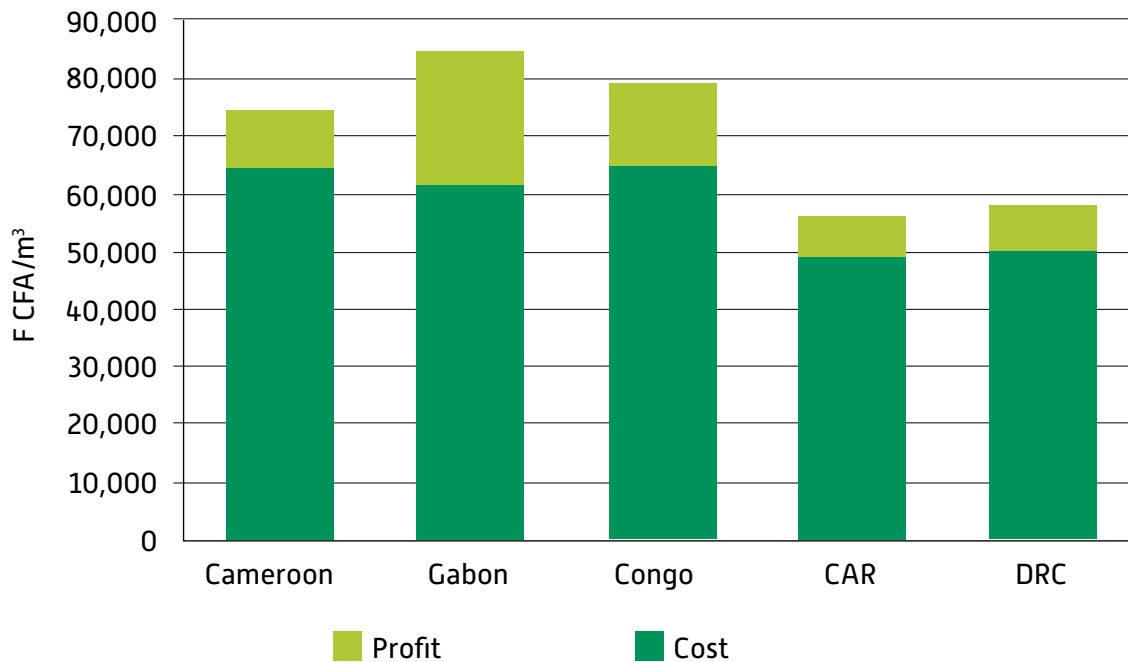
Note: The numbered scale indicates the differences between the shares of the informal sector of the whole economy minus the shares of the informal sector as part of gross value added in the forest sector. Dark green (positive numbers) indicates countries where the informal forest sector is smaller than the informal sector of the wider economy. Dark red (negative numbers) indicates countries where the informal forest sector is larger than the informal sector of the wider economy. Countries range from -65.3 (dark red) to 48.72 (dark green); see annex 2A for details.

2 Despite the fact that chainsaw milling is a legal and regulated activity in most tropical countries, enforcement of chainsaw milling regulations is usually low (Kishor 2012).

3 There are some emerging economies and developing countries in that group as well, such as Brazil, Honduras, Papua New Guinea, Guatemala, Ecuador, and the Republic of Congo. See annex 2A for individual country details. This is consistent with the findings from the wider literature, for example, Loayza and Rigolini (2006).

The informal forest is an important source of employment and income globally, in particular for rural and vulnerable communities (Cerutti and Tacconi 2006). For each chainsaw miller in the formal sector, it is thought that there are more than three in the informal sector (FAO 2018). As the government does not monitor informal sector activity, it is difficult to provide precise figures on the size of the informal forest sector. However, one estimate places the number of people involved in the worldwide informal forest sector at 40–60 million (FAO 2018). This figure is in addition to the numerous forest-dwelling indigenous peoples and local communities who primarily depend on forests for their livelihoods (Arce 2019). Furthermore, informal chainsaw milling is a profitable activity, with profits exceeding costs in all countries examined (figure 2.2). In some countries, the informal sector thus accounts for a significant share of employment and income opportunities (Kishor 2012). However, whereas the contribution of formal forest sector output to world GDP is estimated at 0.9 percent of global GDP, including also the informal forest sector just adds 0.2 percent (FAO 2014).

FIGURE 2.2
PROFITS AND COSTS ASSOCIATED WITH INFORMAL CHAINSAW MILLING



Source: Adapted from Lescuyer and Cerutti 2013.

Note: Cost includes all the costs of chainsaw-harvested products, such as wages, tree purchases, and transport. CAR = Central African Republic; DRC = Democratic Republic of Congo.

TABLE 2.1
SHARE OF INFORMAL ACTIVITIES IN GROSS VALUE ADDED OF THE FOREST SECTOR

WORLD BANK INCOME GROUP	SHARE OF INFORMAL FOREST SECTOR IN GVA (%)	STANDARD DEVIATION (SD)	COUNTRIES WITH INFORMAL SECTOR SHARE MORE THAN ONE SD HIGHER THAN THE AVERAGE	COUNTRIES WITH INFORMAL SECTOR SHARE LESS THAN ONE SD HIGHER THAN THE AVERAGE
Low income	57.6	23.7	Democratic Republic of Congo, Eritrea, The Gambia, Somalia	Cambodia, Republic of Congo, Republic of Korea, Zimbabwe
Lower middle income	46.9	27.9	Armenia, Bhutan, Côte d'Ivoire, Djibouti, Mauritania, Moldova, Nigeria, Philippines	Egypt, El Salvador, India, Pakistan, Solomon Islands, Uzbekistan
Upper middle income	31.3	26.6	Angola, Azerbaijan, Dominican Republic, Mongolia, Namibia, Thailand, Turkmenistan	Dominica, Iraq, Jordan
High income	6.0	6.9	Argentina, Cyprus, Equatorial Guinea, French Guinea, Ireland, Italy, Trinidad and Tobago, Uruguay	

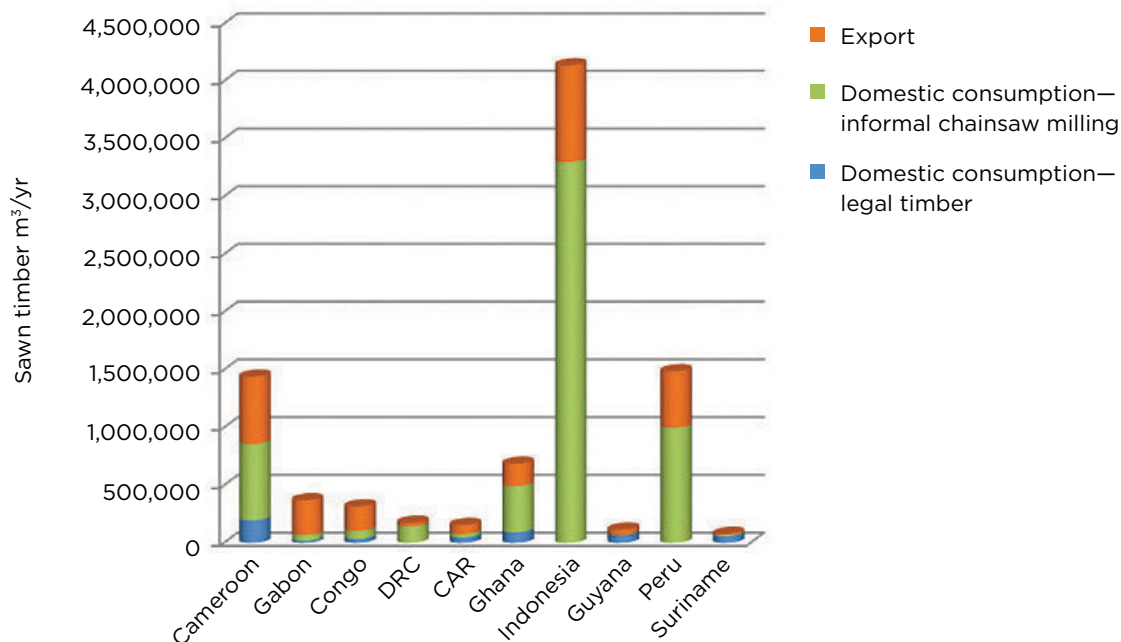
Source: FAO 2014.

Note: GVA = gross value added.

Informal forest sector activity can be divided into three main subsectors: timber, fuelwood (for example, charcoal), and non-wood forest products (NWFPs).⁴ Informal operators in these subsectors may engage in a range of activities, including subsistence agriculture, small-scale trading, and artisanal crafts and services. The extent of informal production for each subsector depends on a number of different factors and varies between countries.

⁴ NWFPs are distinct from non-timber forest products (NTFPs). NWFPs include such forest products as mushrooms, resins, and animal products like game or honey. The NTFP category, on the other hand, includes fuelwood, wood chips, and other wood-based fiber products (for example, from bamboo or cork). See FAO (1999) for more details.

FIGURE 2.3
TIMBER VOLUMES ON DOMESTIC AND FOREIGN MARKETS FOR SELECT TROPICAL COUNTRIES



Source: Kishor 2012.

Note: CAR = Central African Republic; DRC = Democratic Republic of Congo.

In general, informal sectors are larger for products destined for domestic and regional markets. For timber, exported products are usually associated with large-scale, formal sector production, while domestic and regional consumption is largely supplied through informal chainsaw milling (figure 2.3).⁵ Fuelwood (for example, charcoal) is largely produced for domestic and regional consumption: Informal sectors can be quite substantial and informal operators often participate in illegal harvesting, as in the Congo Basin (Behrendt, Megevand, and Sander 2013). Equally for NWFPs, much of the production is informal, is often subsistence-related, and is dominated by a mostly female labor force (FAO 2018).⁶

Both domestic and international timber markets in tropical countries are supplied by the informal sector. Most of the timber produced for domestic consumption in tropical countries is supplied through informal chainsaw milling rather than formal production (figure 2.2). Even timber exports (which tend to be supplied by large-scale formal operators) can include informal sector products, as domestic timber can be mixed into international shipments, whether by legal means or by counterfeit paperwork (Kishor 2012). In many countries, informal timber production is overtaking formal production; for example, in the Congo Basin, the informal sector accounts for

⁵ Timber products can usually fetch higher prices on international markets (especially Western markets) than on domestic markets. As such, large formal operators tend to sell on the international markets, leaving a domestic demand gap that is usually filled with low-quality products through informal supply networks. However, this is not always the case; in particular, the problem of international trade in illegal timber has drawn considerable attention in recent years as illegally produced logs can be mixed in with legally certified logs destined for international markets (Kishor 2012).

⁶ However, more information is needed particularly for the NWFP sector: Because of high levels of informality as well as other factors, not enough information is available on the true value and extent of NWFPs and services (Forestry Department 2016). Therefore, this chapter largely focuses on the informal sectors for timber and fuelwood.

as much as 87 percent of total production (table 2.2). This expansion of informal production is due in part to an increase in illegal logging (Arce 2019).

TABLE 2.2
INFORMAL TIMBER PRODUCTION IN CENTRAL AFRICA

Volumes of timber (m ³) in 2009	Cameroon (Yaoundé, Douala, Bertoua)	Gabon (Libreville)	Congo (Pointe-Noire, Brazzaville)	DRC (Kinshasa, daily flow only)	CAR (Bangui)
Informal timber production for domestic markets	662 000	50 000	99 000	146 000	33 000
Informal timber production for unofficial export to nearby countries	60 000	0	0	> 50 000	6 000
Total informal timber production	722 000	50 000	99 000	196 000	39 000
Formal timber production (from industrial waste or small-scale permits) for domestic markets	198 000	20 000	10 500	Not estimated	34 000
Official exports of industrial timber	343 000	150 000	93 000	29 000	41 000
Total legal timber production (domestic consumption + official exports)	541 000	170 000	104 500	29 000	75 000
Informal production / total production (%)	57	23	49	87	34

Source: Lescuyer and Cerutti 2013.

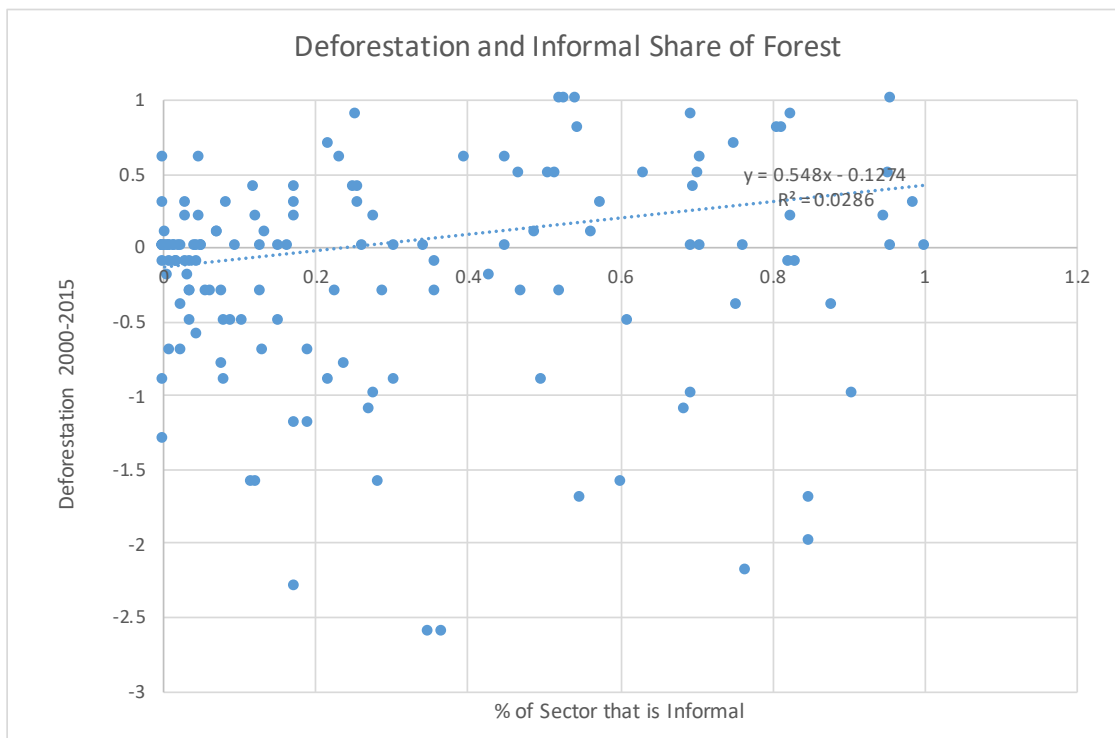
Note: CAR = Central African Republic; DRC = Democratic Republic of Congo.

Most of the growing domestic fuelwood needs are met by the informal sector. In tropical countries, most of the locally traded wood is used for fuel or made into charcoal (Kishor 2012). Charcoal consumption has increased by 20 percent in the past 10 years and almost doubled in the last 20 years, putting pressure on forest resources in Sub-Saharan Africa, Southeast Asia, and South America (FAO 2018). For example, in Tanzania charcoal makes up 95 percent of the energy supply, but there is no comprehensive policy framework governing this sector, which has led to a highly informal and unregulated sector with direct environmental impacts (FAO 2018). The fuelwood sector is one of the major threats to forests, especially as energy demands are predicted to increase (Megevand et al. 2013).

The informal forest sector and sustainability

The informal forest sector has numerous impacts on environmental sustainability, including both deforestation and forest degradation. Available data indicate a positive (but very weak) relationship between the informal share of the forest sector and the rate of deforestation in each country. Figure 2.4 shows the plot for the average deforestation rates between 2000 and 2015 against the informal share of the forest sector. Despite the positive relationship, there are many outliers and only about 3 percent of the variation in deforestation can be explained by the share of the informal sector. Informality, on its own, does not appear to be a decisive deforestation driver as deforestation rates are determined by many interdimensional factors (see Busch and Ferretti-Gallon 2017).

FIGURE 2.4
DEFORESTATION RATES AND THE SHARE OF THE INFORMAL FOREST SECTOR



Sources: World Bank 2018; FAO 2014.

Negative environmental impacts stem from the fact that informal operators do not tend to comply with environmental and other regulations, and (as they often operate outside regulatory frameworks) they cannot easily be sanctioned for their activity.⁷ Informal operators may not use or respect land use management plans that would otherwise function to protect vulnerable forests. For example, most of Kinshasa's fuelwood needs are met through informal harvesting from degraded and mostly cleared forests within 200 kilometers of the city (Behrendt, Megevand, and Sander 2013). In addition, Durst and Enters (2001) point out that the presence of informality makes the introduction of reduced-impact logging—a component of SFM—more difficult, even with subsidies; informal timber can be sold at lower cost, which depreciates the entire market and undermines efforts to promote RIL.

Negative environmental impacts also stem from the fact that the informal sector tends to have low productivity levels (Arce 2019). Small-scale chainsaw millers carry out the majority of informal forest sector production (for timber and charcoal). Beyond harvesting methods, charcoal production itself is inefficient: Most charcoal production in developing countries uses simple technologies with conversion efficiencies of between 10 percent and 22 percent, compared with more than 30 percent with more advanced technologies (FAO 2018). The low level of mechanization and productivity levels of the sector result in greater inefficiency and stress on forest resources and excessive logging.

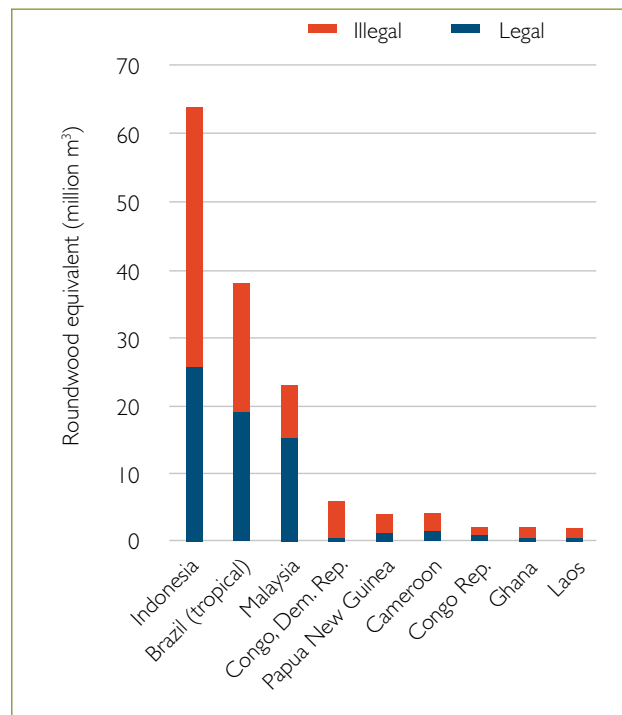
⁷ If informal forestry operators also engage in illegal logging, harvesting can be especially damaging when done in protected areas or when protected species are removed.

Beyond environmental impacts, the informal forest sector can contribute to unsustainable governance-related outcomes. Large informal forest sectors can put pressure on formal operators, which reduces their incentives to follow the law. For example, formal operators may face significant pressure to launder products by combining informal (or illegal) logs with formal ones. In this way, the informal sector can facilitate the creation and maintenance of corruption networks and money laundering, increasing risky speculative investments, crime, and trafficking (Kishor 2012). The informal sector also hampers fiscal sustainability because informal operators do not pay taxes or other fiscal charges; this represents lost revenue that otherwise would have been available to invest in SFM or other public goods like electrification. Furthermore, in the presence of large informal markets, the true contributions of the forest sector are underestimated in national account statistics like GDP and value added (FAO 2018);⁸ this—combined with suboptimal tax revenues collected from the sector—may lead governments to underinvest in the sustainable development of the sector.⁹

Informal forest sectors can also hamper efforts toward social and economic sustainability, as both informal sector products and livelihoods supported tend to be of lower quality than in the formal sector (Arce 2019). The informal forest sector is often characterized by low wages and productivity, gender equality gaps, highly hazardous work, lack of job security, and inadequate safety and health conditions (Arce 2019; Briassoulis 1999). Informal sector production may be largely undertaken by women, who are also paid less than men on average. For example, in Sub-Saharan Africa, women earn about 32 percent less than men (FAO 2018).

Another key determinant of the informal forest sector’s impact on sustainability is the level of illegal logging.¹⁰ Illegal logging accounts for 15–30 percent of global forestry production and up to 90 percent in tropical primary producer countries (INTERPOL 2016) (see table 2.3 and figure 2.5). The expansion of illegal logging also tends to reinforce the weight of informal work in the sector (ILO 2019), further

FIGURE 2.5
ESTIMATED PRODUCTION OF LEGAL AND ILLEGAL
TIMBER BY SELECTED TROPICAL COUNTRIES, 2013



Source: Jianbang et al. 2016.

⁸ For instance, the Zambian government estimates that including the informal economy in the calculation would increase the forest sector’s total annual contribution from 5.5 percent to 23 percent of GDP (Forestry Department 2016).

⁹ Developing countries tend to spend less on their forest sectors compared with other countries despite the fact that the sector delivers significant returns (Whiteman, Wickramasinghe, and Piña 2015).

¹⁰ While the informal sector engages in illegal logging and harvesting in many countries, the available data show little statistical relationship between illegal logging and informality. Estimates for illegal logging have a large degree of uncertainty, but CIFOR estimates for 19 countries (Jianbang et al. 2016) do not show a strong association between the estimated mean percent of illegal logging and the share of informality in the forestry sector (see annex 2A for more details).

impacting sustainability. Illegal logging impacts not only environmental sustainability but also fiscal sustainability, costing billions in government revenues every year. Revenue loss estimates range from \$30 billion to over \$157 billion per year (Montero et al. 2019).¹¹ Not only does illegal logging and its trade directly cost government revenues, it also is a drain on resources with little gain for domestic operators (Kishor 2012).¹²

TABLE 2.3
SHARE OF ILLEGAL LOGGING IN TIMBER HARVESTED, SELECTED COUNTRIES

COUNTRY	% ILLEGAL	RANGE FOR ILLEGAL SHARE	
	WB (*)	PERCENTAGES	
Bolivia	80.0%	80	80
Brazil	33.5%	20	50+
Cambodia	90.0%	90	90
Cameroon	50.0%	50	65
Colombia	42.0%	42	42
Congo, Dem. Rep.	90.0%	90	90
Congo, Rep.	70.0%	70	70
Ecuador	70.0%	70	70
Gabon	70.0%	50	70
Ghana	52.0%	34	70
Indonesia	75.0%	60	80
Lao PDR	45.0%	45	80
Liberia	80.0%	80	80
Malaysia	35.0%	35	35
Papua New Guinea	70.0%	70	70
Peru	80.0%	80	90
Russian Federation	30.0%	10	50
Thailand	40.0%	40	40
Vietnam	30.0%	20	40

Sources: Jianbang et al. 2016; World Bank 2006.

Note: *Mean values are estimated from Jianbang et al. (2016). Jianbang et al. (2016) provide estimated percentages of illegal logging from four different sources; the percent illegal shown is an average calculated from these four sources. The range of illegal production share shows the minimum and maximum percent of illegal production estimated for a given country from these four sources.

¹¹ Estimates are, however, uncertain because of the lack of consistent and reliable information on the extent of illegal logging.

¹² For example, when illegal forest products are exported, they go through a complicated chain of operators who wield disproportionate market and political power. As a result, the majority of profits accrue to middlemen operating outside the country of origin. See Kishor (2012) for more details.

Fiscal Instruments and the Informal Forest Sector

Informal activity impacts the type of environmental fiscal instruments that can be used to target forest sector operations. Informality encumbers the collection of traditional forestry taxes, especially where governance capabilities are low.¹³ Furthermore, when implementing environmental fiscal policy for the forest sector, policy makers should consider the equity impacts on vulnerable and forest-dependent populations. Given forests' strategic function for resource-dependent, rural, indigenous, and other vulnerable communities, any policy reforms should be designed to avoid regressive impacts on these populations (Boyd et al. 2005; Hanson and Sandalow 2006). However, this does not mean that the policy in question should not be implemented at all; rather, the policy should be complemented with a compensation mechanism or other targeted interventions. Implementing higher taxes on charcoal, for example, would most likely not have the desired effect: As the majority of charcoal is produced and consumed by poor households with few alternatives, the tax would either penalize poor populations (Anthon, Lund, and Helles 2008) or both.¹⁴ Such a tax policy could then be complemented with targeted payments to low-income households to account for any regressive effects and adverse incentives.

Despite these challenges, environmental fiscal policy instruments can promote sustainable forests while impacting the informal sector itself. Fiscal reforms have several effects on both the extensive and intensive margins.¹⁵ The impact from fiscal reforms on the informal sector through the extensive margin will depend on the magnitude of net revenues raised and on the design of fiscal mechanisms. An increase in overall taxation of forest-related activities may create an incentive to reduce the use of labor and/or capital, to shift out of formal production, or to cease production altogether. If undesirable, such motivation can be reduced if fiscal reforms involve tax rebates for some practices as well as provide support to firms to increase their profitability and productivity.

Adjustments on the intensive margin can also create incentives for producers to move either into or out of the informal sector, depending on how the feebates are structured. If they entail a large increase in costs, fiscal reforms can encourage more intensive and environmentally damaging production and may also encourage a move outside the formal sector where both taxes and regulations are avoided. Avoiding the creation of adverse effects requires inducements so that, at each stage of production, the taxation system gives a fiscal advantage to the more sustainable option. As noted in other chapters, a feebate scheme charged only to logging concessions most likely will still not be enough to bring the shadow economy into the light. If, however, the feebate scheme is applied where chokepoints (unavoidable control points) exist, pressure to formalize and certify can be created. If a processor faces the same feebate scheme, there is the incentive to ensure that inputs are purchased from certified logging companies to receive the tax rebate and lower costs. If this scheme is applied along the timber supply chain, it reinforces the pressure on actors to join the formal market.¹⁶

13 In many cases, forest sector administration is characterized by high levels of corruption, manifested through para-fiscal levies like bribes, kickbacks, and protection money (Kishor and Oksanen 2006). On the one hand, these para-fiscal charges tend to increase the size of the informal sector, as the avoidance of costs is one of the main incentives to leave the formal sector. On the other hand, large informal sectors also reinforce the creation and maintenance of corruption networks (Kishor 2012), as discussed above.

14 If a tax increases the price of goods, certain consumers may not be able to afford the increase in costs and may substitute away from the higher-priced good. If there is no readily available substitute for forest products, consumers may turn to the informal market. This demand for informal market goods reinforces incentives for firms to join the informal sector. The regressive effect of taxes can lead to informal market entrance if no other policy instruments are used in combination to mitigate this impact.

15 The extensive margin refers to the overall use of different inputs in the production activities of the forest sector. The intensive margin of adjustment refers to changes in the labor and capital-output ratios.

16 See chapters 6 and 7 for more details on using fiscal mechanisms to target chokepoints along the commodity supply chain.

The ultimate impact on the informal forest sector from fiscal policy will depend on the structural reasons for informality within a given country. Several stylized models explain the presence of informality within an economy as a whole (La Porta and Shleifer 2008, 2014). The exclusion model states that informality may be caused by burdensome regulations that increase the costs of formalization (de Soto 1989, 2000). If this model holds in an economy, policies that reduce the compliance costs of formalization would lead to a reduction in the share of informal sector activity. The rational exit model states that the benefits of formalization may be outweighed by its costs, and firms (as rational actors) will exit the formal market if the costs outweigh the benefits (Levy 2008; Maloney 2004). In this case, policies that increase the benefits and reduce the costs of formalization may help reduce the size of the informal sector share of production (Perry et al. 2007). Finally, the dual economy model of informality states that informal firms serve different customers or are not competing with formal firms (La Porta and Shleifer 2014; Harris and Todaro 1970; Lewis 1954). Informality in this case may then fall autonomously, without policy intervention, as the economy grows (Rothenberg et al. 2016). These models of informality are not mutually exclusive, and informality may be caused by a combination of these factors.

Depending on which informality model (or combination) characterizes an economy, fiscal policies may be designed to reduce incentives to join the informal sector.¹⁷ In the exclusion and rational exit models, tax rebates based on legal accreditation with the state and verification of SFM practices would be appropriate (see chapters 6 and 7 for more discussion). The same instruments may also have some effect if the dual economy paradigm is the dominant one; however, in that scenario demand-side initiatives that target vulnerable communities may have more impact.

However, data on the links between fiscal reforms and informal forest activity are very limited. Country-level research is thus needed to resolve the potential for fiscal reforms to promote SFM in general and on its impacts on the informal sector. Here, we briefly examine several of the environmental fiscal reforms described in this publication, which may be able to work despite large informal sectors or even to incentivize formalization of the forest sector.

1. Changing tax types

Reforming the existing tax and fee structure in the forest sector can impact the informal sector in various ways. For example, imposing fixed costs (like area fees or property taxes) tends to drive marginal players out of the formal industry. This may professionalize the industry, making SFM more feasible. In general, if the environmental fiscal reforms reduce the costs or increase the benefits of formalization, they could help reduce the size of the informal forest sector. These reforms are most appropriate for the timber subsector, as its formal production tends to be more regulated than the fuelwood or NWFP subsectors.

2. Substituting labor taxes with environmental taxes

Another promising fiscal policy approach is the revenue-neutral environmental fiscal reform, whereby taxes are shifted away from economic “goods” such as employment or labor and

¹⁷ Despite the potential of environmental fiscal instruments to produce positive policy outcomes, other policy instruments will also be necessary. Fiscal policy is not a silver bullet—other policies are needed to address all the issues related to informality and the sustainability of the forest sector.

toward environmental “bads” such as deforestation or forest degradation.¹⁸ If environmental fiscal reform is implemented, policy makers can reduce some of the fiscal barriers to formal employment (for example, by lowering income taxes).

The effects of fiscal reforms will depend on the changes to overall tax revenues. One can consider the following cases: (i) overall forest taxes are increased, and (ii) they remain the same.¹⁹ If taxes increase significantly, there is the possibility to use revenues to reduce other taxes and/or directly support vulnerable groups negatively affected by the reforms (for instance, via targeted income transfers). Using some revenue to reduce other taxes, especially payroll taxes for low-income labor, would be beneficial to the wider economy. Although there are tax interaction effects to consider, most modeling exercises in economies with significant unemployment show that imposing an environmentally desirable tax and reducing employment taxes does reduce unemployment as well as improve environmental indicators. Using revenues in this way would also reduce the incentive to exit the formal sector because of the employment tax (Markandya, González-Eguino, and Escapa 2013).²⁰

The amount by which employment taxes could be decreased, however, will not be large unless the forest sector is a major part of the whole economy. If the reforms do not raise significant additional taxes, the scope for reducing other taxes will be small as will be the pathway for influencing the informal sector. The potential for fiscal reforms involving forest taxation combined with a reduction of employment taxes in the formal sector is better in countries where forests rents account for a large share of GDP, which is the case in Burundi, the Central African Republic, the Democratic Republic of Congo, Guinea-Bissau, Liberia, Mozambique, Niger, the Solomon Islands, Somalia, and Uganda (World Bank 2018).

3. Variable environmental taxes

Variable environmental taxes (that is, Pigouvian tax rates that vary according to the environmental impacts) can be implemented to target the sustainability of production of the forest sector. Previously, variable environmental tax rates were too complicated to put in practice in the forest sector (Leruth, Paris, and Ruzicka 2000); however, recent policy developments have made them accessible to a wide range of countries.

The taxation-and-rebate (feebate) instrument is a promising policy mechanism that could both reduce the share of informal sector production and promote SFM. The feebate (similar to a deposit-refund system) is a fiscal mechanism under which all formal timber harvesters, processors, and/or retailers are charged a high tax rate based on the worst-case assumption that their production was unsustainable.²¹ When accredited producers can prove to fiscal administrators that their production has been more sustainable, they are offered a tax rebate. Proof can be in the form of third-party certification agencies (that is, FSC or PEFC for timber and Roundtable on Sustainable Palm Oil for palm oil), or government-sponsored certification (such as the Mexican Forest Certification System for timber in Mexico and Indonesia Sustainable Palm Oil for palm oil in Indonesia). In this way, the tax rate varies depending on

18 See Castellucci and Markandya (2012); Markandya (2012); Markandya, González-Eguino, and Escapa (2012, 2013); and Pigato (2019) for more details on environmental fiscal reform and tax shifting.

19 It is difficult to imagine forest tax reforms resulting in a decline in forest revenues. In particular, feebate mechanisms can be designed in a revenue-neutral manner; see chapters 5, 6, and 7 for more details.

20 See Pigato (2019) for more details on environmental fiscal reforms.

21 The (Pigouvian) tax rate in this case corresponds to the environmental damage caused by producing one unit of timber or other wood product. For more details on this mechanism and the choice of tax rates, see chapters 6 and 7.

production practice. Again, this reform may be most appropriate for the timber subsector, as individuals and firms in the fuelwood and NWFP subsectors often operate outside of formal tax systems.

Introducing a feebate system would impact the informal sector in various ways depending on how the existing fiscal regime is modified. If the reform involves a basic increase in the tax payable, an incentive is created for firms engaging in activities that are only marginally profitable in the formal system to consider moving out of it and continuing as an informal or illegal enterprise (Loayza 1999). If, however, the reform offers the possibility of reducing the level of tax payable upon the compliance with set conditions, then the incentive would work in the other direction—that is, to encourage enterprises in the informal sector to move to the formal sector.

The incentive to formalize and implement SFM practices would be strengthened if the tax structure involved rebates downstream in the supply chain. As there are significant challenges with taxing harvesters directly (owing to their large number, their isolated and dispersed location, informality, and risk of corruption), policy makers might decide to apply the feebate scheme to formal processors or retailers of forest products.²² Under a downstream feebate, the pressure to formalize comes from both private and public agents. If downstream processors can reduce their tax bill by sourcing from accredited and sustainably certified suppliers, it helps reduce the market for uncertified (and informal) forest inputs. A downstream feebate would hence be more effective in reducing informality in countries with formal domestic wood processing and retail industries.

The magnitude of any impact will depend critically on the size of the tax rates applied and how they change the status quo, the feebates offered, and other taxes in the system. There is considerable theoretical discussion in the literature on the design of an ideal system but little empirical evidence so far as major packages of such reforms have not been tried. Yet there are some countries with modest fiscal reforms in the forest sector along the lines suggested that merit evaluation. This is a topic for further research.

4. Public procurement

Public procurement policies, while not usually included as a traditional fiscal instrument, can be easily implemented even in the case of large informal sectors. Public procurement policies are regulations that stipulate what kinds of and how purchases can be made with public funds. Many countries have already implemented this reform for sustainable forest products; for example, the United Kingdom implemented the Timber Procurement Policy, which stipulates that all timber and wood products must be from independently verifiable legal and sustainable sources (see chapter 6 for more details). By requiring all timber and wood products publicly purchased to be legal and sustainable, governments send a powerful signal regarding their commitment to a sustainable forest sector. Furthermore, public procurement policies are relatively simple to introduce, even in countries with low governance capacities and high levels of informality (Brack 2014).

22 The number of downstream processors and retailers tends to be fewer than the number of direct forest harvesters; therefore, it may be easier for governments to implement taxation at this segment of the forest value chain. Furthermore, using variable environmental export taxes may be the best policy option for countries with low governance capacities, and especially where deforestation is largely driven by international commodity export. See chapters 7 and 8 for more details.

5. Ecological fiscal transfers

Ecological fiscal transfers are another fiscal policy mechanism that can be implemented under a wide variation of governance arrangements and that may have an impact on the informal forest sector. All governments distribute centrally generated revenues to subnational or regional and municipal governments for various reasons (see chapter 11 for more details). With EFT, a portion of central government revenues are distributed based on an environmental or ecological indicator. For example, India distributes a portion of revenues to states based on the forest cover in the jurisdiction. Brazil, France, Germany, and Portugal also use EFT (usually based on the amount of forested area designated as protected).

EFT distribute central government revenues to compensate regions that forgo economic development in favor of forest conservation; thus, EFT can serve as an incentive for *public* actors to invest in SFM and forest conservation. This policy may help jurisdictions overcome local corruption networks in part by providing an alternative source of funding that can then also be used to invest in strengthening governance capacities. Furthermore, EFT can support better recordkeeping of the status of forests. Distributing revenues in this way sends a strong signal that the public sector is committed to investing in sustainable forests.

6. Fiscal reforms in other sectors

Fiscal reforms in other sectors such as agriculture may be able to improve the sustainability of forests despite the presence of large informal sectors. Indeed, reforms in other sectors may be able to reduce informal operations if the reforms reduce the incentive to convert forests to other land uses. For example, reforming agricultural subsidies may reduce the incentives to (informally or illegally) clear-cut forests for cattle grazing or agricultural commodities (see chapter 12 for more details).

7. Expenditure policies

Expenditure mechanisms are another key fiscal policy that can impact the informal sector by providing alternative livelihoods and employment opportunities, among other effects.²³ Results-based expenditure policies, notably payments for environmental services and REDD+, may be able to reduce informal forest sector activity. These policies create an incentive for parties to engage in the formal sector insofar as participating in these schemes generates some benefits to the providers of the services and requires some administrative recognition (Lipper and Neves 2011).²⁴ Such expenditure policies may be more effective in the fuelwood and NWFP subsectors, as many individuals participate in these sectors for subsistence; providing an alternative source of livelihoods and employment may be most effective where informality is the highest.

By investing in programs to encourage sustainable use of resources (especially regarding increased efficiency), demand for forest products and therefore forest exploitation in general is reduced. An example where direct expenditure is more effective than taxation is charcoal production in countries with low enforcement capacity. In the Democratic Republic of Congo,

23 The focus of this publication, however, is on revenue-neutral or revenue-raising instruments that can be applied under a wide variety of governance arrangements and capacities. Therefore, we refer the reader to the executive summary and chapter 1 for more details and references on forest sector expenditure policies.

24 However, schemes such as REDD+ can also create a "leakage" if participating enterprises find their profits from logging reduced and undertake logging activities elsewhere, frequently in the informal or illegal sector (Enters et al. 2002; Kuik 2014).

charcoal is the main driver of deforestation, where 84 percent of harvested wood is used for charcoal and firewood, carried out through a very large number of individually small entities in the informal sector (World Bank 2018). In Kinshasa alone, the country's capital, the charcoal sector employs more than 300,000 people, and most charcoal producers earn less than \$50 a month (Trefon 2016). Taxing them would not be feasible, and there is also evidence that such taxes would have the opposite effect of intensifying wood extraction (Anthon et al. 2008). In this case, expenditure policies that invest in increased efficiency cookstoves or plantations for biomass can reduce the demand for charcoal and therefore reduce pressure on forests.

More generally, there is an efficient role for direct public expenditures in increasing the supply of forest-derived or other agricultural products, through technological investments that encourage increased productivity on the land, to discourage expansion into forested, protected, or ecologically important lands. These effects on supply and demand (and therefore price signals) are more easily achieved through expenditure policy compared to tax policy and therefore expenditures should supplement environmental tax reforms.

Revenue gains from formalization

Government revenue would also increase if part of the informal sector was converted into the formal sector. While it is not practical to assume informal activity could be completely eliminated, some reduction of the informal sector should be possible given the evidence of the variation in its size across countries at similar levels of development. Table 2.4 estimates revenue increases from formalizing half the current informal sectors in countries with available data.

Forestry tax revenues vary greatly across countries. Accordingly, the potential for increasing them by reducing the informal share of the sector will also vary. GTZ (2005) reviewed the sector in 18 countries and managed to obtain information on tax revenues in 10 of them.²⁵ Tax instruments included in the estimates were (a) volume-based taxes such as stumpage fees, (b) area-based charges, (c) corporate taxes on forest enterprises, and (d) export taxes.²⁶ Forest tax revenue as a percent of government revenue ranges from around zero in Brazil,²⁷ Chile, and South Africa, to as much as 14 percent in the Central African Republic and 25 percent in Cameroon (table 2.4). Thus, there is a huge variation in the fiscal role of forest taxation across this sample of countries.

25 From a further survey of the literature, data from an additional two countries have been obtained.

26 Not all these instruments are used in all countries; the differences between the instruments are discussed in other chapters in this collection.

27 Brazil introduced a new forest code in 2012 that is not captured in the GTZ data. It also does not have any forest taxes, but there is an economic instrument called the Environmental Reserve Quota (CRA, per the Portuguese acronym). These quotas are tradable quotas based on the amount of protected forest area that every landowner should keep in her property, which varies depending on the forest type. This economic instrument is currently in the regulating process at the state level. Rajão and Soares-Filho (2015) estimate the price of the quotas under different scenarios. None of the revenue, however, appears to go to the government.

TABLE 2.4
TAX REVENUES FROM FOREST SECTOR AND POTENTIAL INCREASE IF INFORMAL SECTOR COULD BE HALVED

COUNTRY	FOREST REVENUE AS % OF GOVERNMENT REVENUE	ESTIMATED FOREST REVENUE (US\$, MILLIONS) (2014)	SHARE OF INFORMAL SECTOR (%)	INCREASE IN REVENUE IF INFORMAL SECTOR WAS HALVED (US\$, MILLIONS)	SOURCE
Benin	00.03	44.31	52.8	24.75	GTZ (2005)
Cameroon	25.00	1,191.23	52.1	647.03	Fernagut (2014)
Central African Republic	14.00	3,736.60	56.1	2,387.27	ITTO (2005)
Congo, Dem. Rep.	00.40	11.06	94.8	100.21	GTZ (2005)
Congo, Rep.	00.90	12.05	13.4	0.93	GTZ (2005)
Mali	00.70	10.59	35	2.85	GTZ (2005)
Malaysia	01.54	772.73	42.7	288.18	GTZ (2005)
Guyana	00.10	0.72	34.2	0.19	FAO (2010); OECD (2018)
Nicaragua	00.13	2.35	35.5	0.65	GTZ (2005)

Note: Estimates are based on forest revenues as a share of total government revenues estimated at different dates but recalculated based on actual government revenues in 2014.

As expected, the change in revenue depends on the original size of the informal sector and the level of taxation. In some cases, the increase in revenue could be very large. This increase in income could then be used to increase forest-related tax expenditures, such as rebates for producers who conform to specified environmental criteria, or investments into alternative livelihoods or afforestation programs (for example, payments for environmental services). If these new expenditures were allocated to vulnerable forest users, it is likely that those brought into the formal sector would benefit most, as these two groups often coincide. Another possibility is to use the increase in revenues to reduce the rate of taxation, thus making the tax burden smaller. This “tax shifting” could be done specific to the tax burdens in the forest sector or the tax burdens in the wider economy, depending on the amount of new revenues generated and diversification objectives.

A ‘Forest-Smart’ and Socially Sustainable Policy Mix

A forest-smart and socially sustainable strategy uses a comprehensive policy approach.

Despite the fact that certain environmental fiscal policy reforms can work despite large informal sectors (and may even be able to impact formalization), other, nonfiscal policies are necessary to reinforce environmental and social sustainability. Improving governance alone (for example, banning informal activities or strengthening enforcement to eliminate informal operations) would miss addressing the key drivers of the problem—in particular, drivers related to economic necessity and a lack of alternative livelihoods, among others (Kishor 2012). The diversity that characterizes forest sector production suggests that a combination of various policies should be used: Regulations, information instruments, and fiscal policies should all be used to reduce poverty, encourage formalization, and increase SFM.²⁸

²⁸ Furthermore, different tools should be used when addressing forest-producing versus forest-consuming countries (see chapter 7 for more details). In particular, addressing illegal logging requires action and coordination at various stages (Kishor 2012).

A sustainable policy mix takes forest dependency into account. About 350 million people living within or adjacent to dense forests depend on them for their subsistence and income. Of those, about 60 million people (especially indigenous communities) are wholly dependent on forests. Forests are therefore a key safety net for rural populations and any policy reforms that impact the forest sector should be carefully considered in terms of their impact on poverty and forest dependency. In particular, environmental fiscal reforms should be evaluated for their impact on vulnerable and poor populations in order to avoid regressive impacts.

Sustainable forest sector policies can contribute toward poverty reduction. Policy makers who wish to reduce informal forest sector production should focus on poverty reduction policies. As jobs are key for economic and social development, policies should improve labor market conditions by increasing the informal sector share of production; improving the quality of formal jobs through gains in productivity, earnings, and access to social insurance; improving tenure rights and unionization rates; and connecting vulnerable groups to better jobs (Arce 2019; World Bank 2018). Significant gains could be achieved if policy makers focus on giving women equal access to land ownership and tenure as well as helping women access training and paid employment (FAO 2018; Whiteman, Wickramasinghe, and Piña 2015). Promoting community forest management can also provide significant benefits (FAO 2018); for example, a program in India that strengthened community forest management increased real cash incomes for forest users by 53 percent and increased household incomes by 40 percent (World Bank 2013). Investments in goods with strong public good components, such as electrification, will also be an important component (see chapter 8 for more details).

Sustainable forest sector policies help formalize the industry. Various policy instruments can help formalize the forest sector, such as the provision of credit and other sources of financing supplemented with technical assistance in production methods,²⁹ marketing, and management as well as investments in infrastructure (Arce 2019). Policy makers should strengthen governance capacities,³⁰ such as law enforcement, monitoring systems, and the ability to confront vested interests with tougher sanctions. A bonus system that rewards field agents for implementing legality might also help reduce corruption (Kishor 2012; Lescuyer and Cerutti 2013). Independent observers can also be used to accompany and support national forest monitoring systems, as is done in Cameroon, the Democratic Republic of Congo, and Indonesia (Kishor 2012). Developing producer organizations may also help transform the informal sector (FAO 2018). Reducing barriers to formality would help reduce the incentives to join the informal sector—for example, by reforming small-scale logging permits to simplify the accreditation procedure.³¹ Other corrective measures to reduce the costs of formality include removing unduly strict restrictions, obsolete institutional arrangements, and centralized decision-making (Briassoulis 1999).

Sustainable forest sector policies promote SFM. Policy makers should ensure that incentives to offset the costs associated with sustainably produced charcoal are provided (Kishor 2012). Demand-side policies that reduce the pressure on forest resources, like investments in improved efficiency cookstoves, can also contribute to SFM. Additionally, policy makers could explore investments in alternative sources of energy for rural needs, like decentralized solar (Kishor 2012).

29 The policy mix should include technical measures that improve processing efficiency, in particular for charcoal (Kishor 2012).

30 Crucial forest sector governance and revenue management reforms are described in more detail in two complementary reports, World Bank (2019a) and World Bank (2019b).

31 Such reforms also represent an opportunity for policy makers to better integrate customary tenure on forestland, and to formalize local people's rights over forest resources (Lescuyer et al. 2012). However, such reforms will only be effective at reducing the informal sector if the costs are lower than the benefits legality might bring to operators (Kishor 2012).

Policy makers can strengthen community forestry (an important component of sustainable forest sectors) by improving forest management plans; in Mexico, such a program was found to have increased jobs by 27 percent and the net value of goods and services produced by 36 percent (World Bank 2013). Promoting forest certification can increase the supply of forest products from well-managed forests; however, complementary cost-sharing programs for smallholders might be necessary in conjunction with certification efforts. Policy makers should provide incentives that offset the costs of sustainable production. Education and outreach programs, including adequate formal and nonformal training on SFM (especially harvesting), can help increase productivity and wages, reduce accidents and high workforce turnover, and improve environmental outcomes (Arce 2019).

Policy approaches should be tailored to the forestry subsector in question. Different policies will be needed to address the timber, fuelwood, and NWFP sectors. In particular, environmental taxation instruments may be more appropriate where informal sectors are relatively small, such as the timber subsector. On the other hand, expenditure policies may be more appropriate where informal sectors are relatively large and therefore would complicate the efficient collection of environmental taxes, such as the fuelwood (that is, charcoal) and NWFP subsectors. Expenditure policies for the subsectors should focus on livelihood and employment, to provide rural and vulnerable communities with alternative and formal livelihoods.

Furthermore, policies should be tailored to the different types of firms or individuals operating in the informal sector (Benjamin et al. 2014).

Policy makers should ensure collaboration within governments and with civil society. Policy should be coherent across governmental departments, integrating forest strategies with those that deal with agriculture, food, land use, and rural and national development (Arce 2019). In addition, policy makers should consider providing opportunities for civil society to participate in the reform process and to ensure local communities have rights to consultation, access, and benefits from forest resource use (Kishor, Castillo, and Nguyen 2015).

Collaboration is also needed on an international scale. The barriers to achieving sustainable forest sectors are multifaceted and require wide-ranging policy solutions that operate on multiple levels. Beyond domestic coordination, international efforts will be needed to achieve economic, social, and environmental sustainability in the forest sector. International efforts to curb illegal logging in particular, like FLEGT and anti-money laundering laws, are a key component of these efforts. Other key international policies include collaboration to codify treaties, agreements, and international standards (Kishor 2012).

If situated within a comprehensive policy approach, environmental fiscal policy reforms can create positive incentives for economic, social, and environmental sustainability. Environmental fiscal policy instruments have been underutilized in the forest sector for various reasons, including the administrative difficulty and distributional implications of taxing informal production. Recent policy developments have opened opportunities to apply environmental fiscal mechanisms to the forest sector to achieve numerous goals, including improving environmental outcomes while reducing the incentives to exit the formal sector. However, policy makers should ensure that environmental fiscal policy reforms are supplemented with key interventions that promote equitable development including higher quality employment and livelihoods, increase productivity, and encourage SFM.

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ANNEX 2A

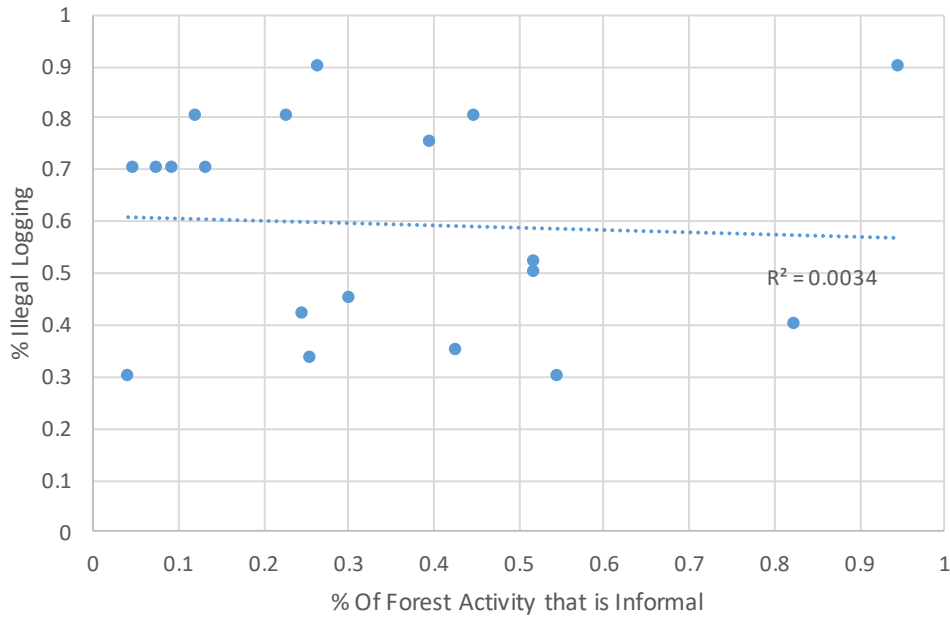
TABLE 2A.1
COUNTRIES WHERE THE INFORMAL FOREST SECTOR IS MUCH SMALLER OR MUCH LARGER THAN THE INFORMAL SECTOR AS A WHOLE

INFORMAL FOREST SECTOR MUCH SMALLER	COUNTRY	INFORMAL FOREST SECTOR MUCH LARGER	COUNTRY
10.10%	Equatorial Guinea	-65.30%	Mauritania
11.62%	Denmark	-59.34%	Eritrea
11.82%	France	-58.21%	Mozambique
11.91%	Canada	-54.39%	Namibia
11.93%	Italy	-51.35%	Iran, Islamic Rep.
11.98%	Brazil	-51.18%	Philippines
12.67%	Honduras	-48.53%	Bhutan
12.79%	Sweden	-48.35%	Congo, Dem. Rep.
13.13%	Czech Republic	-44.03%	Dominican Republic
13.13%	Norway	-42.15%	Malawi
13.24%	Finland	-40.92%	Gambia, The
14.49%	Mexico	-39.52%	Armenia
16.03%	Cyprus	-38.39%	Ukraine
16.26%	Hungary	-36.29%	Ethiopia
17.65%	Pakistan	-36.11%	Vietnam
19.07%	Portugal	-33.65%	Chad
19.28%	Algeria	-32.91%	Togo
19.49%	Cambodia	-32.72%	Azerbaijan
19.59%	Poland	-32.65%	Côte d'Ivoire
19.86%	Zambia	-31.90%	Thailand
20.10%	Spain	-29.64%	Niger
20.58%	Uruguay	-27.02%	Kenya
21.13%	Slovenia	-26.74%	Guinea-Bissau
21.15%	Bulgaria	-26.39%	Angola
21.75%	Latvia	-24.76%	Nigeria
21.77%	Lithuania	-23.99%	Sri Lanka
21.96%	Egypt, Arab Rep.	-21.72%	Haiti
22.24%	Romania	-21.17%	Kyrgyz Republic
22.98%	Estonia	-19.62%	Cameroon
24.41%	Papua New Guinea	-15.78%	Jamaica
25.35%	Croatia	-15.76%	Morocco
25.65%	Venezuela, RB	-15.70%	Burkina Faso

27.47%	Solomon Islands	-15.57%	Indonesia
27.96%	Guatemala	-14.73%	Madagascar
28.75%	Ecuador	-14.20%	Central African Republic
29.08%	Georgia	-12.97%	Nepal
29.76%	Brunei	-11.48%	Guinea
30.57%	El Salvador	-11.23%	Malaysia
31.73%	Congo, Rep.		
31.89%	Kazakhstan		
34.21%	Russian Federation		
35.07%	Belize		
39.24%	Bolivia		
40.31%	Peru		
44.77%	Gabon		
48.72%	Zimbabwe		

Note: Figures are differences between the shares of the informal sector of the whole economy minus the shares of the informal sector as part of gross value added in the forest sector. Countries are listed in order of size difference.

FIGURE 2A.1
PERCENT OF ILLEGAL LOGGING AND PERCENT OF FOREST SECTOR THAT IS INFORMAL



Source: Based on estimates from Jianbang et al. 2016.

Figure 2A.1 shows little correlation between the rates of illegal logging and the informal share of forest activity. The trend line is even slightly negative, with the share of illegal logging declining as the share of informal forestry increases. Not much can be read into this correlation. Various studies emphasize the importance of government policies, institutional factors, and especially the monitoring of exports as factors that influence the scale of illegal logging (Hoare 2015; Lawson et al. 2014; Gonçalves et al. 2012). The size of the informal sector, as such, does not seem to determine this phenomenon. This is surprising as the conventional view is that a large informal sector and illegal logging are highly correlated. However, disaggregated analyses that look at individual subsectors and local deforestation rates may show a higher correlation; as such, caution should be taken when examining aggregated data of this kind.