

Article

Voluntary Sustainability Certification and State Regulations: Paths to Promote the Conservation of Ecosystem Services? Experiences in Indonesia

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Abstract: The Forest Stewardship Council initiated a pilot Forest Certification for Ecosystem Services (ForCES) project from 2011 to 2017 to improve and promote sustainable forest management addressing a range of ecosystem services. Three sites in Indonesia were studied in the pilot. Whilst the development of the certification standard was largely by a partnership between the certification standard organization, civil society and research organisations, implementation and monitoring of the impact of this voluntary sustainability standard will entail interaction with state regulations. This study sought to understand how certification and state regulations concerning ecosystem services in Indonesia interplay, particularly in the agenda setting and negotiation stage. Using the conceptual lenses of transition theory and state and non-state market-based governance, the interrelationships between ecosystem services certification and regulations were found to be both complementary, supporting and antagonistic. The majority were complementary. Antagonism occurred where regulations do not accommodate land use issues and due to different contradictory state regulations. The voluntary instruments were developed largely in the absence of state involvement and without any substitution with regulatory standards. Given the increasing proliferation of voluntary market-driven initiatives at farm, forest concession and landscape level, stakeholders developing and managing voluntary standards need to collaborate with national and local governments to create synergy to enable their acceptance, adoption and effectiveness to positively enhance the conservation of ecosystem services through incentivizing market-based instruments.

Keywords: ecosystem services; voluntary sustainability certification; state regulation; plural governance arrangements; Indonesia

1. Introduction

The Forest Stewardship Council (FSC) is an international organization providing a system for voluntary accreditation and independent third-party certification. This system allows certificate holders to market their forest products and services as the result of environmentally appropriate, socially beneficial and economically viable forest management. FSC sets the standards for the development and approval of FSC Stewardship Standards, based on the FSC Principles and Criteria and sets standards for the accreditation of conformity assessment bodies (also known as certification bodies) that certify compliance with FSC's standards. Based on these standards, FSC provides a system for certification for organizations seeking to market their forest products as FSC certified. FSC certification was arguably the first fully-fledged forest-related global non-state market-driven (NSMD) governance (also known as private governance), created in 1993 through transnational environmental and social groups [1]. FSC certification recognizes responsible “sustainable” forest



management through independently verified compliance with a set of underlying principles, criteria and indicators that delineate the ecological, social, economic and policy impacts resulting from forest management for specific objectives [2].

To contribute to tackle the threats to maintaining ecosystem services worldwide [3], FSC led the Forest Certification for Ecosystem Services (ForCES) project from 2011 to 2017 to improve and promote sustainable forest management considering a range of ecosystem services, and to address threats to ecosystem services by providing greater incentives to those practicing responsible forest management [4], [5, 6]). The project was intended as a pilot to identify and certify ecosystem services, test possible business models, and study the benefits of certification on preservation of ecosystem services. It was executed as a multi-stakeholder partnership with the Centre for International Forest Research (CIFOR) providing scientific support and backstopping, WWF Indonesia, SNV Vietnam, FSC Chile and the Asia Network for Sustainable Agriculture and Bioresources (ANSAB) as in-country partners, largely funded by a grant from the Global Environment Facility (GEF) of the United Nations Environment Program (UNEP). The project was conducted in ten pilot sites in Chile, Vietnam, Nepal and Indonesia which covered a range of land-use types and status protected areas, forest concessions, conservation areas, small-scale farms and community-managed forest areas. Outcomes outlined at the beginning of the project were the development of scientifically tested and auditable ES indicators for assessing compliance with certification criteria, a methodology to assess social and environmental benefits of FSC certification, and the design of new certification business models for rewarding the provision of ecosystem services. Among these planned outcomes, the priority was enabling a global FSC system for certifying ecosystem services to be in place as a tool to give ample incentives to forestry stakeholders practicing sustainable forest management. Because of the ForCES project, in 2018 FSC developed new tools seeking to govern how ecosystem services are provisioned. The resulting standard and accompanying documents outline compliance requirements for ecosystem services within FSC certification, as voluntary additions to FSC Forest Management Certification [7]. In Indonesia, a diverse set of stakeholders were consulted on and drafted a national Ecosystem Services standard. The FSC ES certification is therefore a voluntary sustainability standard, a form of NSMD governance.

Another form of NSMD governance of forest ecosystems is the REDD+ framework, which addresses deforestation and land degradation by financially rewarding developing countries for emissions reductions associated with a decrease in the conversion of forests to alternate land uses. REDD+ finance can come from public and private, bilateral and multilateral sources. Payments for Ecosystem Services (PES) occur when the beneficiaries or users of an ecosystem service make payments to the providers of that service. In practice, this takes the form of payments made in return for a flow of benefits or ecosystem services [8], such as the amount of carbon sequestered, or input-based payments based on management practices applied to restore or protect ecosystems, such as forest restoration programs [8]. The concept of PES aims to incentivize land and forest owners to ensure a guaranteed flow of ecosystem services [9].

Laws and regulations have been the main forms of governance used by governments, juxtaposed with customary law by locals and traditional authorities [10]. However, governance arrangements can be driven by non-state actors, international markets and consumers' agency, with non-state governance increasingly emerging as an alternative to command-control mechanisms such as laws and regulations [11]. In the Netherlands for example, voluntary sustainability standards are actively promoted by the government as an alternative and addition to regulations [12]. Cashore et al. [13] suggest that NSMD governance excludes governments from formal participation in governance, as non-state actors govern all processes. However, state and non-state actors operating in the same sector can create interrelationships between policy instruments such as state regulations and voluntary standards, tools and guidelines. Interrelationships between policy instruments and sustainability tools are important to improve effective land use [11]. However, interactions between state and NSMD governance arrangements can cause difficulties in attributing causality of impacts



to specific policy instruments [11]. These interrelationships exist horizontally between stakeholders — and also vertically from global to national and vice versa. Types and pathways of interrelationships between state governance and NSMD governance have been shown to occur at three main stages in the regulatory process of agenda setting and negotiation, implementation, and monitoring and enforcement [14]. Lambin et al. [11] then identified three main interactions—complementarity, substitution, and antagonism— occurring at these different stages. Complementarity indicates mutual interactions between two instruments—public regulations and sustainability standards are positively reinforcing—e.g. both governance instruments seek to fill the gaps of the other. Substitution is when non-state-driven regulations are adapted to state regulations. Complementarity and substitution may intertwine and overlap. Antagonism is when governance instruments conflict with each other at any stage of the process. The purpose of defining interrelationship aims to provide clarity on the interrelationships between certification and regulations [11]. Interrelationships between governance arrangements are often more complex in practice with intricate constellations, bricolage and hybrids, involving other forms of governance alongside state and NSMD such as customary and project-based governance [15]. As new forms of governance related to ecosystem services expand, this new grey space of governance raises questions on how well the certification of ecosystem services fits with and is situated within state regulations.

A useful lens to view the introduction of ecosystem services certification into state governance is transition theory. This theory originates from the technological sector and seeks to understand complex sociotechnical transitions from an evolutionary economics perspective [16–18]. The resulting Multi-Level Perspective (MLP) on transitions has been employed in policy contexts to analyze conditions at regime, landscape and niche level (c.f. [19–21]). A transition is viewed in the MLP as a regime shift from one sociotechnical regime to another causing radical changes in existing systems. The term ‘radical’ addresses the speed of changes, rather than the size of changes. Radical changes may be sudden but also incremental, piecemeal and slow. Niches are where new innovations, including policy instruments, are developed and radical novelties emerge. The MLP conceptualizes interests in the alignment of paths within levels. Levels are defined as interactions between processes with three levels identified: technological niche, sociotechnical regime, and sociotechnical landscape. A sociotechnical regime refers to the coordination between technology and social groups, such as scientists, policy makers, and users. Both niche and regime communities may share rules that coordinate actions. These rules maybe stable and well-articulated for regimes, whereas for niche-innovations they are often unstable and emergent [18]. Three types of rules are recognized: cognitive (belief systems, guidance, goals, agenda, learning processes), regulative (regulations, standards, laws), and normative (role relationships, values and behavioral norms) [18]. Niches are where innovations, including policy instruments, are developed and radical change emerges. Actors’ ability to acquire knowledge and understand cognitions and activities make links between processes at different levels and highlight that the dynamics from a MLP are socially constructed. In the context of ecosystem certification, niches can be seen as incubations for creating and testing new sustainability tools [21]. ForCES can be seen as a novel certification tool located at niche level. A transition to a regime level - the current law and regulations on ecosystem services - is driven by exogenous factors such as climate change, biodiversity deterioration and global policy initiatives tackling environmental degradation and deforestation such as REDD+ and payments for ecosystem services [21].

In this study transition theory and governance concepts are used as frameworks to understand how voluntary certification and state regulations concerning ecosystem services evolved and interact in Indonesia, especially in the development stage of agenda setting and negotiation. The questions investigated are:

1. How are ecosystem services translated into state regulations in Indonesia?
2. How are ecosystem services defined in the FSC ecosystem services certification?



3. What are the interrelationships between state regulations and FSC ecosystem services certification in Indonesia?
4. What opportunities and synergies exist between certification and regulations regarding ecosystem services in Indonesia?

2. Materials and Methods

2.1. Data collection

Data was collected in two stages. For primary data, first a purposive sampling design accompanied by snowballing was used to identify 21 key informants from the Indonesian government, FSC and their partners in the ForCES initiative (WWF, CIFOR, United National Global Environmental Facility). The snowballing process ended when informants did not provide new names or information. This resulted in 13 semi-structured interviews in 2017 with national government officials, researchers, project implementers (timber companies, auditors, REDD+ proponents) and consultants involved directly and indirectly in the ForCES project. The interviews were conducted in Bahasa and English using a guideline covering the four research questions.

Secondary data was gathered on three areas; (1) Indonesian state regulations based on official documents, policy documents, websites, databases, media and press releases; (2) FSC ES certification documents including FSC International Generic Indicators (IGIs), the ES Procedure and FSC Ecosystem Services Strategy based on literature provided by FSC and partners on the standard and their websites. At the time of the fieldwork the project was ongoing and the standard was under development, with the first public consultation on the standard completed and the second draft under public consultation; (3) Documents on REDD+ and PES projects in Indonesia indicating the possibilities, shortcomings, synergies and opportunities of how REDD+ and PES sites could become certified by ForCES. The review of relevant literature also aimed to deepen understanding and triangulate the interview data.

2.2. Content analysis

The interview transcripts and literature on regulations and FSC certification were read and analyzed for definitions of ES, the scope of these ES, and policies strategies and rules related to ES. Keywords were manually coded using a two stage thematic analysis framework, with codes allocated based on meaningful expressions and single or short sequences of words and sentences. Content was first categorized under the headings of laws (Undang-Undang or UU), government regulation in lieu of law (Peraturan Pemerintah Pengganti Undang-Undang or Perpu), government regulation (Peraturan Pemerintah or PP), ministerial regulation (Peraturan Menteri), ministerial decree (Keputusan Menteri or Kepmen) and circulation letters (Surat Edaran). The review of regulations was limited to Ministerial level regulations (rather than provincial and local level) to provide a picture of how state regulations governing ecosystem services are implemented on a national level. FSC normative documents were classified and coded as Policy, Standard, Directive, Advice Note, Procedure, Interpretation, Guidance Document, and National Standard. The ForCES documents were classified as Standard, Procedure, Guideline and Directive. Multiple coding was possible for each document. In the second categorization stage, documents were classified according to the four research questions..

3. Results

The results of the document reviews combined with interviews provide a picture of how ecosystem services are dealt with in state regulations and in private sector voluntary market-based standards.

3.1. Ecosystem services in Indonesian state regulations

Two main laws regulate forestry in Indonesia: Law No. 5/1990 on Conservation and Law No. 41/1999 on Forestry, both which form the basis for a series of technical regulations, shown in Table 1. Law



No.5. covers how to manage and conserve supporting ecosystem services, exotic plants and wildlife including allowable utilization under certain conditions and monitoring of hunting, trading and research. This law does not explicitly mention the term ecosystem services. It states the types of organizations that can govern the ES such as national parks, nature parks, forest parks, nature sanctuaries and wildlife reserves. Law No. 41 defines forests as “a unity of ecosystem in the form of landscape containing biological resources dominated by trees in the natural alliance of its environment, which one cannot be separated”. Thus, ES are implicitly regulatory embedded in forests. ES are also seen as forest products alongside the biotic and abiotic functions such as plants and soils, and the law defines that ES also comprise tourism, water and beauty of nature. Shown in Table 1, ecosystem services were specified in nineteen regulations.

Table 1. Indonesian regulations dealing with ecosystem services

State regulation	Type of ecosystem services			
	Provisioning	Supporting	Regulating	Cultural
Law No. 5/1990 Ecosystem and Nature Conservation	x	x	X	x
Law No. 41/1999 on Forestry	x	x	X	x
Law No. 32/2009 on Environmental Protection and Management	x	x	X	x
Law No. 17/2004 on the Ratification of Kyoto Protocol to the UNFCCC			X	
Regulation in Lieu of Law No.1/2004 Amendment of Law No.41/1999 on Forestry	x	x	X	x
Government Regulation No.45/2004 Forest Protection	x	x	X	x
Government Regulation No. 44/2004 Forest Planning	x	x	X	x
Government Regulation No. 6/2007 jo PP3/2008 Forest Management, Planning and Utilization	x	x	X	x
Government Regulation No. 46/2017 Environmental Economic Instrument	x	x	X	x
Government Regulation No. 28/2011 Nature Conservation and Preservation Management		x	X	x
Ministerial Regulation P.6/2009 Establishment of Forest Management Unit	x	x	X	x
Ministerial Regulation P.6/2010 Norms, Standard, Criteria, and Procedure Forest Management on Production and Protected Forest	x	x	X	x
Ministerial Regulation P.42/2009 Template, Criteria, and Standard on Water Catchment Area Management	x	x	X	
Ministerial Regulation P.36/2009 Procedures for Licensing for Commercial Utilization of Carbon Sequestration and/or Storage in Production and Protected Forests	x	x	X	
Ministerial Regulation P.30/2009 The Implementation Procedures of Reducing Emissions From Deforestation and Forest Degradation (REDD)	x	x	X	
Ministerial Regulation P.22/2012				x



State regulation	Type of ecosystem services			
	Provisioning	Supporting	Regulating	Cultural
Business Guideline for Tourism Activity on Protected Forest				
Ministerial Regulation P.31/2016 Business Guideline for Tourism Activity on Production Forest				X
Ministerial Regulation P.68/2008 on the Implementation of Demonstration Activities on Reducing Emission from Deforestation and Forest Degradation			X	

However, not all these laws define or deal with ecosystem services consistently. Government Regulation No. 46/2017 on Environmental Economic Instruments specifically explicitly explains the scope of environmental services, whereas Government Regulation No. 28/2011 on Nature Conservation and Preservation Management openly mentions tourism, water and carbon as a part of ecosystem services without explaining the scope of these ecosystem services. Article 6 of Law No. 41/1999 states that forests have three functions: conservation (due to their biodiversity, protection (for their ecological functions), and production (for timber or for future conversion). Regulations No.45/2004 on Forest Protection, No. 44/2004 on Forest Planning, No. 6/2007 jo PP3/2008 Forest Management, Planning and Utilization, No. 46/2017 on Environmental Economic Instruments, and No. 28/2011 on Nature Conservation and Preservation Management however all have different interpretations of forests and ES. The first three regulations govern provisioning services with timber and non-timber forest products the most mentioned. Regulation No. 28/2011 regulates nature conservation and preservation management but does not explicitly mention ES, instead forest services are addressed in terms of wildlife and unique ecosystems. Regulation No. 46/2017 specifically defines environmental services as benefits derived from ecosystem and environment for human beings and for survival inter alia resource provision, regulating services, natural processes, and cultural preservation. Another example is the Law No. 32/2009 on Environmental Protection and Management which governs natural resources, human health, economic growth, energy, transportation, agriculture, industry and international trade with the aim of minimizing impacts on environment, by requiring an Environmental Impact Assessment of potentially harmful activities. However Perpu No.1/2004 which amended the 1990 Law on Forestry, allows mining in state forests which had been established before the 2004 law was enacted.

Twelve years after being mandated in Articles 42 and 43 of Law No. 32/2009, the Government Regulation No. 46/2017 on Economic Instruments on the Environment was adopted. This regulation explicitly defines environmental services as “the benefits of ecosystems and the environment for human beings and the survival of life which includes the provision of natural resources, natural and environmental arrangements, advocates of natural processes, and the preservation of cultural values”. The regulation seeks to improve accountability and law enforcement on environmental protection and management by changing the behaviour of the government concerning economic and development activity; requiring systematic, measurable and structured funding scheme; and encouraging and gaining international and public trust on managing environmental funds. However, the regulation does not explain how to measure the benefits of environmental services or how to measure the impacts of restoration and conservation activities. Three main economic instruments are identified in the regulation, shown in Figure 1. The first instrument, Economic Activity and Development Plans, aim to internalize environmental externalities at national, regional and local scale. The second instrument, the Environmental Fund, acts as a monetary redirecting process between the government as environmental provider and individuals as beneficiaries through a performance-based agreement to increase environmental services. The fund covers water protection, biodiversity protection, carbon sequestration, nature preservation and other environmental services, operating on national-regional government, regional-regional government, national government-



individual, and regional government-individual scales. Compensation can be monetary or non-monetary based on the costs of environmental conservation, community empowerment and implementation, which can be paid to the ecosystem services provider through grant mechanisms, based on criteria including proof of land ownership, authority to provide, generate and increase environmental services and measurable valuation. Compensation is promoted to fund restoration, conservation, biodiversity enrichment, community capacity improvement on environmental protection, renewable energy, sustainable economic development and its supporting infrastructure. Compensation can be financed from national or regional budgets, or from other sources. Incentives include eco-friendly labelling systems; procuring eco-friendly goods and services; tax, subsidy and retribution enforcement; eco-friendly financial institutions; waste and emission trading permits; environment assurance; payments for environmental services and performance rewards on environmental management and protection. The third set of instruments, aim to provide incentives and disincentives through a range of mechanisms, taxes, subsidies and permits for non-governmental actors to protect environment and limit environmental degradation by reducing liability, easing implementation, facilitation and assistance; guidance and support, rewards and acknowledgement and promoting corporate public performance beyond that required in laws to apply sustainable consumption and production.

Figure 1. Visualization of Government Regulation No. 46/2017 on Economic Instrument on Environment



In 2009, the Government participated in two international initiatives to support REDD+ readiness: The World Bank's Forest Carbon Partnership Facility and the UN-REDD Programme. At the national level, a REDD+ strategy was developed, a legal framework to regulate REDD+ was established under Ministerial Regulation P.30/2009 for the Implementation Procedures of Reducing Emissions From Deforestation and Forest Degradation (REDD). This regulation includes a national reference emission level and a system to monitor greenhouse gas removals and emissions from forests. At the sub-national level, several provincial governors are strong supporters of the REDD-plus concept and have issued decrees, established working groups and encouraged the involvement of external, non-governmental actors to promote REDD+ activities.

Indonesian regulations that address ES have been triggered by international agreements such as the United Nations Framework Convention on Climate Change (UNFCCC) and Convention on Biological Diversity (CBD) leading to Ministerial Regulation P.30/2009. The implementation of Reducing Emissions From Deforestation and Forest Degradation (REDD) provoked Ministerial



Regulation P.36/2009 Procedures for Licensing for Commercial Utilization of Carbon Sequestration and/or Storage in Production and Protected Forests, the 2009 Government pledge to cut greenhouse gas (GHG) emissions by 2020 and National Action Plan Addressing Climate Change. Prioritization of forest rehabilitation in the National Medium-Term Development Plan 2010-2014 stems from the UNFCCC COP 13 in Bali to implement the Kyoto Protocol. Laws that facilitate REDD+ have been enacted: guidance REDD+ pilot projects (Ministerial Decree P68/2008); mechanisms for reducing emissions from deforestation and degradation (Ministerial Decree P30/2009), Ministerial Regulation P20/2012 setting principles and criteria for demonstration activities and rights and obligations of forest carbon project proponents.

3.2. Ecosystem services governance by non-state market-driven initiatives

The most recent FSC Principles and Criteria document (FSC-STD-01-001 V5-2) from 2015 [22] is explicit in defining ecosystem services as: “The benefits people obtain from ecosystems including provisioning services such as food, forest products and water; regulating services such as regulation of floods, drought, land degradation, air quality, climate and disease; supporting services such as soil formation and nutrient cycling; and cultural services and cultural values such as recreational, spiritual, religious and other non-material benefits”. Additional incentives for forest owners and managers to address ES were however seen as much needed, given the main focus on exploiting timber in the FSC standards. FSC and the ForCES partners recognized that forests also provide other goods and services and that beneficiaries of forest ecosystem services and products can be any person, group of persons or entity that uses or is likely to use the benefits, which can include persons, groups of persons or entities located around forest areas such as local communities, indigenous peoples, forest dwellers, neighbours, downstream water users, tenure and use rights holders. In the ForCES Guidance document, end users such as consumers or indirect beneficiaries of carbon mitigation are however not considered as beneficiaries [23].

Given this context, the ForCES project [4-6] sought to provide additional incentives to forest owners and managers and community-based forest organizations to promote sustainable forest management and set aside forest areas to protect biodiversity in intact landscapes. The aim of the project was to adopt FSC standards to emerging ecosystem services markets and target ecosystem services with present or future market potential and to generate and distribute income from ecosystem services besides from timber to forest concession owners and managers. After planning and implementing management activities to protect or restore ecosystem services at the three ForCES project pilot sites (shown in Table 2), developing impact indicators and establishing methodologies for monitoring these, these tools were tested and developed through certification of the sites and identifying business models of who would pay for the certified ecosystem services, how, and how much for each ecosystem service at each site. Of the three sites, only in the East Kalimantan site did stakeholders decide to pursue ES certification.

Table 2 ForCES project pilot sites Indonesia

Site name	Forest type	Area in hectares (ha)	Governance model	Ecosystem services being managed
Lombok	Semi-evergreen tropical mountain forest	3,036 ha (185 FSC certified)	Managed by four community forest groups Government owned Forest Management Unit (<i>Kesatuan Pengelolaan Hutan</i>)	Watershed services



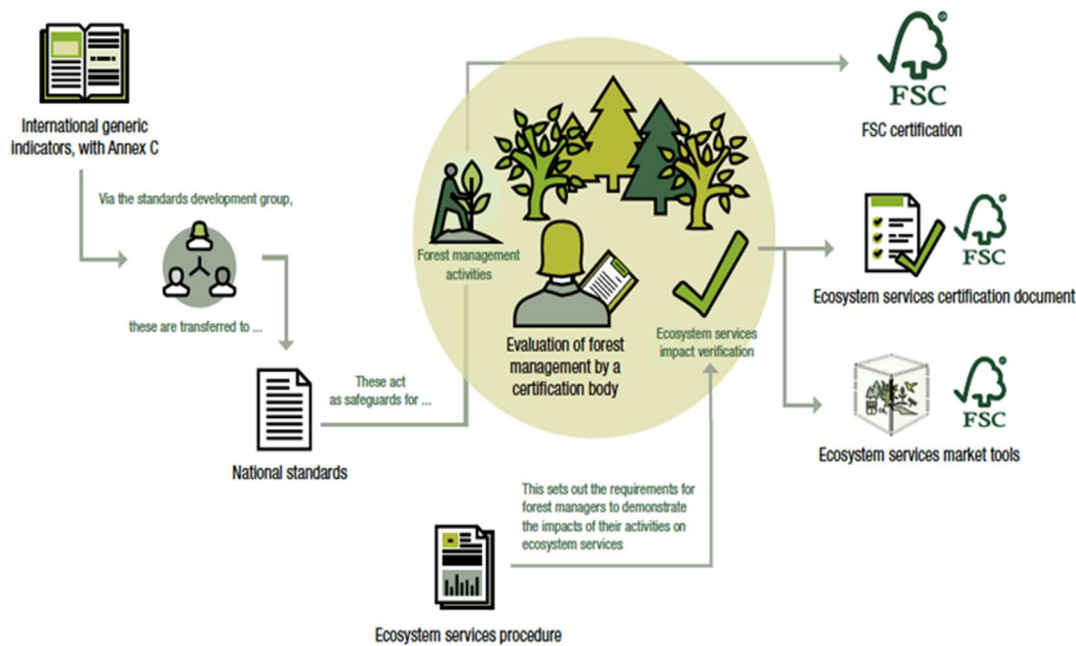
East Kalimantan	Natural tropical forest (lowland and highland Dipterocarp)	93,425 ha (84,850 FSC certified 15,857 ha Protected area)	Privately owned forest concession logging company PT. Ratah Timber Protected area	Biological diversity conservation Carbon sequestration and storage
West Kalimantan	Natural tropical forest and lake	7,076 ha	Government owned Forest Management Unit (<i>Kesatuan Pengelolaan Hutan</i>) National Park Ecotourism areas managed by communities in two villages, collaborative management approach	Biological diversity conservation Recreational services

During the project, an FSC Ecosystem Services Procedure was established and final policy document published in May 2018. This procedure established new tools to strengthen incentives for the protection of ecosystem services. FSC sees its certification as providing businesses with a ‘safeguard model’: providing a guarantee to potential buyers of FSC-certified products about how social, environmental, and economic values are protected in forests. To effectively apply this to emerging markets for ecosystem services, FSC-certified forest management unit (FMU) concession holders and managers needed to augment this with information about the quantity of the ecosystem service: known as a ‘quality model’. FSC ES certification aimed to do this by develop its own systems and tools for quantifying ecosystem services and incorporating systems developed from other quality models (e.g. Verified Carbon Standard, Gold Standard Foundation). The first tool is the FSC Ecosystem Services Procedure, which allows FSC certificate holders to demonstrate the impact of their forest management activities on ecosystem services. Once impacts are verified, FSC certificate holders can make Ecosystem Services Claims, to provide governments, investors, buyers and businesses with assurance that the impacts they are paying for do preserve ecosystem services. These procedures were included the FSC global strategy as Annex C, as an addition to FSC’s International Generic Indicators. FSC saw this as enabling the promotion and wider adoption of ES tools, riding on the broad interest in ecosystem services among FSC network members [5]. Previously ES had been mainly addressed in FSC Principle 9 on the Maintenance of High Conservation Value Forests. ES certification therefore became embodied as an FSC standard (FSC-STD-60-004 V1-0 EN International Generic Indicators), procedures (FSC-PRO-30-006 Demonstrating the Impact of Forest Stewardship on Ecosystem Services), a discussion paper (FSC-DIS-30-006 Market Tools and Trademark Use for Demonstrated Ecosystem Services Impacts) and guideline (FSC-GUI-30-006 Guidance for demonstrating ecosystem services impacts).

FSC ES certification can be adopted by privately-owned forest concessions and community-owned forests, as long as they can prove their ability to demonstrate their environmental activities. Figure 2 shows how FSC ES certification can be obtained by forest owners and the focus on ES in FSC certification.

Figure 2. ForCES ecosystem services certification process





Source: [24].

ES certification is seen by FSC and the developing partners as part of a broader strategy to increase the market value of sustainable timber and the FSC brand. The explicit attention to ES emphasizes the verification of the outputs, outcomes and impacts of managing and governing forests to maintain and improve ecosystem services. A measurable and verifiable theory of change adapted to the local context is compulsory for forest concession holders seeking ES certification, with assessment methods aiming to be credible through their third party nature, and being replicable due to being based on verifiable information such as scientific publications.

Stakeholders in the ForCES project also sought to stimulate one complementary regulatory process supporting ES. For example, WWF Indonesia worked with the government of Lombok to formulate regulations concerning tourism in a protected area.

Interviewees mentioned concerns about the legitimacy of voluntary standards such as the Round Table for Sustainable Palm Oil (RSPO) certification and a number of cases where FSC has disassociated itself from timber companies, refusing the certification of any wood produced by companies, even if it was harvested in FSC-certified forests [25]. Such dissociation has not happened specifically for ES certification, and the state did not play a role in these affairs as they are internal to the certification systems. This is unlike the role of the state in Indonesian Sustainable Palm Oil certification (ISPO), where the government is certification owner but has also revoked certification for companies not complying with the ISPO standard [26]. The existence of both mandatory, such as the mandatory government ISPO alongside and voluntary standards such as RSPO was also stated to create confusion among public, consumers and private sector.

At least 39 REDD+ and PES projects and schemes have been commenced in Indonesia, which provide another form of NSMD governance of forest ecosystems [27, 28]. These have been implemented by non-governmental organisations and private sector and most were in the design phase or early implementation stages, with the oldest originating from 2001. These projects mainly address two ecosystem services: carbon and watershed protection and vary in terms of payments, some being output based - measuring the additionality of the REDD+ projects to business as usual situation – the most common type of schemes for PES [8] and others are input based. The PES schemes have been developed with small number of stakeholders and communities in sites in Lombok, Kapuas Hulu, West Kalimantan and East Kalimantan. Private sector enterprises and a state company



have been involved in five of the projects as buyers and have used the carbon offsetting system as part of their corporate social responsibility schemes, mainly to avoid planned deforestation.

Zero-deforestation commitments advocating responsible sourcing of agricultural value chain commodities such as palm oil, timber, soya and cacao. These aim to end deforestation caused by activities in the supply chain. By 2018 a number of commitments by the private sector had been announced in Indonesia, most at a definition level, such as the Accountability Framework, and some and identification level such as High Carbon Stock Approach (HCSA) and deforestation and forest degradation monitoring, for example by Global Forest Watch and WWF. State regulations, such as the extended 2017 Moratorium on primary forest clearing and conversion of peatlands, 2016 Palm oil permit moratorium, setting up the Peatland Restoration Agency and 2014 Plantation Act stimulated private-NGO-civil society and research partnerships, such the HCSA initiative between Indonesia’s Palm Oil Smallholder Union, NGOs the Forest Trust and Greenpeace, private sector and later the UNDP. These were later endorsed by the then Deputy Director for International Cooperation and Climate Change Finance at the Ministry of Finance of Indonesia the government “to support the enabling condition to achieve our government’s National Determined Contribution target” [29]. Starting in 2013, companies made forest-related sustainability commitments in their palm oil and pulp and paper value chains in Indonesia termed “No Deforestation, No Peat, No Exploitation” (NDPE). Many of these initiatives have since converged in the form of jurisdictional multi-stakeholder initiatives involving government, companies, and civil society at subnational level, such as the South Sumatra Eco-Region Alliance/Partnership Consortium for Landscape Management and the Central Kalimantan Commitment to Sustainable Palm Oil [30, 31].

4. Discussion: Interrelationships between state and non-state ecosystem services governance arrangements, opportunities and synergies

Transition theory emphasizes that changes cannot be expected to happen overnight or substantially at local, national, regional or global scale. The empirical results of this study reflect this, showing how after seven years ES certification is still in its infancy. In comparison, FSC forest management certification, one of the oldest voluntary sustainability standards, has taken over two decades to become mainstreamed as a form of NSMD recognized in both production landscapes and consumer markets [14, 32]. ES certification was developed as an add-on to FSC certification. This pairing strategy aims to speed both voluntary sustainability certification instruments in gaining traction and uptake from a niche to regime level. FSC is trying to elevate the ES concept to more tangible practices to demonstrate restoration and conservation activities have positive impact on the provision of ecosystem services, evidenced in terms of the pledge in the FSC Global Strategy 2015-2020. ES certification can be seen as a new social-technical system innovation which may take place in the next 20 to 30 years. This prediction is based on the experience of FSC Forest Management certification and Chain of Custody certification, which took around 20 years to become one of the most influential and widely adopted voluntary sustainability certification schemes in the world [14, 33].

4.1. Interactions between voluntary ecosystem services certification and Indonesian state regulations

Transition theory predicts that the planning of novel practices and structural change presuppose each other[18]. In this case in Indonesia, ES certification as a novel practice and governance arrangement was found to interact with state regulations with different complementarities, antagonisms and absences of collaboration, mirroring the interactions conceptualised by Lambin [11], and summarised in Table 3.

Table 3 Interactions between state regulations and non-state market driven ecosystem services governance in Indonesia

Type of interactions	Examples
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<i>Complementary</i>	
<ul style="list-style-type: none">• Private or hybrid instruments reinforce state regulations• Private or hybrid instruments fill policy gaps• State threatens regulations for private sector to adopt voluntary standard• State promotes information sharing and greater transparency• State participates in multi-stakeholder roundtables• State collaborates with NGOs and local communities for natural resource co-management• State encourages private sector standards to converge	<ul style="list-style-type: none">• ES certification fits into the tools (labelling systems) included in Government Regulation No. 46/2017 on Economic Instrument on Environment.• ES Certification fills policy gaps on halting deforestation and promoting sustainability; Fills gaps on how to measure impacts of restoration and conservation projects• No examples found for ES certification. State mandatory standards ISPO for palm oil and SVLK for timber• ES certification reinforces government Indonesian Timber Legality Verification System (<i>Sistem Verifikasi Legalitas Kayu</i>, SVLK).• No examples found for ES certification• State collaboratively working with CSOs and community stakeholders on ecotourism in a ForCES project• No examples for ES certification, but apparent in REDD+ and PES projects
<i>Substituting</i>	
<ul style="list-style-type: none">• State endorses certification in public policies• State adopts certification standards in laws	<ul style="list-style-type: none">• No endorsement by state of ES certification• No aspects of ES certification adopted in laws, although RSPO oil palm certification standards mirrored in ISPO, and aspects of timber legality VPA adopted in SVLK timber legality system
<i>Antagonism</i>	
<ul style="list-style-type: none">• Different instruments propose conflicting management practices and/or different incentives• Standard owner’s dissociation of non-compliant companies.• Existence of norms undermines efforts to develop stronger regulations	<ul style="list-style-type: none">• Various instruments and initiatives define ES inconsistently• Disassociation of companies from FSC and RSPO certification, no state role. Created consumer confusion.• Unclear land tenure makes compliance with ES certification challenging
<i>Absence</i>	
<ul style="list-style-type: none">• Private instruments developed without state involvement• State develops ES certification instruments without private sector involvement	<ul style="list-style-type: none">• ES certification in Indonesia, some limited state involvement in one ForCES project• No example for ES certification

A number of complementary interrelations were found. Multilateral, international environment agreements are known to be important triggers in forming new and reformed regulation as a means of demonstrating international commitments [34]. In this case, Indonesian regulations that address ES were triggered by international agreements such as the UNFCCC, CBD, REDD and Kyoto Protocol. State regulations, particularly on Environmental Economic instruments, created a legal

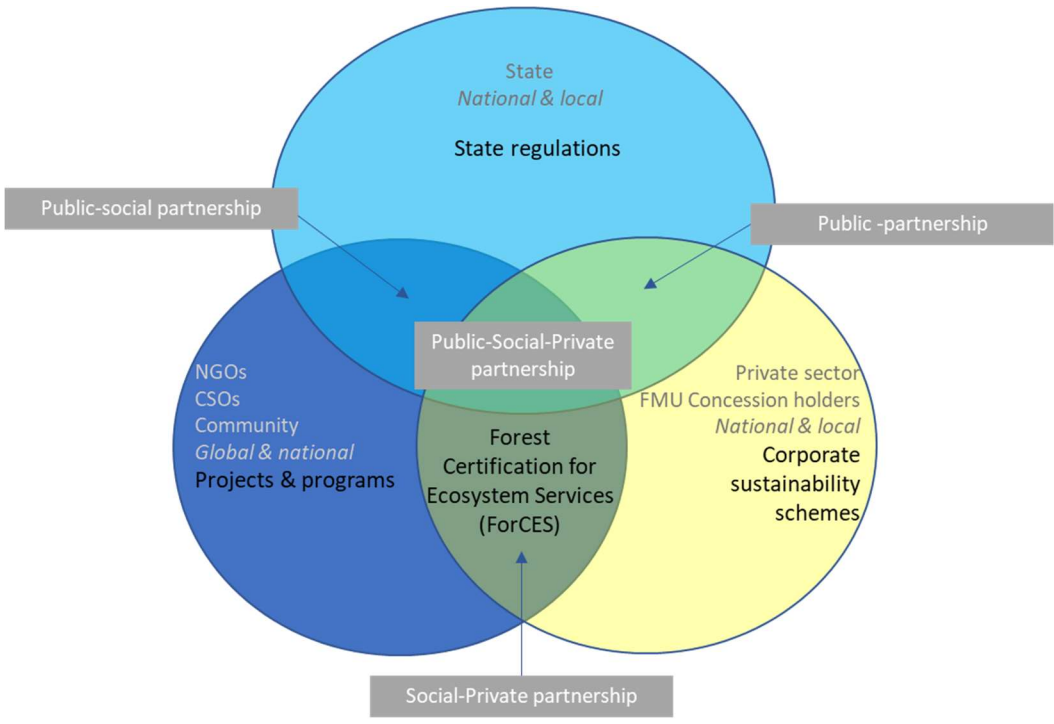


entrance point and enabling condition for market driven governance arrangements, such as the ES certification. However, whilst the Economic Instruments Law talks specifies ecolabels, it does not explicitly specify voluntary sustainability standards, such as ES certification or voluntary certification schemes such as FSC and RSPO, where specific ecosystem services are made explicit.

This experience mirrors Milder and colleagues [35] findings relating to SAN/Rainforest Alliance certification, that policies are sometimes in synergy and sometimes at cross-purposes. This complementarity can create enabling conditions for private governance such as setting up laws and regulations on land rights and deregulating bottlenecks in value chain certification, but multiple laws and regulations in conjuncton with sustainability tools and private initaitves can create difficulties in determing which were effective and contributed to meet sustaianblity goals. Pacheco et al's [36] investigation of the state and private certification regimes governing palm oil supply in Indonesia show a similar situation also how complementarities emerged among instruments with global reach, but that disconnects persist especially within state regulations, between regulations and private standards, and between standards operating across different territorial scales.

In ES certification in Indonesia - shown in Figure 3 - a multi-stakeholder social-private partnership between civil society, private sector and non-governmental entities collaborated to create new type of governance for ecosystem services. This is form of NSMD governance where civil society and industry collaborate, also termed corporate governance [37]. The collaboration has not yet led to public-social-private governance arrangement foreseen by Delmas and Young [38]. This difference may be due to the niche innovation status of ES certification, given that market demand for ES products and certification is not yet well-established and the ForCES project acted as an incubator for creating and testing new sustainability tools [21].

Figure 3. Forest Ecosystem Services Certification governance as a social-private partnership



(adapted from Delmas and Young [38])

As ES certification is in the process of being scaled up in the socio-technical innovation journey, further complementarity could be gained. ES certification has already resulted in changes in FSC certification such as the FSC IGIs and FSC FM National Interpretation, and to upscale further, the civil society, NGO and private sector partners behind ES certification may need to engage with other certification schemes to enact a regime change. ES certification could potentially fill gaps in



commodity value chain certification schemes, which while making some ES explicit, have a commodity limited focus, rather than an ecosystem or landscape. The more holistic approach taken by ES certification and the tools and guideline developed, including the High Conservation Value (HCV) concept, is complimentary with initiatives such as the Accountability Framework Initiative, the Policy Transparency Toolkit (SPOTT), Global Canopy's Forest 500 initiative, the TRASE platform and Global Forest Watch which support monitoring and reporting. The ES certification approach may help fill gaps, particularly when initiatives are in a pilot phase – allowing complementarity to be designed in- and where initiatives do not have global application or do not focus on all or the same commodities. Increased complementarity can enable broader focus on ecosystem services, increase uptake and drive innovation to a regime level.

Equally, ES certification could engage with ES initiatives such as REDD+ and PES projects to increase additionality. Given that the REDD+ and PES projects in Indonesia are more embedded in state regulations, they offer a window of opportunity for ES certification, which provides a developed set of tested tools that both private and state sector can use to measure and verify impacts. ES marketplace websites such as Ecosystem Marketplace and Watershed Projects provide information about the PES projects that also provide opportunities to further develop ES tools, overcome challenges and improve positive impacts. REDD+ projects are more effective when tenure rights are clear [39], but as many REDD+ and PES projects struggle to be effective due to tenure issues [40, 41], and this was problematic in some sites of the ForCES project as well [6], uncertain and contested tenure is also highly likely to hinder ES certification. State lands and natural resources which are used and claimed by communities, invite different interpretations of who has actual rights and responsibilities over them. Government licenses to use or convert forests on community-claimed lands in Indonesia has led to conflict [42]. This in turn can reduce incentives to protect forests.

The growing number of corporate voluntary zero deforestation commitments and multi-stakeholder initiatives can be also seen as an additional, complimentary exogenous factor that may aid adoption of ES certification at a regime level, akin to the way that the High Conservation Value toolkit has been adopted in RSPO and FSC certification [43].

Secondly, some antagonistic interrelations were found among state regulations concerning ES, and between state regulations and ES certification.

Several of the regulations provide conflicting definitions of ES, their scope in terms of land-use, and how ES are measured and governed. Using the lens of transition theory, FSC certification can be seen as an innovation regime, given its development and mainstreaming into market-based governance in the last two decades [32]. The characteristics of an innovation regime, as defined by Grin et al. [18], include clear cognition (indicated by the set of belief systems embodied in the standard and processes, guidance documents with goals and agenda) and norms (embodied in the FSC principles and criteria setting out role relationships, values and behavioural norms). According to this definition, the state regulatory regime has not yet reached an innovation status, as it includes outdated concepts which conflict with recent regulations which have a more explicit focus on ecosystem services e.g. carbon and watershed protection.

Antagonism between state regulations and ES certification occurs mainly due to unclear land and resource tenure norms which undermines efforts to develop stronger regulations and make compliance with ES certification challenging.

Such antagonism between state and private schemes also occurred in the sphere of timber legality certification in Indonesia, where proponents of the four main schemes (FSC, PEFC, LEI, and SVLK) delegitimize each other's schemes, suggesting that legitimacy is a tool in market competition to win market acceptance and share [44]. Although the FSC scheme was considered the best scheme according to the Forest Certification Assessment Guide (FCAG), small-scale forest holders prefer the SVLK scheme, which had the lowest FCAG score, because of its mandatory nature and available subsidies.

Antagonism could be reduced by better linking existing state regulations to private standards at multiple levels, and embracing sectoral and multi-stakeholder approaches of commodity value chain certification and corporate sustainability initiatives, with more integrated territorial, landscape level



management and governance. Accommodating and coordinating multilevel governance in landscapes (such as those in the ForCES project) beset with institutional fragmentation and jurisdictional mismatches, alignment with local initiatives and governance structures, and frameworks to assess and monitor the performance of multi-stakeholder approaches implies moving beyond existing administrative, jurisdictional, and sectorial silos, where multi-stakeholder platforms and bridging organizations and individuals are seen as key [45].

Thirdly, no substitution was found between the state endorsing or adopting ES certification. This maybe however because the concept is too recent. Examples from timber and oil palm certification schemes, which explicitly mention ecosystems services [12, 46], and have a longer process of development show how the state has adopted many of the concepts of timber VPA and palm oil certification. These commodity certification schemes also followed a similar development trajectory: starting as private, civil society and NGO governance arrangements with later state adoption of many concepts in mandatory standards. In 2011 Indonesia's Ministry of Agriculture decreed the mandatory Indonesian Sustainable Palm Oil (ISPO), which with many similarities to the three voluntary, certification systems of Roundtable on Sustainable Palm Oil (RSPO), the International Standard for Carbon Certification (ISCC) and the Sustainable Agriculture Network (SAN). Areas of commonality and difference are apparent. The four standards cover a similar range of topics, but the depth, breadth, and level of detail in addressing key issues varies, reflecting goals of the different initiatives behind each standard but also indicative of a process of converging, emerging norms for sustainable good practices in oil palm [46].

A fourth category, where an absence of interactions was found, was also evident. In this case ES certification was promulgated by adopting NSMD governance, with the ForCES project used to develop the ES standard developed by civil society, non-governmental and research stakeholders as key stakeholders in the agenda-setting and negotiation phase, with only one example of engagement with the Indonesian government. These private-social agents collaborated at niche and regime level to formulate a supporting environment for ForCES and FSC to work the field. Paraphrasing Mokyr's [47] analogy, they prepared the environment for seeds to grow because eventually "the environment into which these seeds are sown is, of course, the main determinant of whether they sprout" or die. Agents in state and non-state systems did not interact to endorse or implement the voluntary standard into a state regulation. This is in contrast to the legally binding Voluntary Partnership Agreement (VPA) on timber legality standards developed between EU and Indonesian public, private and civil society actors to promote trade in legal timber products and improve forest governance. This led to the SVLK Indonesian mandatory timber legality assurance system [48].

4.2. Opportunities to create synergies by closing the gap between translations of ES in state regulations and voluntary certification

Different complementarities, antagonisms and absences of collaboration characterize the current governance arrangements of ecosystem services by the state, private sector and civil society. Building connections and enhancing complementarities could be important ways to gradually reduce antagonisms and fill the voids.

The results of the analysis of Indonesian regulations show that various terms for the concept of ES are used and that these differ and lack consistency, with different regulations using different terms, some without clear definitions, leading to confusion and creating the possibility for different interpretations. State regulations concerning ES are biased against improved forest management due to problems in practice to access credit and the high transaction costs to obtain and process permits, the lack of tenure security and unclear tenure and resource rights and weak institutional capacity to enforce forestry regulations and avoid forest encroachment. These results confirm Lambin et al's [11] findings on the limitations of command-and control instruments. They found uncompensated opportunity costs, a lack of government enforcement, decreased governmental power in response to transnational markets, and unanticipated spill-over effects outside the regulator's jurisdiction.

As the laws on forestry and conservation were enacted over twenty years ago, they largely predate the international and national adoption of ecosystem services. However, the recent



Government Regulation No. 46/2017 on Environmental Economic Instruments provides clearer definitions of types of ES and opening for market driven initiatives which seek to enhance, protect nature and to mitigate impacts on ecosystems. However, this regulation adds to the complexity of existing regulations on natural resources. An abundance of state regulations does not imply their efficacy, particularly when land tenure is in dispute [49].

Ecosystem services are clearly defined in the ES certification standard and procedure, providing a bridge between some state regulations and ES certification, as well as a complimentary bridge to other voluntary commodity certification standards, corporate deforestation commitments, REDD+ and PES.

Given that this study is based on a single, recent case (the ForCES project and resulting ES standard) of market-driven governance, a limited number of informants, and scrutinized only state regulations and policies that directly affect land use (protected areas and other land use restrictions) relating to forestry and agriculture, the generalizability of lessons to other forms of voluntary, market-driven initiatives is limited. Mather [50] notes that state governance of land use has traditionally relied on mixes of command-and-control instruments covering both direct land use policies (such as protected areas and other land use restrictions) with land-based activity policies (such as agricultural and forestry policies) and indirect land use policies (macro-economic, trade, fiscal and property law). As this study scrutinized only state regulations and policies directly affecting land use and agricultural and forestry policies, a wider review of policies is recommended in future studies.

The existence of multiple laws and regulations in parallel with market-driven certification also creates difficulties in unentangling and determining the impacts of the different state and NSMD governance arrangements and determining the effectiveness of each in reaching sustainability goals at different scales [35, 51], enabling policies and private initiatives to be implemented more cost-effectively.

5. Conclusions

This study aimed to understand the interrelationships between ecosystem services certification as a voluntary sustainability standard and state regulations concerning ecosystem services in Indonesia. The study is framed using conceptual frameworks of transition theory and governance, focusing on statutory and non-state market-based governance arrangements and their interrelationships in the agenda setting and negotiation stages of the development of the ES certification.

Public regulations in Indonesia are shifting towards more explicit attention to and governance of ecosystem services. Forests are defined as an ecosystem unit in the form of landscape, containing biological resources dominated by trees, which are not be separate. Therefore, ES are embedded in regulations covering forest ecosystems and their products- mainly timber and non-timber, but also services. Recent regulations have defined the benefits of ecosystems for people and life including the provision of natural resources, natural and environmental arrangements, natural processes and for their cultural values. The many interpretations of ecosystem services in Indonesian regulations and policies however, which appear to trigger confusions i.e. how forest owners and managers should comply with the different regulations. Statutory regulations are mandatory, based on a carrot and stick policy design, creating obligatory requirements for companies and individuals, whilst there are few regulatory or fiscal incentives for compliance with voluntary standards, stakeholders, particularly NGOs and CSOs, and competitive and supply chain based pressure appears to provide an alternative incentive.

The FSC ES certification standard and procedures provide one clear definition of ES compared to the multitude of definitions of ES in state regulations. ES certification is an option under FSC Forest Management Certification, aiming to demonstrate the impact of restoration and conservation initiatives by forest managers in return for monetary incentives.

At all levels of the governance process—agenda setting and negotiation, implementation and monitoring and enforcement, complementary, substituting and antagonistic interrelationships occurred between voluntary sustainability standards as non-state market driven governance



arrangements, and state governance arrangements. An absence of any interrelations was also found. Although the ES certification standard is voluntary, and the Indonesian government was hardly involved in its development, it is generally complementary to state regulations: filling gaps and providing tools to measure benefits and impacts of restoration and conservation activities. As the majority of connections were complementarity, and as FSC certification and ES certification has a strong focus on stakeholder engagement, traction can be gained using an stakeholder approach that includes public, social and private sector stakeholders to reduce antagonistic relationships, which is known to suppress innovation. Antagonism occurs also in the state regulations where various regulations are existing with varying ES terms in the regulations leading to public confusion.

While ES certification is novel to Indonesia and globally, the system appears to have synergies with other market driven ES projects, by allowing the certification of ES and bringing them to the input-based ES market, as well as providing tools to measure and quantify ES.

Two major aspects need to be addressed if the concept of ES certification is to move from a niche to regime innovation. The first is the interlinked issue of transparency, legitimacy and accountability that dogs voluntary NSMD standards in general [52, 53]. Concerns about the lack thereof have led to the counter-development of southern standards [54], such as the Indonesian Sustainable Palm Oil (ISPO) and the Indonesian Timber Legality Verification System (Sistem Verifikasi Legalitas Kayu, SVLK). Also, there have been cases where after pressure and campaigns, certification standards such as FSC have disassociated themselves from companies seen to be not complying with their standards. Experiences with NSMD commodity certification suggest whilst voluntary sustainability standards were introduced as innovations with high expectations of solving multiple sustainability issues including safeguarding ecosystems, they generally have not been a panacea with expected outcomes and impacts [51, 55]. Without support from enabling regulations it is questionable if ES certification can have either the intended impact [51]. or gain a sufficient “logic of appropriateness” as it progresses through the phases of innovation, to garner sufficient legitimacy [1]. The second major barrier is the underlying issue of land and natural resources tenure rights and responsibilities. Without clarification, the potential access, benefits and costs that could accrue from ES certification rest on rocky ground, as has been shown in other NSMD approaches such as PES and REDD+ initiatives [39, 56].

In summary, three types of interactions between ES certification and regulatory governance arrangements were found. The majority of the interrelationships are largely complementary with Indonesian state regulations with non-state arrangements filling policy and regulatory gaps, such as providing tools to verify the impacts of certification as a tool to protect ecosystem services. Voluntary, non-state market driven governance such as certification, some REDD+ and PES schemes and corporate zero deforestation commitments focus mainly on private sector activities – both on producers such as timber concessions but also on companies as buyers and consumers. The development of ES certification in Indonesia has also involved stakeholders such as small-scale farmers, communities, NGOs and civil society organisations, but the state was only involved when protected areas were included in a landscape level initiative. State regulations governing ES are abundant and operate on different scales, with antagonism among state regulations when instruments conflict each other at any different stage of the regulatory process and do not address unclear land tenure, undermining certification. To further the acceptance and adoption of Ecosystem Services certification as an effective non-state market-driven policy instrument for land use governance and conservation, both FSC as a standard organization and its civil society and non-governmental organization, and private sector partners arguably need to engage more with national and local -national policies and regulatory processes to ensure synergistic interactions to move from a niche level innovation to a regime changing socio-technical transformation.

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References

- Bernstein, S. and B. Cashore, *Can non-state global governance be legitimate? An analytical framework*. Regulation & Governance, 2007. 1(4): p. 347-371.
- Romero, C., et al., *An overview of current knowledge about the impacts of forest management certification: A proposed framework for its evaluation*. Vol. 99. 2013: CIFOR.
- Millennium Ecosystem Assessment, *Ecosystems and Human Well-being: Opportunities and Challenges for Business and Industry*. 2005, Island Press: Washington, DC. p. 155.
- FSC. *FSC Ecosystem Services Strategy*. 2015 [14 July 2019]; Available from: <https://ic.fsc.org/preview.fsc-ecosystem-services-strategy-a-6059.pdf>.
- FSC. *ForCES: Creating Incentives to Protect Forests by Certifying Ecosystem Services*. 2017 [14 July 2019]; Available from: <http://forces.fsc.org/download.forces-final-report.58.pdf>.
- FSC. *Market research and business models for new FSC ecosystem services tools: A summary of findings from the ForCES project*. 2017 [14 July 2019]; Available from: <http://forces.fsc.org/download.market-research-and-business-models-for-new-fsc-ecosystem-services-tools-a-summary-of-findings-from-the-forces-project.52.pdf>.
- FSC, FSC-PRO-30-006. *Ecosystem Services Procedure: Impact Demonstration and Market Tools*. V 1.0. 2018, Forest Stewardship Council: Bonn, Germany.
- Smith, S., et al., *Payments for ecosystem services: a best practice guide*. Defra, London, 2013.
- Fripp, E., *Payments for Ecosystem Services (PES): A practical guide to assessing the feasibility of PES projects*. 2014: CIFOR.
- Galanter, M., *The modernization of law*. Modernization: The dynamics of growth, 1966: p. 153-165.
- Lambin, E.F., et al., *Effectiveness and synergies of policy instruments for land use governance in tropical regions*. Global Environmental Change, 2014. 28: p. 129-140.
- Ingram, V., et al., *Governance options to enhance ecosystem services in cocoa, soy, tropical timber and palm oil value chains*. Environmental Management, 2018. 62(1): p. 128-142.
- Cashore, B., et al., *Private or self-regulation? A comparative study of forest certification choices in Canada, the United States and Germany*. Forest Policy and Economics, 2005. 7(1): p. 53-69.
- Gulbrandsen, L.H., *Dynamic governance interactions: Evolutionary effects of state responses to non-state certification programs*. Regulation & Governance, 2014. 8(1): p. 74-92.
- Ingram, V., M.A. Ros-Tonen, and A. Dietz, *A fine mess: Bricolaged forest governance in Cameroon*. International Journal of the Commons, 2015. 9: p. 24.
- Rip, A. and R. Kemp, *Technological change*. Human choice and climate change, 1998. 2(2): p. 327-399.
- Geels, F.W., *The multi-level perspective on sustainability transitions: Responses to seven criticisms*. Environmental innovation and societal transitions, 2011. 1(1): p. 24-40.



- 711 18. Grin, J., J. Rotmans, and J. Schot, *Transitions to sustainable development: new directions in the study of long*
712 *term transformative change*. 2010: Routledge.
- 713 19. Mwangi, E. and A. Wardell, *Multi-level governance of forest resources*. International journal of the
714 Commons, 2012. 6(2): p. 79-103.
- 715 20. Manning, S. and J. Reinecke, *A modular governance architecture in-the-making: How transnational standard-*
716 *setters govern sustainability transitions*. Research Policy, 2016. 45(3): p. 618-633.
- 717 21. Savilaakso, S. and M.R. Guariguata, *Challenges for developing Forest Stewardship Council certification for*
718 *ecosystem services: How to enhance local adoption?* Ecosystem Services, 2017. 28: p. 55-66.
- 719 22. FSC, FSC-STD-01-001. FSC Principles and Criteria (P&C) for Forest Stewardship (FSC-STD-01-001 V5-2).
720 Standard (STD) V(5-2). 2017, FSC Bonn, Germany.
- 721 23. FSC, *Guidance for Demonstrating Ecosystem Services Impacts* FSC-GUI-30-006 V1-0 EN 2018, Forest
722 Stewardship Council: Bonn, Germany.
- 723 24. FSC, *ForCES: Creating Incentives to Protect Forests by Certifying Ecosystem Services*. 2017, Forest
724 Stewardship Council: Bonn.
- 725 25. WWF. *Forest Stewardship Council dissociates with Asia Pulp and Paper*. 2007 Retrieved April 22, 2018];
726 Available from: http://www.wwf.or.jp/activities/upfiles/20080116opt_fsc.pdf.
- 727 26. Hidayat, R.A. *The progress of ISPO system and outlook*. 2019 [cited 13 Janaury 2020; Available from:
728 [https://www.iscc-system.org/wp-content/uploads/2019/11/3_ISPO-Update-and-Outlook-](https://www.iscc-system.org/wp-content/uploads/2019/11/3_ISPO-Update-and-Outlook-compressed.pdf)
729 [compressed.pdf](https://www.iscc-system.org/wp-content/uploads/2019/11/3_ISPO-Update-and-Outlook-compressed.pdf).
- 730 27. Suich, H., et al., *Payments for ecosystem services in Indonesia*. Oryx, 2017. 51(3): p. 489-497.
- 731 28. CIFOR/CEC/CIRAD/IFRI. *International Database on REDD+ projects and programmes. Linking Economic,*
732 *Carbon and Communities data REDD projects database*. 2019 14 July 2019]; Available from:
733 <http://www.reddprojectsdatabase.org/view/projects.php?id=360&name=Indonesia&type=project>
- 734 29. UNEP. *Towards Zero Deforestation*. 31 December 2018 Story - Climate Change. 2018; Available from:
735 <https://www.unenvironment.org/news-and-stories/story/towards-zero-deforestation>.
- 736 30. Miller, E.D., Lujan B., Schaap B., *Collaboration Toward Zero Deforestation Aligning Corporate and National*
737 *Commitments in Brazil and Indonesia*. 2017, Environmental Defence Fund and Forest Trends.
- 738 31. CDP. *From Risk To Reward. Accelerating corporate action in the palm oil sector*. 2018 5 March 2019]; Available
739 from: [https://6fefcbb86e61af1b2fc4-](https://6fefcbb86e61af1b2fc4-c70d8ead6ced550b4d987d7c03fcd1d.ssl.cf3.rackcdn.com/cms/reports/documents/000/004/208/original/CDP_Indonesia_Forest_Report_2018.pdf?1552515691)
740 [c70d8ead6ced550b4d987d7c03fcd1d.ssl.cf3.rackcdn.com/cms/reports/documents/000/004/208/original](https://6fefcbb86e61af1b2fc4-c70d8ead6ced550b4d987d7c03fcd1d.ssl.cf3.rackcdn.com/cms/reports/documents/000/004/208/original/CDP_Indonesia_Forest_Report_2018.pdf?1552515691)
741 [/CDP_Indonesia_Forest_Report_2018.pdf?1552515691](https://6fefcbb86e61af1b2fc4-c70d8ead6ced550b4d987d7c03fcd1d.ssl.cf3.rackcdn.com/cms/reports/documents/000/004/208/original/CDP_Indonesia_Forest_Report_2018.pdf?1552515691).
- 742 32. International Trade Centre (ITC), *The State of Sustainable Markets: Statistics and Emerging Trends* 2015.
743 2015: Geneva. p. xviii, 148 pages
- 744 33. Potts, J., et al., *The State of Sustainability Initiatives Review 2014: Standards and the Green Economy*.
745 International Institute for Sustainable Development and London and the International Institute for
746 Environment and Development, 2017.
- 747 34. Morgan, B. and A. Timoshyna, *Creating synergies between Voluntary Certification Standards (VCS) and*
748 *regulatory frameworks: Case studies from the FairWild Standard*. Policy Matters, 2016. 21: p. 111-125.
- 749 35. Milder, J.C., et al., *Measuring impacts of certification on biodiversity at multiple scales: experience from the*
750 *SAN/Rainforest Alliance system and priorities for the future*. Policy Matters, 2016. 21: p. 14.
- 751 36. Pacheco, P., et al., *The public and private regime complex for governing palm oil supply: What scope for building*
752 *connections and enhancing complementarities?* Vol. 174. 2017: CIFOR.



- 753 37. Stringer, C., *Forest certification and changing global commodity chains*. Journal of Economic Geography, 2006. 6(5): p. 701-722.
- 754
- 755 38. Delmas, M.A. and O.R. Young, *Governance for the environment: New perspectives*. 2009: Cambridge University Press.
- 756
- 757 39. Sunderlin, W.D., et al., *The challenge of establishing REDD+ on the ground: Insights from 23 subnational initiatives in six countries*. Vol. 104. 2014: CIFOR.
- 758
- 759 40. Arts, B., V. Ingram, and M. Brockhaus, *The Performance of REDD+: From Global Governance to Local Practices*. *Forests*, 2019. 10(3).
- 760
- 761 41. Ravikumar, A., et al., *Multilevel governance challenges in transitioning towards a national approach for REDD+: evidence from 23 subnational REDD+ initiatives*. *International Journal of the Commons*, 2015. 9(2).
- 762
- 763 42. Bakker, L. and S. Moniaga, *The space between: Land claims and the law in Indonesia*. *Asian Journal of Social Science*, 2010. 38(2): p. 187-203.
- 764
- 765 43. Brown, E., et al., *Common guidance for the identification of High Conservation Values*. HCV Resource Network, 2013.
- 766
- 767 44. Wibowo, A. and L. Giessen, *From voluntary private to mandatory state governance in Indonesian forest certification: Reclaiming authority by bureaucracies*. *Forest and Society*, 2018. 2(1): p. 28-46.
- 768
- 769 45. Ros-Tonen, M.A.F., J. Reed, and T. Sunderland, *From Synergy to Complexity: The Trend Toward Integrated Value Chain and Landscape Governance*. *Environmental Management*, 2018. 62: p. 1-14.
- 770
- 771 46. Yaap, B. and G. Paoli, *A Comparison of Leading Palm Oil Certification Standards Applied in Indonesia. Towards Defining Emerging Norms of Good Practices*, in *Full Report 2014*, Daemeter: Bogor, Indonesia.
- 772
- 773 47. Mokyr, J., *The lever of riches: Technological creativity and economic progress*. 1992: Oxford University Press.
- 774
- 775 48. Setyowati, A. and C.L. McDermott, *Commodifying legality? Who and what counts as legal in the Indonesian wood trade*. *Society & Natural Resources*, 2017. 30(6): p. 750-764.
- 776
- 777 49. Wright, G., *Indigenous people and customary land ownership under domestic REDD+ frameworks: A case study of Indonesia*. *Law Env't & Dev. J.*, 2011. 7: p. 117.
- 778
- 779 50. Mather, A.S., *Land-use policies*, in *Our Earth's Changing Land: An Encyclopedia of Land-use and Land-cover Change*, H.J. Geist, Editor. 2006, Greenwood Press: Westport, London. p. 375-379.
- 780
- 781 51. Ingram, V., et al., *The Impacts of Cocoa Sustainability Initiatives in West Africa*. *Sustainability*, 2018. 10(11): p. 4249.
- 782
- 783 52. Cashore, B., *Legitimacy and the privatization of environmental governance: How non-state market-driven (NSMD) governance systems gain rule-making authority*. *Governance*, 2002. 15(4): p. 503-529.
- 784
- 785 53. Auld, G. and L.H. Gulbrandsen, *Transparency in nonstate certification: consequences for accountability and legitimacy*. *Global Environmental Politics*, 2010. 10(3): p. 97-119.
- 786
- 787 54. Schouten, G. and V. Bitzer, *The emergence of Southern standards in agricultural value chains: A new trend in sustainability governance?* *Ecological economics*, 2015. 120: p. 175-184.
- 788
- 789 55. Potts, J., et al., *The State of Sustainability Initiatives Review 2014 Standards and the Green Economy*. 2014, State of Sustainability Initiatives London.
- 790
- 791 56. Mahanty, S., H. Suich, and L. Tacconi, *Access and benefits in payments for environmental services and implications for REDD+: Lessons from seven PES schemes*. *Land use policy*, 2013. 31: p. 38-47.

