Smart Mixes in Forest Governance

Jing Liu (registration number 135)

1. Deforestation and Forest Degradation: Common Pool Resources Problems

Forest plays vital and diversified roles in supporting ecosystems and human welfare, including sustaining the livelihood of forest-dwelling specifics, producing goods, controlling climate and conserving water and soil.\(^1\) However, alarming high rate of forest conversion and degradation threatens the health of the forests. Around 13 million out of 4 billion hectares forest coverage disappears every year.\(^2\) Deforestation does not disperse equally across the globe. It is more prominent in developing countries, especially countries with rich tropical forests.\(^3\) Forest coverage has been expanding in Europe and has been stable in North America.\(^4\) However, forest degradation is still a concern in developed countries. The health of riparian forests is also a concern in North America.\(^5\) Biodiversity is an important concern for Europe, where very few primary forests have remained except in Russia.\(^6\)

Literature has identified multiple drivers that cause forest problems. Commercial and subsistence agriculture, mining, infrastructure and urban expansion are common drivers for deforestation. The drivers for forest degradation include timber logging, uncontrolled fires, livestock grazing in forest and fuelwood use.\(^7\) In addition to those activities directly influencing forest status, the economic (poverty, market, global demand), cultural, demographic, technological and institutional factors may also contribute to deforestation and forest degradation via affecting above mentioned human activities.\(^8\)

The co-existence of multiple drivers for forest problem calls for different regulatory regimes and instruments. The rich diversity of driver combinations across countries suggests the regime and instrument mixes to address forest problems are highly context-based and complex. In spite of this, there is one underlying factor behind the diverse drivers for forest problems: the forests are common pool resources. This means that the exclusion of other users is very costly if

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\(^1\) Millennium Ecosystem Assessment 2005.
\(^2\) FAO 2010, 10.
\(^3\) South America and Africa mark the highest deforestation rates, at 4 and 3.4 million hectares annually from 2000 to 2010. At national level, the largest annual net loss can be found in Brazil, Australia, Indonesia, Nigeria, Tanzania, Zimbabwe, the Democratic Republic of the Congo, Myanmar, Bolivia and Venezuela. See FAO 2010, xvi, 21.
\(^4\) Ibid., xvi.
\(^5\) McDermott, Cashore & Kanowski 2010, 95; Sweeney et al. 2004, 14132; Verry & Dolloff 2000.
\(^7\) Hosonuma, et al 2012, 3-4.
\(^8\) Gupta et al, 2012, 30.
not impossible (non-excludability) and the exploitation of one user diminishes the availability for others (subtractability).\(^9\) Because exclusion is costly, when no institutions restrict access, resource users may tend to free-ride and to overexploit resources. In this case, “the tragedy of the commons” scenario materializes.\(^10\)

Scholars have identified basically three types of property rights to restrict access to common pool resources: public, private, and communal.\(^11\) Extensive academic attention has been paid to how common pool resources are protected under these different property rights and to the conditions for each property rights to function effectively.\(^12\) The effective functioning of property rights means that the over-exploitation of common pool resources is prevented by either excluding users so that the subtraction of resources does not exceed levels of sustainability or making sure that present users do not expand their activities to exceed these levels.

Property rights do not work in vacuum. Rather, they are influenced by the institutional background. As many other environmental problems, forest problems have been regulated under public regulation for a long time. In 1980s and 1990s, neoliberal ideas on free trade, liberalization, and privatization diffused globally.\(^13\) As a result, attempts of developed countries to prevent illegal logging in tropical countries via import bans lost support. As governmental and intergovernmental options for addressing environmental issues were blocked or failed by the invocation of legislation that enabled free trade, states, NGOs and social movement groups put more energy and resources into private regulatory regimes – like nascent certification and monitoring efforts.\(^14\)

Both public and private regulation influence the functioning of property rights. For example, public regulation can affirm private ownership of forests via registration or the creation of (quasi-)private property rights\(^15\) on state-owned forests via granting concessions. Besides, private regulatory regimes, such as forest certification, can apply to resources that are managed under different property rights and can as such influence the effectiveness of these property rights. In addition, public and private regulation are also closely linked. Therefore, property rights, public and private regulation compose an intricate and interacted system which

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\(^9\) Feeny et al. 1990.
\(^10\) Hardin 1968, 1243.
\(^12\) For example, Ostrom has identified eight design principles for the success of communal property rights regimes. The limitations of private property rights and public property rights have been discussed extensively in law and economics’ literature. See Ostrom 2010; Cole 2010; Anderson & Leal 1991; Stroup & Baden 1983.
\(^13\) Dobbin, Simmons & Garrett 2007, 449-472.
\(^14\) See Bartley 2003.
\(^15\) It is debatable whether such rights should be classified as “property rights” or “quasi-property rights”. This research will not engage in this legal discussion, but uses the term “property rights” broadly to denote “a set of rights to control assets”, or in other words the form of power where “a sanction and authority for decision-making” over resources have been established. See Cole 2010; Denman 1978; Dasgupta 1982.
governs common pool resources like forests. However, how such different regulatory regimes and instruments interact in practice and whether their mixes are smart in solving common pool resources, has not been extensively studied yet. To explore this, is the main goal of this study.

This chapter is structured as follows: after this introduction, section 2 examines property rights, public and private regulation for forests respectively. Whether their mixes are smart or not is explored in section 3 and 4, with the former focusing on the interaction between public and private regulation, and the latter discussing the influence of their interaction on the functioning of property rights. Section 5 concludes.

2. Forest Governance: Property Rights, Public and Private Regulation

2.1 Governing Common Pool Resources

For common pool resources, a mismatch between the benefits and the costs of their consumption exist. Because the resources users can capture the full benefits without bearing the complete costs, they tend to over-harvest the resources. 16 The creation of property rights, including public, private and communal property rights can help internalize the externalities. 17

These property rights and institutions are not established without costs. Property rights need to be defined, properties need to be policed and in case of disputes, some dispute settlement mechanisms are necessary. These various activities associated with the establishment and maintenance of property rights create transaction costs. 18 Therefore, it is not always desirable to establish property rights for common pool resources. If the resource is uncongested and the transaction costs for establishing property rights are high, it is desirable to leave the resource in open access. 19 When congestion increases as time passes, or technological innovations reduce transaction costs, such as boundary maintenance costs, establishing property rights becomes more desirable. This also implies, the best ways to balance environmental protection and minimalizing transaction costs are not fixed but dynamic and evolving.

Transaction cost is a concept that is often vaguely defined or only illustrated with examples. 20 The property rights literature usually uses it in a broad sense to incorporate “costs associated with the transfer, capture and protection of rights” 21 or “the resources used to establish and maintain property rights”. 22 Cole differentiates transaction costs into two types: the exclusion costs and coordination costs. “Exclusion costs are the costs of drawing and enforcing

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16 Hardin 1968; Alexander & Peñalver 2012.
17 Demsetz 1967, 347; Feeny et al. 1990, 1.
20 Allen 2000, 898-899. For such examples, see Barzel 1985, 8; Alchian & Woodward 1988, 66.
21 Barzel 1989, 122.
boundaries to restrict access to and use of the resource to the owner(s) of the property”. Coordination costs are the costs associated with solving collective action problems. To reduce exclusion costs, hence requires a clear definition of property rights and the capacity to enforce the rights, including policing, dispute settlement and sanctioning. For private property, decision making power is vested in individuals. Sometimes, however, the individual owners need to negotiate with external parties in using and managing resources. For both communal and public property, collective decision making institutions are established and coordination takes place inside these institutions. These three types of transaction costs (definition, enforcement and coordination) are connected to two other factors: information and scale. Collecting and distributing information is crucial in both exclusion and coordination activities. Scale concerns the level on what property rights are managed and possibly the links between the units that may manage property rights at different levels. The scale of governance can influence both the enforcement of property rights and the coordination between stakeholders. These five factors set the necessary preconditions for property rights to be able to effectively address common resource problems: clear definition of property rights, enforcement, coordination, information creation and sharing, and scaling. In fact, these elements which are referred to in the literature as transaction costs are nothing else than conditions that need to be fulfilled for the proper functioning of property rights.

Those conditions are determined by diverse factors, including the nature of the resources, ecological, technological and institutional circumstances, and even culture and ideology. This research focuses on the influence of institutional factors on the conditions for a proper functioning of property rights, more particularly on public and private regulation. In other words, this research examines to which extent public and private regulation interact in facilitating the necessary preconditions for effectively addressing common pool resources by clearly defining property rights, enhancing enforcement capacity, smoothing coordination, generating and sharing information and operating the right scale of governance.

However, the establishment of property rights does not mean all problems related to common pool resources are solved. For example, the market value of the timber is internalized via establishing forest property rights, but other non-market values, such as the ecological and esthetic value of the forest are not considered by the self-interested private actors. In other words, the right holder may still use his property in a way which creates externalities for third parties. This results in market failure which may therefore justify external intervention, including both public and private regulation.

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24 Ibid.
25 Ibid., 135.
Therefore, this research examines how public and private regulation interact, on the one hand, to help the establishment and maintenance of property rights, and on the other hand, to overcome the externalities of property rights.

A few countries are chosen as examples to illustrate how the mixes of public, private regulation and property rights work in practice. A number of factors need to be considered in choosing countries: the prominence of forestry problems, the stage of development, the prevailing property rights and the presence of an institutionalized certification system.

According to such criteria, five countries are chosen: Indonesia, Bolivia, Canada, the US, and Sweden. They all have substantial forest coverage: 51.4% in Indonesia, 52.2% in Bolivia, 34.1% in Canada, 33.3% in the US and 69.2% in Sweden.26

Indonesia and Bolivia are two developing countries suffering from rapid deforestation. They both have adopted diverse types of property rights: public, private and communal. The property rights are often less clear and less secure than in many developed countries. This ambiguity has led to conflicts between forest users and has contributed to high deforestation rates. Although fewer forests have been certified in Indonesia and Bolivia than in the three developed countries, given the low penetration rate of forest certification in developing countries, they represent examples with comparatively well institutionalized certification schemes for developing countries.

Canada, the US and Sweden are developed countries with stabilized forest coverage, but still facing forest degradation problems, such as the loss of ecological function caused by insufficient protection of riparian forests and the loss of biodiversity. Most forests in Canada are publicly owned where private forests are more popular in the US and Sweden.27 Community-owned or managed forests do exist in these three countries (such as those owned or managed by Indian tribes in the US, First Nations in Canada and Sami people in Sweden,) but only on small scale.28 Forest certification has started to develop from these countries and has a wide coverage there: around 36% of forest areas in North America are certified29 and more than half of the forests are certified in Sweden.30

2.2 Property Rights for Forest

It is worth noting that “most property regimes governing environmental goods are admixtures of individual private ownership, private (non-state) common property management, state ownership and management (i.e., regulation)”.31 Both ownership and less complete property rights can be established for forests. Owners have broad rights over their property (either

27 McDermott, Cashore & Kanowski 2010, 74, 80, 136.
forests or the land where forests grow), including access, harvest, management, exclusion and alienation. Sometimes, less complete rights are established for forests. For example, private parties can gain rights to access, harvest and manage a specific part of publicly owned forests via permits or concessions.\(^{32}\) In these cases, ownership and less complete users’ rights co-exist on the same forests: ownership is a public property right, while user’s rights are private. The differentiation of public, private and communal property rights is a heuristic rather than a clear division. It is conducted for the convenience of analysis. This research treats the forests as public, private or communal according to the party on which the management right is vested on.\(^{33}\)

FAO collected data from 188 countries (accounting for 99% of total forest area) on forest ownership by 2005.\(^{34}\) Different from the terminology used in this research, the FAO data defines forests owned by individuals, corporate/institutions and communities as private forests. According to FAO, public forests compose the largest part of the global forests, amounting to 80%. 18% of forests are privately owned, and other 2% are classified as other (including unknown and disputed ownership).\(^{35}\) Public ownership was predominant in most regions. Private ownership was common in Europe excluding Russian (more than 50%), Central America (46%), Oceania (37 %), East Asia (33%) and North America (31 %).\(^{36}\) For private forests, data concerning the type of forest owner is only available for 55% of global forest area. In these areas, “59 percent of private forests were owned by individuals, 19 percent by private corporations and institutions, and the remaining 21 percent by local communities and indigenous people”. This suggests communal forests are only a small fraction of global forest areas. They are more common in Africa (excluding Northern Africa) and Central America.\(^{37}\)

An interesting phenomenon is the shift of property rights in developing countries since colonization. Although historically forests were exploited by local communities in many developing countries, as a result of the influence of colonization and decolonization, state ownership and control over natural resources became common there. An example constitutes the case of Indonesia. Forests used to be managed by communities. During the colonial period the colonial government claimed ownership over resources and controlled land in Java.\(^{38}\)

\(^{32}\) This is the main approach to manage public forest in Canada. Permits/concessions have also been established on public forests in Indonesia and Bolivia.

\(^{33}\) For example, in Indonesia, Community Based Forest Management policies provide different extent of right to harvest and manage forests to communities on public forests. These types of forests are discussed under the heading of “community forests”.

\(^{34}\) FAO has been monitoring forests since 1946 and has produced the Global Forest Resources Assessments every five years. The recent assessment report was produced in 2010, which provides information on forest ownership in 2005.

\(^{35}\) FAO, 2010, 122.

\(^{36}\) Ibid, 122-123.

\(^{37}\) Ibid, 123.

\(^{38}\) Gold & Zuckerman 2014, 3.
later post-colonial Indonesian government retained state ownership.  

During the Suharto period, the forest management authority was concentrated in the hands of the central government, which claimed control over forests in the whole country. But it could only conduct direct control over forests on Java and outsourced forests in other areas to big timber companies with good political connections. The rights of smaller loggers and customary communities were not recognized. Only after the reformasi period, rights of the marginalized actors started to become recognized to a limited extent. The Basic Forestry Law of 1999 stipulates that “Forest control by the state shall respect customary laws, as long as it exists and its existence is recognised and not contradicting national interests”. The law requires government to establish regulation on the process to recognize customary (adat) communities. Such a governmental regulation, however, has never been passed. In practice, the existence of the adat community depends on the recognition of the government and the adat rights can be revoked if the existence of adat is no longer recognized or if it is determined to contradict national interests. Hence the adat system has rarely enjoyed “more than minimal force in practice”. Private forests are also admitted in Indonesia by the Basic Agrarian Law (1960) and Basic Forestry Law (1967). However, the definition of private forests was not clear and low land registration process threatens the security of private forests. Given the unclear definition of forest tenure, land conflicts are common in Indonesia.

Like in Indonesia, a shift from customary forests to public forests also happened in Bolivia. The first Forestry Law of Bolivia in 1974 declared state ownership of all forests and required the users of forests on both public and private land to obtain permits from the state. Permits were granted only to registered enterprises and local and indigenous communities were excluded. A land and forest law reform was enacted in the mid 1990s. The state still owned all forests in Bolivia, but the land on which forests grows could be owned by the state, private parties and indigenous groups (via Tierras Communitarias de Origen—TCOs). Three types of forest tenure were established on the public land: long term contracting, concessions by private

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39 Ibid., 79.
41 This is believed to relate with the demise of military role in social affairs and the emergence of civil society. Under such situation, communities began to claim for their rights and the conflicts between them and transmigrants/concessions operators came to rise. See McCarthy et al. 2006; Arnold 2008, 81.
43 Article 67(2)(3).
44 Arnold 2008, 86.
45 Bartely 2011, 530.
46 Safiti 2010, 88.
48 It is estimated that 22.5-24.4 million out of 98.6 million forests in Indonesia are subject to conflicts. See Indrarto et al, 2012, 13.
49 Benneker 2008.
50 Boscolo & Vargas Rios 2007, p. 192.
parties and concessions assigned to local communities (ASLs). Reform that have been implemented since 2006 have further strengthened the rights of indigenous people and have put a halt to issuing new concessions to timber companies. However, the theoretical clear forest tenure has not had a great spin off in practice, especially not in case of private and communal rights. Without clear forest tenure, forest users have little incentives in protecting their forests, leading to alarming deforestation rate, which amounts to 0.7% per year in Indonesia and 0.53% per year in Bolivia in the late half of the first ten years of the twenty first century.

In developed countries, comparative clear forest tenure has been established. Some countries are dominated by public forests, such as Canada, where over 90% forests are publicly owned. But private parties can gain rights to harvest public forests via area or volume-based licences. The licensees have important influence on forests via preparing management plans. Private forest plays a more important role in some other countries, such as the US and Sweden. In the US, 58 % forests are privately owned. In Sweden, 50 % of forests are owned by individuals, 25 % by private sector companies, 6 % by other private owners. Clear forest tenure has been established in those countries, providing incentives to right holders to conserve the forests. Therefore, deforestation is no longer a major problem in developed countries. However, in spite of the establishment of clear forest tenure, some externalities remain. Because the right holders cannot capture the full benefits of maintaining biodiversity, conserving the soil and water, these issues are often neglected by them. Therefore many developed countries still face forest degradation problems, such as biodiversity loss in Sweden and health of riparian buffer zones in the US and Canada.

2.3 Public Forest Regulation

Deforestation in rainforests started to trigger global attention since the 1960s. Since the 1970s, several international environmental conventions started to address forest protection.

51 Müller, Pacheco & Montero 2014, p. 29.
52 Pacheco et al. 2008.
53 FAO 2010.
54 Müller, Pacheco & Montero 2014.
55 McDermott et al. 2010, p. 74.
56 McDermott et al. 2010, 76.
57 McDermott et al. 2010, 76.
58 Id, 80.
60 Sahlin 2011, 2.
61 McDermott et al. 2010, 95.
62 such as the 1973 Convention on the International Trade in Endangered Species (banning international trade on vulnerable forest species), the 1975 World Heritage Convention (establishing protected sites, including forest land) and the Ramsar Convention on Wetlands of International Importance (preventing the conversion of forested wetlands).
However, a legally binding agreement has not been reached. The forest-related rules still disperse among various non forest-focused international environmental conventions.

Unlike the slow progress in international forest law, most countries have adopted various types of regulatory instruments on forest in domestic law, such as spatial planning, permits, tax, subsidy, soft targets, information and education. A full discussion of all those instruments is out of this research’s scope. This section focuses on three commonly used instruments, which have important influence over the functioning of property rights: spatial planning, permits and concessions, as well as other technical standards.

### 2.3.1 Spatial Planning

Different actors may exploit resources in the same areas, such as timber harvest (either by large companies, private owners or indigenous communities), food collection, plantation, agriculture in the same forests. The co-existence of multiple activities potentially leads to spatial conflicts. For example, in Indonesia, conflicts between commercial timber companies and indigenous people are widespread. In addition, the fast expansion of palm oil planting, mining and agriculture led to the conversion of forests. The competition between timber harvest, agriculture and cattle ranching in Bolivia has also led to fast deforestation.

Spatial planning is an important tool to address such conflicts, by deciding which activities are allowed in specific areas. However, the coordination of different interests in spatial planning is not easy. The case of Indonesia illustrates this. Both central and regional governments have the authority to plan space at respective levels, often resulting in conflicting plans. In addition to the Ministry of Forest which is responsible to decide the boundary for forestry activities, non-forestry agencies also determine the areas for their related activities according to sector-based legislation, such as the areas for agriculture, mining and the establishment of eco-regions. Though the Spatial Planning law requires coordination among the actors involved in planning land use, it is not actually implemented. In summary, the conflicts between different levels of government and different departments have led to incoherent spatial planning.

### 2.3.2 Permits and Concessions

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63 Instead the UNFF adopted a non-legally binding instrument on all types of forest in 2007.
64 For an overview of the regulatory instruments, see Gupta, Van der Grijp & Kuik 2012, p. 34-44; McDermott, Cashore & Kanowski 2010.
66 Ibid., 4-9.
67 Müller, Pacheco & Montero 2014, 10.
68 Gupta, Van der Grijp & Kuik 2012, 128.
69 Arnold 2008, 95.
70 Indrarto et al. 2012, 21.
Permits and concessions are commonly used by the government to restrict access to forest. In Indonesia, the Ministry of Forest is responsible to issue most logging permits. Local governments can issue some “lesser” permits and other authorities can issue permits for mining and estate crops plantation. Based on conflicting spatial planning, these different agencies sometimes issue conflicting permits, thereby accelerating deforestation. In Bolivia, concessions have been used to authorize private actors (including 20 years logging contracts and 40 years concessions) and indigenous people (via ASLs) to access public forests since 1996. Authorization is also needed to access and harvest private and communal forests (in terms of TCOs). Similar as in Indonesia, land tenure and forests have been regulated by different agencies authorized by different laws in Bolivia. For example, TCOs are decided by the National Institute for Agrarian Reform. ASLs are granted by municipalities. Out of fear that claims for TCOs endanger their availability of municipal forests reserves for ASLs, municipalities sometimes oppose the granting of TCO, complicating the process to regularize land and solve land conflicts.

### 2.3.3 Other Technical Standards

Spatial planning and permits are related to the establishment of property rights. In addition, public regulation can also determine how forests are to be managed directly, and hence influence the execution of property rights. They can also help to address the remaining externalities of property rights, such as the health of riparian buffer zones in Canada and the US and biodiversity loss in Sweden. These technical standards include, for example the minimum logging cycle, a minimum cut diameter by tree species and so on. The examples of Sweden and Bolivia show that the design of such standards are usually based on western science which is more suitable for the resource management by commercial parties at a large scale than for small scale forestry which are often artisanal, low impact, low capital intensive and often lack information. Using the same standards for commercial forestry and small scale ones has created challenges for the later.

### 2.4 Private Forest Regulation

When the international community failed to reach a legally binding forest agreement, and existing international law and organizations provided unsatisfactory solutions for forestry problems, private and hybrid regimes started to develop since the 1990s. The earliest and most

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71 Such as timber extraction licenses for non-commercial purposes and non-timber forest product extraction permits. Barr et al 2006.
72 Indrarto et al 2012, 31
73 Boscolo & Vargas Rios 2007,192.
74 Pacheco 2004, 91
75 Real 2002, 79-81
76 Pacheco et al. 2008, 40-44.
influential of these private regimes concerns forest certification, represented by the Forest Stewardship Council (FSC) and the Programme for the Endorsement of Forest Certification (the PEFC). The forest certification schemes set standards for forest management and supply chain of timber production. It requires an accredited, independent third-party certifier to evaluate and audit the production processes or methods according to pre-defined environmental and social sustainability standards.\(^7\) The standards are defined by an independent governing body, and audits are conducted by private actors.

The FSC was initiated by environmental NGOs in 1993.\(^78\) FSC has developed a global standard for well-managed forests, the FSC Principles and Criteria.\(^79\) To tailor the general standards to the local situation in different jurisdictions, FSC delegates the authority to elaborate them to its national affiliates.\(^80\) Many countries have published their own FSC standards, such as the Bolivian Council for Voluntary Certified Forest Management Standards (Boliviano Certificacion Forestal Voluntaria, CFV), FSC Sweden standards, regional FSC standards in the US and Canada. In countries where national standards have not been developed, forests are evaluated by certification bodies against their own standards adapted according to the FSC Principles and Criteria, such as in Indonesia. The stringent standards of FSC caused caution among the forest industry, which responded by establishing their own industry-lead national certification schemes, such as the Canadian Standards Association (CSA) in Canada, the Sustainable Forest Initiative (SFI) in both Canada and the US, as well as the industrial-led certification scheme in Sweden (PEFC Sweden). These national schemes were later endorsed by the PEFC. Together, the FSC and PEFC covered 10% of the global forests by 2014.\(^81\) However, most certified forests are in North America and Europe. In addition to FSC and PEFC, some countries have developed other certification schemes, such as the Indonesia Eco-label Institute certification (LEI).\(^82\)

In spite of the differences between national standards, they have to comply with some general principles, such as the FSC Principles and Criteria and the PEFC International Standards. These general principles set standards regarding environmental, economic and social issues. Clearly defined forest tenure and respecting indigenous peoples’ rights are required under both FSC and PEFC standards.\(^83\) Though FSC is generally believed to have more stringent than PEFC


\(^{78}\) Gulbrandsen 2010, 52.


\(^{80}\) Gulbrandsen 2010, 55.


\(^{82}\) Klassen et al. 2014, 256.

standards, the competition between them has led to the ratcheting up and convergence of standards. 84

3. Towards Smart Mixes: The Interaction between Public and Private Regulation

As discussed earlier, good governance of common pool resources rely on the proper functioning of property rights, which are influenced by institutional factors, including public and private regulation. Though forest certification started to develop due to the unsatisfaction with public regulation, they do not work separately. Rather, public and private regulation are usually closely linked. A smart mix of these regimes/instruments hence can be analyzed from two perspectives: how public and private regulation interact and how their interaction influence the property functioning of property rights. This section focuses on the first perspective. It shows that on the one hand, public and private regulation can operate complementarily, and on the other hand, the differences between them remind us they cannot replace each other.

3.1 Complementarities between Public and Private Regulation

Both public regulation and private regulation set performance standards for forest activities. Such standards can be complementary or contradictory. For example, certification schemes in both Indonesia and Bolivia require clear forest tenure and the protection of indigenous rights over forests. 85 However, in Indonesia, the state only gives minimum recognition of customary rights. However, the content of such rights and the procedure to formalize the rights remain unclear. Therefore, three layers of conflicting rules exist: public regulation, private regulation and customary law, counteracting effects of each other. In Bolivia, the same discourse triggered the forest law reform and the development of forest certification in the late 1990s, which makes the standards under two schemes similar to each other. The coherence of standards led to the quick permeation of forest certification in early 2000s. 86 The similarity and coherence of standards are also found in the US and Canada regarding riparian forests protection. This contributes to the joint force of public and private regulation in enforcement. 87 In Sweden, domestic law only provides a framework for forest regulation and includes minimum requirements. It, to a large extent, relies on certification to concretize its standards. Though largely complementary, sometimes the standards under public and private regulation are not fully coherent, leading to confusions among forest operators. 88

84 Overdevest2010.
86 Espinoza & Dockry 2014, 82.
87 Anecdote evidence shows that certification may have helped to improve the legal compliance of forest operators. See Carraway et al. 2002, 26.
88 For example, the requirement about set aside forests are not fully aligned in certificate schemes and law. See Lister 2012, 191-193.
The coordination between public and private regulators can strengthen the enforcement. In North America, processes have been established for information sharing and for the public regulators to rely on the audit conducted by certification schemes. This can save the resources of public regulators which can be allocated for other purposes.\textsuperscript{89} In Sweden, the public regulation relies on a soft steering model and the coercion level of public regulation is low.\textsuperscript{90} In this case, the widely adopted certification provides a very useful complement to oversight.\textsuperscript{91}

Most certified forests are located in developed countries, which generally score high on good governance and public regulation. Moreover, certified forests in developing countries are usually already better regulated before certification than most other users in the same country. For example, the case study of Indonesia shows that the certified community-managed forests were already managed well due to prior public regulation.\textsuperscript{92} However, since good public regulation is missing in developing countries, it is more difficult for the major part of forests and fisheries to get certified in these countries.

When public regulation is lacking, certification is most likely to bring public regulation about when financial incentives are present, such as increased demand or a price premium. In addition, when public regulation is already in place, certification to some extent accredits public regulation.\textsuperscript{93} The evaluation and certification process help to expose insufficiencies in public regulation and this triggers regulators to solve them. Sometimes certification leads to changes in legislation. For example, in Sweden, the certification criterion regarding retention trees was also later incorporated into government regulation.\textsuperscript{94}

### 3.2 Differences between Public and Private Regulation

Although public and private regulation can be complementary, important differences exist. Firstly, the case studies show that standards under public and private regulation are not always coherent. In North America and Bolivia, certification standards closely mimic public regulation. However Indonesia provides an example of contradictory norms in public and private regulation regarding indigenous people’s property rights.

Secondly, and more important, private regulation and public regulation operate in different ways. Whereas public regulation applies at the national or regional level certification applies to

\textsuperscript{89} Such as the arrangement between Forest Practices Board in British Columbia and SFI; between the Ontario’s Minister of Nature Resources and CSA as well as FSC. See Wood 2009, 94.
\textsuperscript{90} Johansson & Keskitalo 2014, 121-123.
\textsuperscript{91} Hysing & Olsson 2005, 512.
\textsuperscript{92} Hinrichs, Muhtaman & Irianto 2008, 43.
\textsuperscript{93} The existence of a good management system is a criterion in both forest certification. Public regulations are a crucial part of the management system. Therefore the evaluation process inevitably also involves the assessment of public regulation.
\textsuperscript{94} Lister 2012, 193-194.
certified forests and operates at the management unit level. Moreover, certification control is based on company documentation and selected site visits and hence is selective.\textsuperscript{95}

Thirdly, both public and private regulations are subject to their own limitations. Public regulation requires enforcement capacity. This is a problem for many developing countries, which are subject to staff, financial and expertise scarcity and vulnerable to corruption and elites capture. Even in developed countries with stronger governance capacity, limits exist. For example, reduced budget undermined the usage of suasive instruments in Sweden.\textsuperscript{96} As far as certification is concerned, insufficiency of accountability mechanisms has been noted. For example, a study of Sweden shows that certifiers are reluctance to revoke certifications when challenged by third parties.\textsuperscript{97}

4. Towards Smart Mixes: The Influence of Public Private Interaction on the Functioning of Various Property Rights

This section discusses how the interaction between public and private regulation influences the functioning of property rights and its capacity to address remaining externalities of property rights.

4.1 Definition of Property Rights

Some literature argues that either public property rights or private property rights are the only solution to the common pool resources problem.\textsuperscript{98} However, experience does not support these arguments. Private forests are more popular in the US and public property rights dominate in Canada. However, both countries perform relatively well in spite of the different types of property rights adopted regarding riparian zone protection.

The shifts of property rights, especially from communal property rights to public or private property rights need to be conducted with caution. Experience shows that the shifts are often based on unsubstantiated confidence in the effectiveness of the private or public property rights. Nationalization may transform “previously limited access common pool resource into open access resources” when the government does not have the capacity to enforce its public property rights over vast resources.\textsuperscript{99} “Likewise, the substitution of common property for private ownership has been environmentally and socially deleterious, where privatization has meant the loss of access to critical resources by local populations and private entrepreneurs are motivated solely by short-term profit, discounting the future value of the resource”.\textsuperscript{100} For

\textsuperscript{95} Keskitalo \textit{et al.} 2009; Johansson 2014.
\textsuperscript{96} Hysing 2009, 656.
\textsuperscript{97} Sahlin 2013, 8.
\textsuperscript{98} Ophuls 1973, 228; Demsetz 1967; Johnson 1972.
\textsuperscript{99} Young 2001, 286.
\textsuperscript{100} \textit{Ibid.}
example, in Indonesia, communal property rights used to be the dominating approach to regulate forests, based on customary law. However, since the colonization, customary law and communal property rights have been replaced by state ownership of forests. Traditional control over forests has hence been dismantled. The government, however, has no capacity to control the vast forests in Indonesia, leading to rampant illegal logging.\textsuperscript{101} Given the incapacity of the government to control the forests, it often grants concessions to commercial interests in state forests, where traditional communities used to live. Traditional communities have established customary institutions and rules to control their behaviors in the forests, tailored to local conditions. The private interests, however, do not have the knowledge and incentives to protect the forests with conflicting interests. For example, companies used fire to clear forests, to facilitate access and to reduce compensation to local communities. Migrants conducting agriculture in forests have never been subject to traditional \textit{adat} rules and hence have also used fire to gain access to farmland without controlling it.\textsuperscript{102}

Rather than the type of property rights, it seems that the clear definition of property rights and their content are more important. A comparatively complete property right is crucial to incentivize sustainable behaviour. This is in line with the theoretical literature, more particularly Schlager and Ostrom who argue that at least, communities need to have right to access, harvest and manage the resources to induce effective communal management.\textsuperscript{103} In addition to establishing communal forests, Indonesia also adopted some Community-Based Forest Management policies to promote the involvement of communities in forest management in public forests. Although aiming at promoting community management of the forests, these policies often provided limited rights to the communities, failing to incentivize responsible behavior.\textsuperscript{104}

In addition to the types of rights awarded, the institutional arrangement is also crucial. For example, in Bolivia, the rights of indigenous people over forests are recognized in law. However, the law also required the establishment of a new institution, the TCO, on top of traditional self-governing institutions (usually the villages) as a precondition to confirm the communities’ property rights. Geographically separated and culturally different villages have been joined by the TCO and thus have weakened the basis of self-governance. The co-existence of different levels of governance has also weakened the capacity of conducting effective control in Indonesia and Bolivia. Therefore, unsuitable institutions can impede the definition of clear property rights.

\textsuperscript{101} Indrarto \textit{et al.} 2012, 12, 20-24.  
\textsuperscript{102} McCarthy 2000, 111.  
\textsuperscript{103} Schlager & Ostrom 1999, 105.  
\textsuperscript{104} Sari 2013, 295-296.
The match between property rights and the cultural and economic characteristics of the user groups are also important. For example, replacing communal property rights with private property rights for indigenous people or local communities is problematic because they are often exploiting natural resources for subsistence use and are not used to large scale operations, intensive use and commercialized activities. Private forests are usually regulated by instruments most suitable for large scale intensive use and for commercial entrepreneurs. Hence communities in Indonesia and Bolivia have hardly succeeded in obtaining certificates in forest management. 105

Both public and private regulation can influence the definition of property rights. The influence of public regulation can be found in various ways. For example CBFM policies define the scope of rights granted to communities; the institutional arrangements for communal property rights depend on public regulation. To get certified, clear forest tenure needs to be established and the rights of indigenous people need to be respected. This may act as a barrier for certification in many developing countries where such conditions are not satisfied, such as Bolivia and Indonesia. However, this also suggests that in the certified forests, property rights arrangements may be fine-tuned for the forests to get certified.

4.2 Enforcement

The safeguarding of property rights can be monitored and assured by public and private regulation. As far as communal property rights are concerned, self-governing institutions can also oversee the compliance with property rights.

The enforcement capacity of public regulators is related to the availability of staff, budget, expertise, vulnerability to corruption, the authority provided to a public agency and the relationship between different regulatory bodies. Indonesia and Bolivia provide examples showing that conflicts between different departments and levels of government can lead to conflicting enforcement activities.106 In Sweden, a deregulation process happened in forest regulation in 1990s, leading to minimum public regulation and forest owners and companies substantial discretion to choose the proper measures. 107 Therefore, the coercion of public regulation is not strong, and noncompliance by forest owners and operators is usually left

105 For example, in Indonesia, both FSC and LEI have established specific standards for small scale forestry. However, their coverage is very limited, which covers 2000 hectare and 32, 683 hectare respectively. <http://www.tff-indonesia.org/index.php/en/map-of-tff-activity/list-of-fsc-certified-forest-in-indonesia-61198>.<http://www.lei.or.id/program-kerja-2009-2013>.
106 Supra section 2.3.1,2.3.2.
107 Johansson & Keskitalo 2014, 121.
unpunished. After deregulation, the size and budget of the Sweden Forestry Agency have been reduced, hence the use of suasive instruments has also been reduced.

Certification can provide additional monitoring and assurance to public enforcement capacity. In America, anecdotal evidence shows that certification has contributed to the improvement of compliance with public regulation regarding riparian buffer zone protection. However, certification does not automatically improve monitoring and oversight. Certifiers may be captured by their customers in order to secure income. For example, in Sweden, objections brought by NGOs to certification seldom have serious consequences.

Public regulation, self-governing institutions and private regulation rely on different ways of monitoring: self-governing institutions rely on local users who conduct daily management activities and have easiest access to the information regarding the resources and exploitation activities. Public regulators rely on the monitoring of government officials and the certification schemes require the expertise of forest professionals. The latter actors may have advantages in terms of economies of scale or expertise, but are further elongated from the daily activities in forests and monitoring can therefore be more costly. It is thus crucial to figure out whether these different approaches of monitoring complement or replace/weaken each other. Indonesia provides an example where traditional self-governing institutions have been dismantled by law and self-enforcement is replaced by weak public enforcement. In Bolivia, the traditional governing institutions, the villages, have not been abolished but an additional level of governing institution has been added on top of the villages, de facto weakening their functioning. Certification may also require the replacement of traditional governing institutions by new governing institutions such as cooperatives or enterprises, adding to the complexity in enforcement.

4.3 Coordination

Many different actors are involved in exploiting forests. Coordination between the various parties, both among right holders or between forest rights holders and other parties is crucial for the proper functioning of property rights.

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108 Ibid., 124; Hysing 2009, 656.
109 Hysing 2009, 656.
110 For example, a study on the forest operations’ incompliance of public regulation in Texas shows that these which transport timber to SFI mills have higher compliance rate than those transport timber to non-certified mills. Carraway et al. 2002, 26.
111 NGOs complain that certification bodies sometimes delays in responding to formal complaints and are reluctant in requiring the suspension or revoke of certificates. The first partial suspension of certificate has only made in 2014. Sahlin 2013, 8. Stora Enso2014, 38.
112 Supra section 4.1.
113 Ibid.
114 Hinrichs, Muhtaman & Irianto 2008, 50.
The different types of property rights vary in their capacity to coordinate the behaviour of the different involved actors. Under public property rights, the state or other level of government is the rights holder, who also decides the allocation of user rights and acts as coordinator. As far as communal property rights are concerned, self-governing institutions play an important role in coordinating the behaviour of its members. These self-governing institutions decide who have rights to access and to harvest the resources and how.

Both public and private regulation can influence the coordination of forest management. However, sometimes coordination among governmental agencies can be problematic. In Indonesia and Bolivia, the departmentalism and struggling decentralization process have led to conflicting decisions and regulatory gaps among differential sectors or different levels of governments.

Certification can also provide a platform for multiple stakeholders to collaborate. The standards of development and governance of the certification schemes usually involve industry, right holders, social groups and environmental interests. The governance structure of certification schemes influence the extent of public involvement. The FSC scheme was initiated by NGOs, while industry generally plays a more important role in PEFC schemes. In spite that FSC is usually better received by NGOs, in recent years, it also causes some concerns. For example, in the case of Sweden, dissatisfaction with certification has led some environmental groups to withdraw their support from certification schemes. This misalignment is problematic since environmental groups are usually an important impetus for increasing demand of certified products.\textsuperscript{115}

The co-existence of different regulatory schemes may also add complexity to forest governance and a cause of confusion among regulatees. For example, multiple institutions have been created to manage community forests in Indonesia and Bolivia: traditional self-governing institutions, institutions reorganized or created by the government (e.g. the TCO in Bolivia) as well as cooperatives/enterprises created to get certification. These complexities have added to the coordination costs. The example of Sweden also shows that the multiple layers of regulation often lead to confusion among forests owners in deciding their forest management activities.\textsuperscript{116}

4.4 Information

The availability of information regarding the resources status, forest activities and their interaction is crucial for resources management. Local users, government institutions and certification assessment can all act as information generators. These different sources of information all have their advantages and disadvantages. Local actors are well informed about

\textsuperscript{115} Gulbrandsen & Auld 2016.
\textsuperscript{116} Uggla, Forsberg & Larsson 2016, 5.
local issues, such as the status of the resources, local livelihood demands and behaviours. The indigenous exploitation of forests in Indonesia is such as an example. The use of fallow periods, fires and open land for agriculture are based on local knowledge and respect ecological limits. However, the replacement of customs by commercial exploitation and agriculture by outsiders, has had devastating effects on the tropical forests.\(^\text{117}\)

Compared to local knowledge, “the state has a regional and national vantage point and a repertoire of tools and techniques not normally available to local institutions”.\(^\text{118}\) However, to obtain information about vast forest areas remains a challenge, especially when the capacity of regulatory agencies is weak, such as in Indonesia and Bolivia. Even in countries with comparatively strong governmental capacity, information insufficiency is not uncommon. This is especially true for issues with high scientific uncertainties, such as forest biodiversity protection. Such uncertainties may cause confusion for forest owners and managers in determining how to protect the forests. The inconsistencies and ambiguities of public and private regulation in Sweden aggravate the differences of opinions between forest owners/managers and environmental groups. Moreover, a recent study reviewing scientific literature on environmental standards shows that the legislative and certification standards regarding many environmental issues do not reach the threshold recommended in scientific literature.\(^\text{119}\) Therefore, the scientific uncertainty has not been well accommodated under the public or the private regulatory system.

Certification can also play an important role in information generation and spreading. Certification schemes have rules concerning the documentation of processes related to forest management. Information is made available during the certification process. Assessment teams gather information from existing documentation and literature produced by clients, scientists, government authorities and other stakeholders. The publication of final reports and of surveillance reports also increases the transparency of information. Assessment reports also identify gaps in knowledge and issue conditions or recommendations accordingly, which provide drivers for information production.\(^\text{120}\)

For resources management it is beneficial to build a robust bridge between those complementary types of knowledge. For example, in North America public and private regulators coordinate in sharing information and rely on the information provided by each other.\(^\text{121}\)

### 4.5 Scale

\(^{117}\) Arnold 2008, 97.  
\(^{118}\) Berkes 2009, 1694.  
\(^{120}\) Cano Chacón 2013.  
\(^{121}\) Supra section 3.1.
Forest and fishery management requires considerations at different scales. Issues such as the retention of trees can be addressed at local scale. But issues like biodiversity and riparian forests protection require landscape considerations. Regulatory approaches vary in their capacity to address different scales. Certification is conducted at management unit level and is therefore particularly tailored to local situations. Coordination between different units is needed in order to incorporate higher level considerations. Public regulation can address issues at both local level or at larger scale. However, research shows that even public regulation regarding riparian zone protection in Canada and the US has not incorporated landscape and watershed-scale consideration sufficiently. In Sweden, many forest areas are set aside from harvest according to certification requirements. These areas, however, are often fragmented. Poor connectivity reduce their capacity in promote biodiversity protection. Public regulation, however, is subject to legal and financial limits. To set aside private forests from harvesting, public regulators need to compensate the private owners for lost production. Lack of funding is a major barrier to reach formal protection targets.

Decentralization is often recommended to regulate natural resources. It is believed to enable decision-making close to local users and hence to contribute to resource management. However, examples of forest governance show that when the system is captured and corrupt and lack of coordination among government agencies and different levels of government is aggravated by obscure and conflicting legislation, the decentralization process itself can be a driver of environmental problems. For example, in Indonesia, conflicting legislation concerning decentralization and recentralization reflects a tug of war between different levels of government. Multiple agencies often conduct conflicting spatial planning and issue overlapping permits over the same area. The self-interested motives of bureaucrats behind these conflicting behaviours have not been overcome yet. In Bolivia, conflicting interests among different levels of governments and different departments also exist, such as the reluctance of municipalities in supporting TCOs application and the nesting of the land regularization process under the agricultural model.

4.6 Externalities

An important goal of property rights in addressing common pool resources problems is to internalize externalities and to limit the incentives of free riding. Property rights, however, have their own limitations. Establishing property rights over forest can help to internalize the economic values of the resources, and hence contribute to solve part of the environmental problems, such as deforestation. However, property rights are less useful in internalizing the

122 Richardson, Naiman & Bisson 2013, 236.
121 Lister 2012, 192.
124 Singer 2009
125 Supra section 2.3.2.
non-market values of resources. For example, the supporting value of forests for other species, its functioning in soil and water conservation will not be internalized by establishing property rights. Indeed, even in countries in North America and Sweden where clear forest tenure has been established, forest degradation may still occur. This has been one of the reasons for creating riparian zone and biodiversity protection by regulation.

5. Concluding Remarks

This chapter analyzes forest problems from the perspective of common pool resources. Because of the non-excludability and subtractability of such resources, users tend to overharvest the resources and free ride on each other, leading to “the tragedy of the commons”. This chapter discusses three types of property rights used to overcome the forest problems: public, private and communal property rights. A smart mixes of regimes and instruments should be able to promote the good functioning of these property rights and to overcome the limitations of property rights. The above analysis shows some examples of smart (or not so smart) mixes of public regulation, private regulation and property rights. Though forest certification started to develop due to the slow progress in international forest law, it is closed interacted with public regulation. A smart mix needs to strengthen the complementarities between public and private regulation. However, this two systems cannot replace each other, suggesting the limitations of public and private regulation need to be addressed from inside. Moreover, the interacted public and private regulation can also influence the functioning of property rights, via defining property rights, influencing its enforcement and the coordination between stakeholders, providing information and addressing scale issues. They can also help to address the remaining externalities.

The above mentioned tentative thoughts on which types of mixes are smart or not in addressing forest problems are mainly based on the examples in five countries: Indonesia, Bolivia, the US, Canada and Sweden. One has to be very careful with generalisations precisely since the case studies showed that the effectiveness of the institutional design with respect to the interaction between public and private regulation, affecting the way in which property rights protect the common pool resource, is highly context specific. There is hence not just one “smart mix”, but some interactions that, under the specific conditions depending upon the country context, may work better than others. It is important to take this context specificity into account also when drawing normative conclusions from the results of this study.
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